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## World AIDS Day — December 1, 2014

World AIDS Day draws attention to the current status of the human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) epidemic worldwide. The theme for this year's observance on December 1 is "Focus, Partner, Achieve: An AIDS-Free Generation."

The first cases of AIDS were reported more than 30 years ago in the June 5, 1981 issue of *MMWR*. Today, an estimated 35 million persons are living with HIV infection (*1*). Although AIDS-related deaths have fallen by 35% since 2005, an estimated 1.5 million persons died from AIDS in 2013 (*1*).

Global efforts, including the President's Emergency Plan for AIDS Relief (in which CDC is a principal agency), have resulted in approximately 11.7 million persons in low-income and middle-income countries receiving antiretroviral therapy for HIV infection in 2013 (*1*). This is nearly 2 million more persons than in 2012 (*1*).

In the United States, nearly 648,500 persons diagnosed with AIDS have died since the first cases were reported (*2*), and approximately 50,000 persons become infected with HIV each year (*3*). An estimated 1.2 million persons in the United States are living with HIV infection (*4*).

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# Antiretroviral Therapy Enrollment Characteristics and Outcomes Among HIV-Infected Adolescents and Young Adults Compared with Older Adults — Seven African Countries, 2004–2013

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Although scale-up of antiretroviral therapy (ART) since 2005 has contributed to declines of about 30% in the global annual number of human immunodeficiency (HIV)-related

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deaths and declines in global HIV incidence,* estimated annual HIV-related deaths among adolescents have increased by about 50% (*1*) and estimated adolescent HIV incidence has been relatively stable.† In 2012, an estimated 2,500 (40%) of all 6,300 daily new HIV infections occurred among persons aged 15–24 years.§ Difficulty enrolling adolescents and young adults in ART and high rates of loss to follow-up (LTFU) after ART initiation might be contributing to mortality and HIV incidence in this age group, but data are limited (*2*). To evaluate age-related ART retention challenges, data from retrospective cohort studies conducted in seven African countries among 16,421 patients, aged ≥15 years at enrollment, who initiated ART during 2004–2012 were analyzed. ART enrollment and outcome data were compared among three groups defined by age at enrollment: adolescents and young adults (aged 15–24 years), middle-aged adults (aged 25–49 years), and older adults (aged ≥50 years). Enrollees aged 15–24 years were predominantly female (81%–92%), commonly pregnant (3%–32% of females), unmarried (54%–73%), and, in four countries with employment data, unemployed (53%–86%). In comparison, older adults were more likely to be male (p<0.001), employed (p<0.001), and married, (p<0.05 in five countries). Compared with older adults, adolescents and young adults had higher LTFU rates in all seven countries, reaching statistical significance in three countries in crude and multivariable analyses. Evidence-based interventions to reduce LTFU for adolescent and young adult ART enrollees could help reduce mortality and HIV incidence in this age group.

In each of seven countries (Côte d'Ivoire, Nigeria, Swaziland, Mozambique, Zambia, Uganda, and Tanzania), a representative sample of ART facilities was selected using either probability-proportional-to-size sampling or purposeful (nonrandom) sampling (Table 1). At each selected facility, a sample frame of study-eligible ART patients was created, and simple random sampling used to select the desired sample size. Eligibility criteria included having started ART during 2004–2012 and ≥6 months before data abstraction. Data were abstracted from ART medical records onto standard forms.

Mortality and LTFU were the primary outcomes of interest. A patient was considered LTFU if he/she had not attended the facility in the 90 days preceding data abstraction for a medication refill, a laboratory visit, or a clinician visit. Mortality ascertainment occurred largely through passive reporting to the health facility by family or friends, and to a lesser extent, through country-specific tracing activities to locate patients late for clinic appointments.

Study design was controlled for during analysis. Age at ART initiation was divided into three age categories (*3*): 15–24 years,

* Information available at http://www.unaids.org/en/media/unaids/contentassets/documents/epidemiology/2013/gr2013/UNAIDS_Global_Report_2013_en.pdf.

† Sources: Kasedde S, Luo C, McClure C, Chandan U. Reducing HIV and AIDS in adolescents: opportunities and challenges. Curr HIV/AIDS Rep 2013;10:159–68; and UNAIDS. Report on the Global AIDS Epidemic, 2012, unpublished estimates; Spectrum 2012.

§ Information available at http://www.unaids.org/sites/default/files/en/media/unaids/contentassets/documents/epidemiology/2012/gr2012/JC2434_WorldAIDSday_results_en.pdf.

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**TABLE 1. Summary of sampling strategies to select cohorts of enrollees for antiretroviral therapy (ART) — seven African countries, 2004–2013**

| | Stage 1: Selection of study facilities | | | | | | | Stage 2: Selection of study patients | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region and country | No. of ART clinics | No. of ART enrollees at ART clinics | Clinic eligibility criteria for study | No. of study-eligible clinics | Estimated no. of study-eligible adult ART enrollees at study-eligible clinics | Site sampling technique | No. of clinics selected | Age-eligibility criteria (age at ART initiation) | ART enrollment years | Patient sampling technique at selected study clinics | Planned sample size | No. of eligible patient charts abstracted | Date of data collection |
| **West Africa** | | | | | | | | | | | | | |
| Côte d'Ivoire | 124 by Dec 2007 | 36,943 | Enrolled ≥50 adults by Dec 2007 | 78 | 36,110 | PPS | 34 | Adults aged ≥15 yrs | 2004–2007 | SRS | 4,000 | 3,682 | Nov 2009–March 2010 |
| Nigeria | 178 by Dec 2009 | 168,335 | Enrolled ≥50 adults by Dec 2009 | 139 | 167,438 | PPS | 35 | Adults aged ≥15 yrs | 2004–2012 | SRS | 3,500 | 3,496 | Dec 2012–Aug 2013 |
| **Southern Africa** | | | | | | | | | | | | | |
| Swaziland | 31 by Dec 2009 | 50,767 | All ART initiation sites eligible | 31 | 50,767 | PPS | 16 | Adults aged ≥15 yrs | 2004–2010 | SRS | 2,500 | 2,510 | Nov 2011–Feb 2012 |
| Mozambique | 152 by Dec 2006 | 43,295 | Enrolled ≥50 adults by Dec 2006 | 94 | 42,234 | PPS | 30 | Adults aged ≥15 yrs | 2004–2007 | SRS | 2,600 | 2,596 | Sept–Nov 2008 |
| Zambia | 322 by Dec 2007 | 65,383 | Enrolled ≥300 adults by Dec 2007 | 129* | 58,845* | Purposeful | 6 | Adults aged ≥15 yrs | 2004–2009 | SRS | 1,500 | 1,214† | April–July 2010 |
| **East Africa** | | | | | | | | | | | | | |
| Uganda | 286 by Dec 2007 | 45,946 | Enrolled ≥300 adults by Dec 2007 | 114* | 41,351* | Purposeful | 6 | Adults aged ≥15 yrs | 2004–2009 | SRS | 1,500 | 1,466§ | April–July 2010 |
| Tanzania | 210 by Dec 2007 | 41,920 | Enrolled ≥300 adults by Dec 2007 | 85 | 37,728* | Purposeful | 6 | Adults aged ≥18 yrs | 2004–2009 | SRS | 1,500 | 1,457¶ | April–July 2010 |
| **Total** | | **452,589** | | **670** | **434,473** | | **133** | | | | **17,100** | **16,421** | |

**Abbreviations:** PPS = probability-proportional-to-size; SRS = simple random sampling.
* Estimates based on available published data.
† In Zambia, from 1,457 records sampled, 243 were excluded because of noncompliance with simple random sampling procedures at one site.
§ In Uganda, from 1,472 records samples, six patients were excluded because of absence of age data at ART initiation.
¶ In Tanzania, from 1,458 records samples, one patient was excluded because of absence of age data at ART initiation.

25–49 years, and ≥50 years. Differences in demographic and clinical characteristics across age groups were assessed using chi-square tests for categorical variables and unadjusted linear regression models for continuous variables.

To estimate the association between age group and rates of death and LTFU, Cox proportional hazards regression models were used to estimate unadjusted and adjusted hazard ratios for each outcome separately. For the multivariable analysis, to best manage missing baseline demographic or clinical data, multiple imputation with chained equations was used to impute missing data included in the model (*4*). Twenty imputed datasets were created for each outcome: death and LTFU (*4*). The imputation model included the event indicator, all study variables, and the Nelson-Aalen estimate of cumulative hazard (*4*). The proportional hazards assumption was assessed using visual methods and the Grambsch and Therneu test.

Demographic and clinical characteristics of adults at ART initiation were compared across age groups by country (Table 2). Age distribution was relatively constant across countries, with 5%–16% aged 15–24 years, 70%–86% aged 25–49 years, and 8%–14% aged ≥50 years. In all seven countries, the youngest age group was almost exclusively female (81%–92%), and the

**TABLE 2. Demographic and clinical characteristics of patients at initiation of antiretroviral therapy (ART) — seven African countries, 2004–2012***

| Characteristic and age group (yrs) | Côte d'Ivoire† (N = 3,682) | | Nigeria† (N = 3,496) | | Swaziland† (N = 2,510) | | Mozambique† (N = 2,596) | | Zambia (N = 1,214) | | Tanzania (N = 1,457 ) | | Uganda (N = 1,466) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Age at ART initiation (No. and %)** | | | | | | | | | | | | | | |
| 15–24 | 188 | 5% | 399 | 11% | 398 | 16% | 284 | 12% | 95 | 8% | 83 | 6% | 95 | 6% |
| 25–49 | 3,087 | 83% | 2,805 | 81% | 1,759 | 70% | 2,069 | 79% | 1,000 | 82% | 1,198 | 82% | 1,261 | 86% |
| ≥50 | 407 | 12% | 292 | 9% | 353 | 14% | 243 | 10% | 119 | 10% | 176 | 12% | 110 | 8% |
| **Female (No. and %)** | | | | | | | | | | | | | | |
| 15–24 | 166 | 87% | 366 | 92% | 326 | 82% | 45 | 86% | 82 | 86% | 73 | 88% | 77 | 81% |
| 25–49 | 2,077 | 68% | 1,808 | 64% | 1,120 | 64% | 838 | 60% | 599 | 60% | 813 | 68% | 837 | 66% |
| ≥50 | 179 | 46% | 146 | 51% | 175 | 49% | 137 | 48% | 45 | 38% | 87 | 49% | 50 | 45% |
| p–value | **<0.001**§ | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | |
| **Among females, pregnant (No. and %)** | | | | | | | | | | | | | | |
| 15–24 | 4 | 3% | 56 | 16% | 82 | 26% | 61 | 30% | 15 | 32% | — | | 25 | 18% |
| 25–49 | 64 | 4% | 188 | 10% | 117 | 11% | 138 | 14% | 56 | 12% | — | | 102 | 9% |
| ≥50 | 0 | 0% | 0 | 0% | 2 | 1% | 0 | 0% | 0 | 0% | — | | 0 | 0% |
| p-value | 0.567 | | **<0.001** | | **<0.001** | | **0.002** | | **0.003** | | | | **<0.001** | |
| **Married/Civil union (No. and %)** | | | | | | | | | | | | | | |
| 15–24 | 41 | 27% | 177 | 43% | 85 | 28% | 99 | 41% | 38 | 46% | 28 | 41% | 21 | 34% |
| 25–49 | 1,393 | 50% | 1,795 | 64% | 725 | 47% | 999 | 55% | 520 | 60% | 505 | 53% | 431 | 43% |
| ≥50 | 202 | 54% | 200 | 67% | 190 | 65% | 113 | 55% | 67 | 64% | 71 | 49% | 40 | 43% |
| Missing | 414 | 11% | 86 | 2% | 384 | 15% | 233 | 9% | 166 | 14% | 299 | 21% | 313 | 21% |
| p-value | **<0.001** | | **<0.001** | | **<0.001** | | **0.001** | | **0.022** | | 0.115 | | 0.354 | |
| **Employed (No. and %)** | | | | | | | | | | | | | | |
| 15–24 | 59 | 47% | 91 | 30% | 68 | 31% | 28 | 14% | — | | — | | — | |
| 25–49 | 1,394 | 63% | 1,541 | 66% | 551 | 48% | 860 | 49% | — | | — | | — | |
| ≥50 | 148 | 53% | 165 | 70% | 73 | 32% | 104 | 56% | — | | — | | — | |
| Missing | 1,081 | 29% | 420 | 12% | 925 | 37% | 328 | 13% | | | | | | |
| p-value | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | | | | | | |
| **Baseline weight (No. and median [kg])** | | | | | | | | | | | | | | |
| 15–24 | 162 | 49.0 | 371 | 52.0 | 356 | 58.0 | 223 | 50.0 | 83 | 49.0 | 80 | 48.2 | 86 | 52.7 |
| 25–49 | 2,743 | 53.0 | 2589 | 57.0 | 1575 | 60.0 | 1,658 | 54.5 | 882 | 53.0 | 1,163 | 51.1 | 1,145 | 55.0 |
| ≥50 | 351 | 54.0 | 274 | 57.0 | 301 | 59.9 | 180 | 52.5 | 108 | 55.0 | 172 | 50.2 | 101 | 56.0 |
| Missing | 426 | 12% | 262 | 7% | 278 | 11% | 535 | 21% | 141 | 12% | 42 | 3% | 134 | 9% |
| p-value | **0.005** | | **<0.001** | | **0.024** | | **0.015** | | **0.001** | | 0.296 | | **0.001** | |
| **WHO clinical stage 4 (No. and %)** | | | | | | | | | | | | | | |
| 15–24 | 25 | 18% | 25 | 5% | 22 | 6% | 32 | 20% | 11 | 13% | 20 | 29% | 12 | 14% |
| 25–49 | 462 | 22% | 197 | 8% | 218 | 13% | 205 | 15% | 96 | 11% | 257 | 27% | 137 | 12% |
| ≥50 | 67 | 25% | 24 | 11% | 53 | 16% | 22 | 15% | 5 | 5% | 48 | 35% | 11 | 12% |
| Missing | 1,101 | 30% | 232 | 7% | 290 | 12% | 979 | 38% | 157 | 13% | 293 | 20% | 164 | 11% |
| p-value | 0.468 | | **0.012** | | **<0.001** | | 0.066 | | 0.100 | | **<0.001** | | 0.551 | |
| **Baseline CD4 count (No. and median [cells/$\mu$L])** | | | | | | | | | | | | | | |
| 15–24 | 165 | 122 | 320 | 192 | 359 | 158 | 249 | 175 | 69 | 147 | 50 | 175 | 76 | 161 |
| 25–49 | 2,811 | 136 | 2321 | 157 | 1618 | 141 | 1,794 | 157 | 701 | 128 | 933 | 126 | 1,011 | 133 |
| ≥50 | 367 | 132 | 244 | 142 | 319 | 160 | 211 | 133 | 79 | 158 | 137 | 160 | 79 | 147 |
| Missing | 339 | 9% | 611 | 17% | 214 | 9% | 342 | 13% | 365 | 30% | 337 | 23% | 300 | 20% |
| p-value | 0.216 | | **0.004** | | 0.139 | | 0.077 | | 0.704 | | 0.243 | | 0.501 | |
| **Baseline hemoglobin (No. and median [g/dL])** | | | | | | | | | | | | | | |
| 15–24 | 156 | 10.0 | 190 | 10.3 | 229 | 10.7 | 211 | 9.4 | 52 | 10.1 | 37 | 9.6 | 55 | 11.5 |
| 25–49 | 2,646 | 9.9 | 1,365 | 10.3 | 1165 | 11.2 | 1,515 | 10.2 | 582 | 10.6 | 648 | 10.2 | 748 | 11.9 |
| ≥50 | 347 | 9.9 | 145 | 10.8 | 218 | 11.6 | 173 | 10.6 | 70 | 11.6 | 90 | 10.9 | 62 | 12.1 |
| Missing | 533 | 14% | 1,796 | 51% | 898 | 36% | 697 | 27% | 510 | 42% | 682 | 47% | 601 | 41% |
| p-value | 0.524 | | 0.690 | | **<0.001** | | **<0.001** | | **0.002** | | **0.028** | | 0.306 | |

**Abbreviation:** WHO = World Health Organization.
* Although the study captured patient follow-up time through 2013, all patients started ART during the period 2004–2012.
† Proportions from Côte d'Ivoire, Nigeria, Swaziland, and Mozambique are weighted to account for sampling design.
† Bold-typed p-values are statistically significant (p<0.05).

middle-age group mostly female (60%–68%); in contrast, the oldest age group was mostly male in all countries, except Nigeria. In the six countries with data on pregnancy at ART enrollment, pregnancy prevalence was highest in the youngest age group in five countries, where it ranged from 16% to 32%. In all seven countries, being married or in a civil union was least common in the youngest age group (27%–46%), reaching statistical significance in five countries. In the four countries

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

Although scale-up of antiretroviral therapy (ART) since 2005 has contributed to a decline of about 30% in the global annual number of human immunodeficiency (HIV)–related deaths and declines in global HIV incidence, estimated annual HIV-related deaths among adolescents have increased by about 50%, and estimated adolescent HIV incidence has been relatively stable. In 2012, an estimated 2,500 (40%) of all 6,300 daily new HIV infections occurred among persons aged 15–24 years. Difficulty enrolling adolescents and young adults in ART and high rates of loss to follow-up (LTFU) after ART initiation might be contributing to mortality and HIV incidence in this age group, but data are limited.

**What is added by this report?**

Age-related differences in enrollment characteristics and outcomes were analyzed among 16,421 patients aged ≥15 years starting ART in seven African countries (Côte d'Ivoire, Nigeria, Swaziland, Mozambique, Zambia, Uganda, and Tanzania) during 2004–2012. Patient characteristics and outcomes were compared across three age groups: adolescents and young adults (15–24 years), middle-aged adults (25–49 years), and older adults (≥50 years). Compared with older adults, adolescents and young adults had higher LTFU rates in all seven countries, reaching statistical significance in three countries (Côte d'Ivoire, Mozambique, and Tanzania) in both crude and multivariable analyses.

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

The higher risk for LTFU among adolescent and young adult ART enrollees, compared with older adults, increases their risk for death and increases the risk they will transmit HIV to seronegative sex partners. Effective interventions to reduce LTFU for adolescent and young adult ART enrollees could help reduce mortality and lower HIV incidence in this age group.

with data on employment status, the youngest age group was least likely to be employed at the time of ART enrollment (14%–47%) (p<0.05).

In all seven countries, median baseline weight was lowest in the youngest age group (48.2–58.0 kg), reaching statistical significance in six countries. In three countries (Nigeria, Swaziland, and Tanzania), prevalence of World Health Organization clinical stage 4 at ART initiation differed across age groups, tending to be lowest in the youngest and highest in the oldest age group (p<0.05). Median baseline CD4 count was similar across age groups in all countries, except Nigeria, where the median was highest in the youngest age group (p=0.004). Median baseline hemoglobin was significantly lower in the youngest age group in four countries (9.4–10.7 g/dL).

Compared with older adults, rates of LTFU were higher in the youngest age group in all seven countries, reaching statistical significance in unadjusted analyses in three countries (Côte d'Ivoire (p=0.005), Mozambique (p<0.001), and Tanzania (p=0.005)) (Table 3). Even after adjusting for baseline demographic and clinical characteristics, rates of LTFU were 1.66–2.45 times as high in the youngest compared with the oldest age group in these three countries (Côte d'Ivoire [p=0.001], Mozambique [p=0.002], and Tanzania [p<0.001]).

In two countries (Swaziland and Uganda), the oldest age group had significantly higher rates of documented mortality than younger age groups (Table 3), and older age remained a significant predictor of mortality even in multivariable analyses.

## Discussion

The three main findings based on the experience of the seven African countries are as follows: 1) adolescents and young adults differed significantly from older adults in ART enrollment characteristics; 2) adolescents and young adults tended to have higher LTFU rates; and 3) in two countries (Uganda and Swaziland), adults ≥50 years had higher documented mortality rates.

Adolescent and young adult ART enrollees were almost exclusively female, commonly pregnant, unmarried, and unemployed. The observation that median weight was lowest among adolescents and young adults could be explained by expected weight-for-age growth, sex differences in weight, or undernutrition. Similarly, the observation that median hemoglobin tended to be lowest in the youngest age group might reflect predominantly female sex or higher prevalence of undernutrition.

Available data suggest that this group of predominantly female adolescent and young adult ART enrollees represents a socially vulnerable population (*2*). Although rates of HIV-related mortality and HIV incidence have declined globally since 2005, mortality has increased and HIV incidence remained relatively stable among adolescents, with the majority of adolescent deaths and new HIV infections occurring in sub-Saharan Africa (*2*). In African countries with generalized epidemics, being young, female, and unemployed increases the risk for voluntary or coerced sexual contact with older, HIV-infected men (*2*); this might partly explain HIV infection at a young age among some of the female adolescent and young adult ART enrollees described in this report. Factors that possibly explain high LTFU rates among adolescent and young adult ART enrollees might include stigma (*2*), lack of money for transport (*5*), child care responsibilities, and migration for work (*6*). LTFU from ART is associated with significant increases in mortality risk (*7*). A recent meta-analysis suggests that 20%–60% of patients lost to follow-up die, with most of these deaths occurring after default from ART (*7*). Therefore, difficulties in preventing LTFU among adolescent and young adults on ART might be a contributor to HIV-related mortality in this age group. Suboptimal ART adherence among adolescents might also be contributing to adolescent mortality (*1*).

**TABLE 3. Association between age group at initiation of antiretroviral therapy and rates of loss to follow-up and death — seven African countries, 2004–2013**

| Country | Age group (yrs) | No. | Lost to follow-up: Rate (per 100) | Crude HR | Crude (95% CI) | Crude p-value | Adjusted AHR* | Adjusted (95% CI) | Adjusted p-value | Died: Rate (per 100) | Crude HR | Crude (95% CI) | Crude p-value | Adjusted AHR* | Adjusted (95% CI) | Adjusted p-value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Côte d'Ivoire** | | | | | | | | | | | | | | | | |
| | ≥50 | 407 | 14.5 | 1.00 | — | — | 1.00 | — | — | 4.2 | 1.00 | — | — | 1.00 | — | — |
| | 25–49 | 3,087 | 17.5 | 1.21 | (0.92–1.59) | 0.171 | 1.33 | (1.00–1.77) | **0.052**† | 2.9 | 0.68 | (0.45–1.05) | **0.077** | 0.76 | (0.51–1.12) | 0.155 |
| | 15–24 | 188 | 23.0 | 1.54 | (1.15–2.04) | **0.005** | 1.66 | (1.24–2.22) | **0.001** | 3.8 | 0.87 | (0.37–2.03) | 0.732 | 0.97 | (0.43–2.18) | 0.935 |
| **Nigeria** | | | | | | | | | | | | | | | | |
| | ≥50 | 399 | 15.3 | 1.00 | — | — | 1.00 | — | — | 1.5 | 1.00 | — | — | 1.00 | — | — |
| | 25–49 | 2,805 | 13.7 | 0.91 | (0.70–1.18) | 0.446 | 0.94 | (0.73–1.22) | 0.640 | 1.1 | 0.79 | (0.43–1.46) | 0.441 | 0.89 | (0.47–1.68) | 0.714 |
| | 15–24 | 292 | 16.5 | 1.09 | (0.79–1.50) | 0.604 | 1.04 | (0.75–1.44) | 0.818 | 0.8 | 0.51 | (0.20–1.34) | 0.166 | 0.74 | (0.30–1.86) | 0.514 |
| **Swaziland**§ | | | | | | | | | | | | | | | | |
| | ≥50 | 353 | 11.0 | 1.00 | — | — | 1.00 | — | — | 3.0 | 1.00 | — | — | 1.00 | — | — |
| | 25–49 | 1,759 | 11.4 | 1.06 | (0.91–1.23) | 0.452 | 0.99 | (0.81–1.20) | 0.887 | 1.9 | 0.66 | (0.46–0.93) | **0.021** | **0.56** | (0.39–0.81) | **0.006** |
| | 15–24 | 398 | 13.2 | 1.26 | (0.94–1.70) | 0.113 | 1.22 | (0.89–1.68) | 0.198 | 1.9 | 0.65 | (0.46–0.92) | **0.018** | **0.58** | (0.38–0.90) | **0.019** |
| **Mozambique** | | | | | | | | | | | | | | | | |
| | ≥50 | 243 | 16.4 | 1.00 | — | — | 1.00 | — | — | 3.8 | 1.00 | — | — | 1.00 | — | — |
| | 25–49 | 2,069 | 14.4 | 0.96 | (0.78–1.18) | 0.686 | 1.02 | (0.79–1.32) | 0.872 | 3.2 | 0.94 | (0.55–1.59) | 0.805 | 1.10 | (0.62–1.96) | 0.733 |
| | 15–24 | 284 | 28.4 | 1.80 | (1.46–2.21) | **<0.001** | 1.76 | (1.27–2.43) | **0.002** | 5.0 | 1.40 | (0.72–2.71) | 0.296 | 1.33 | (0.72–2.45) | 0.339 |
| **Zambia** | | | | | | | | | | | | | | | | |
| | ≥50 | 95 | 21.4 | 1.00 | — | — | 1.00 | — | — | 3.6 | 1.00 | — | — | 1.00 | — | — |
| | 25–49 | 1,000 | 21.7 | 1.01 | (0.75–1.37) | 0.928 | 0.94 | (0.69–1.29) | 0.722 | 2.3 | 0.63 | (0.29–1.33) | 0.223 | 0.66 | (0.30–1.47) | 0.312 |
| | 15–24 | 119 | 25.6 | 1.14 | (0.75–1.74) | 0.539 | 1.21 | (0.78–1.89) | 0.393 | 5.1 | 1.32 | (0.49–3.51) | 0.582 | 1.26 | (0.43–3.71) | 0.679 |
| **Tanzania** | | | | | | | | | | | | | | | | |
| | ≥50 | 83 | 13.0 | 1.00 | — | — | 1.00 | — | — | 8.0 | 1.00 | — | — | 1.00 | — | — |
| | 25–49 | 1,198 | 17.8 | 1.36 | (0.98–1.90) | **0.067** | 1.47 | (1.05–2.06) | **0.024** | 6.4 | 0.80 | (0.52–1.23) | 0.309 | 0.90 | (0.58–1.42) | 0.661 |
| | 15–24 | 176 | 30.1 | 2.01 | (1.24–3.25) | **0.005** | 2.45 | (1.50–4.01) | **<0.001** | 13.5 | 1.37 | (0.70–2.70) | 0.358 | 1.40 | (0.69–2.82) | 0.354 |
| **Uganda** | | | | | | | | | | | | | | | | |
| | ≥50 | 95 | 6.0 | 1.00 | — | — | 1.00 | — | — | 2.8 | 1.00 | — | — | 1.00 | — | — |
| | 25–49 | 1,261 | 7.6 | 1.29 | (0.76–2.17) | 0.346 | 1.37 | (0.81–2.34) | 0.240 | 1.0 | 0.35 | (0.15–0.80) | **0.013** | **0.31** | (0.13–0.76) | **0.010** |
| | 15–24 | 110 | 7.1 | 1.18 | (0.57–2.44) | 0.664 | 1.19 | (0.56–2.51) | 0.647 | 1.0 | 0.34 | (0.07–1.66) | 0.184 | **0.25** | (0.05–1.29) | **0.098** |

**Abbreviations:** HR = hazard ratio; CI = confidence interval; AHR = adjusted hazard ratio.
* All variables presented in the table were included in the multivariable model for each country.
† Bold-typed p-values are statistically significant (p<0.05) or borderline significant (p=0.05–0.10).
§ In Swaziland, the study was designed to assess the effect of interfacility transfer of stable patients (down-referral) on risk for loss to follow-up, and this time-varying covariate was included in the multivariable model in addition to variables presented in the table.

High rates of LTFU among adolescent and young adult ART enrollees is also concerning from a prevention perspective, because LTFU patients are at risk for transmitting HIV to seronegative partners once ART is discontinued and viral load no longer suppressed (*8*). High rates of LTFU among young women, among whom the prevalence of pregnancy is high, also increases the likelihood of mother-to-child HIV transmission.

Adult ART enrollees aged ≥50 years were mostly male, commonly married, and employed. In two countries, this age group had higher documented mortality, similar to findings in other studies (*9*). Higher mortality in this oldest age group should probably be expected because of higher background rates of mortality in the older general population. However, HIV-related reasons for higher mortality in the oldest age group might include slower ART-induced CD4 restoration among older patients (*3*) or incidence of HIV-associated noncommunicable diseases, especially atherosclerotic disease (*10*).

The findings in this report are subject to at least four limitations. First, missing data might have introduced nondifferential measurement error. Second, because of differences in cohort size, there was greater power to detect covariate effect sizes in Côte d'Ivoire, Nigeria, Swaziland, and Mozambique than in Zambia, Uganda, and Tanzania. Third, in Zambia, Uganda, and Tanzania, clinics were purposefully selected, limiting generalizability of findings. Finally, limited active tracing for defaulting patients might have resulted in overestimates of LTFU and underestimates of mortality.

The main finding of this report is that adolescent and young adult ART enrollees differ significantly from older adults in demographic and clinical characteristics and are at higher risk for LTFU. Effective interventions to reduce LTFU for adolescent and young adult ART enrollees could help reduce mortality and HIV incidence in this age group.

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# Provision of Antiretroviral Therapy for HIV-Positive TB Patients — 19 Countries, Sub-Saharan Africa, 2009–2013

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Considerable progress has been made in the provision of life-saving antiretroviral therapy (ART) for persons with human immunodeficiency virus (HIV) infection worldwide, resulting in an overall decrease in HIV incidence and acquired immunodeficiency syndrome (AIDS)–related mortality (*1*). In the strategic scale-up of HIV care and treatment programs, persons with HIV and tuberculosis (TB) are a priority population for receiving ART. TB is the leading cause of death among persons living with HIV in sub-Saharan Africa and remains a potential risk to the estimated 35 million persons living with HIV globally (*1*). Of the 9 million new cases of TB disease globally in 2013, an estimated 1.1 million (13%) were among persons living with HIV; of the 1.5 million deaths attributed to TB in 2013, a total of 360,000 (24%) were among persons living with HIV (*2*). ART reduces the incidence of HIV-associated TB disease, and early initiation of ART after the start of TB treatment reduces progression of HIV infection and death among HIV-positive TB patients (*3*–*5*). To assess the progress in scaling up ART provision among HIV-positive TB patients in 19 countries in sub-Saharan Africa with high TB and HIV burdens, TB and HIV data collected by the World Health Organization (WHO) were reviewed. The results found that the percentage of HIV-positive TB patients receiving ART increased from 37% in 2010 to 69% in 2013. However, many TB cases among persons who are HIV-positive go unreported (*2*), and only 38% of the estimated number of HIV-positive new TB patients received ART in 2013. Although progress has been made, the combination of TB and HIV continues to pose a threat to global health, particularly in sub-Saharan Africa.

Worldwide, approximately one third of persons are infected with TB. In most persons the infection is latent; however, TB can become active, infectious TB disease. HIV infection is one of the strongest risk factors for developing TB disease. To decrease the global burden of TB and HIV, WHO recommends implementation and scale-up of collaborative TB/HIV activities, including intensified TB case-finding among persons living with HIV, provider-initiated HIV testing and counseling among TB patients, and provision of ART for all HIV-positive TB patients, regardless of CD4 count. Current guidelines recommend starting TB treatment first for persons living with HIV not receiving ART at the time of TB diagnosis, then initiating ART as soon as possible within 8 weeks of TB treatment. HIV-positive TB patients with profound immunosuppression (CD4 <50 cells/$\mu$L) should initiate ART within 2 weeks of starting TB treatment (*6*). The recommendation for universal access to ART for HIV-positive TB patients is in line with the Joint United Nations Programme on HIV/AIDS goal to have 90% of all persons with diagnosed HIV infection on ART by 2020 (*7*).

To assess the progress in provision of ART to HIV-positive TB patients, data were reviewed from the WHO global TB database* for 19 countries in sub-Saharan Africa with high TB and HIV burdens that are supported by the President's Emergency Plan for AIDS Relief (PEPFAR), which supports HIV prevention, care, and treatment programs and has played a major role in the scale-up of HIV and TB services globally. A total of 6.7 million persons living with HIV are receiving ART through direct PEPFAR support, and 78% of the global TB/HIV burden is in sub-Saharan Africa (*2*).

From 2009 to 2013, there was an increase from 58% to 80% in the proportion of TB patients tested for HIV in the 19 PEPFAR-supported countries (Figure 1). This increase in HIV testing among TB patients in turn has led to increased detection of HIV infection. Among reported HIV-positive TB patients, there was an increase in the proportion receiving ART from 37% in 2009 to 69% in 2013 (Figure 1).

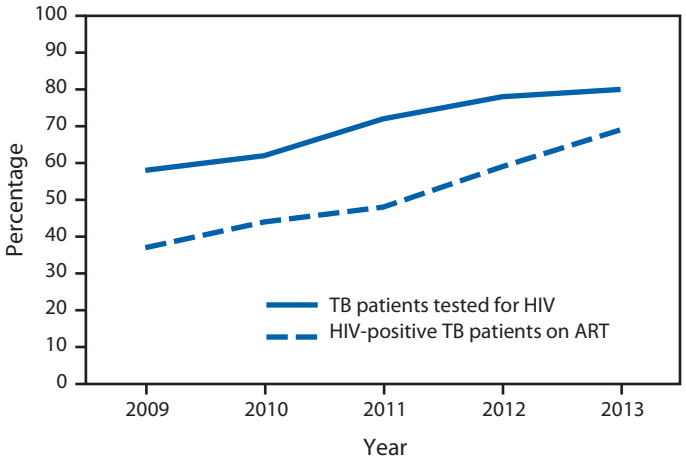
Although the proportion of HIV-positive TB patients receiving ART has increased in sub-Saharan Africa, high percentages of persons with TB disease and HIV infection are not yet receiving ART. Among reported HIV-positive TB patients in the 19 PEPFAR-supported countries, approximately 128,000 did not receive ART in 2013 (Table).

Although TB case reporting rates vary by country, the number of reported TB patients in most countries was substantially smaller than the estimated number† of TB cases because TB disease detection and reporting are incomplete (*2*). Consequently, ART coverage among HIV-positive TB patients is much lower when calculated using the estimated number of HIV-positive new TB patients rather than the reported number of patients (Table) (Figure 2). In the 19 countries in sub-Saharan Africa, only 38% of estimated HIV-positive new TB patients received ART in 2013 (Table).

* Available at http://www.who.int/tb/country/en.
† WHO estimation methods available at http://www.who.int/tb/publications/global_report/gtbr14_online_technical_appendix.pdf?ua=1.

In the PEPFAR-supported countries in sub-Saharan Africa, ART coverage in 2013 among reported TB patients who were HIV-positive ranged from 37% in Ghana to 88% in Malawi, with 17 of the 19 countries providing ART for at least 50% of HIV-positive TB patients. ART coverage based on estimated new HIV-positive TB patients ranged from a low of 9% in Nigeria to a high of 59% in Malawi, with only four of the 19 countries providing ART for at least 50% of estimated HIV-positive new TB patients.

**FIGURE 1. Percentages of TB patients tested for HIV and HIV-positive TB patients on antiretroviral therapy (ART) — 19 countries supported by the President's Emergency Plan for AIDS Relief, sub-Saharan Africa, 2009–2013**




**Abbreviations:** HIV = human immunodeficiency virus; TB = tuberculosis.
**Source:** World Health Organization global TB database. Available at http://www.who.int/tb/country/en.
* Botswana, Cameroon, Côte d'Ivoire, Democratic Republic of the Congo, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Rwanda, South Africa, Swaziland, Uganda, Tanzania, Zambia, Zimbabwe.

## Discussion

ART coverage among reported HIV-positive TB patients in high TB/HIV-burden countries has risen considerably over the past several years but still falls short of the goal of 100%. The ART coverage gap is even more marked for the estimated number of new HIV-positive TB patients in sub-Saharan Africa, with only 38% ART coverage among persons in this group in PEPFAR-supported countries in 2013. Scale-up of ART provision for HIV-positive TB patients is needed to achieve the goal of 100% ART coverage for all HIV-positive TB patients, reduce morbidity and mortality of HIV-associated TB, and decrease the global burden of TB and HIV. If all estimated HIV-positive TB patients were started on ART, it would increase the number of HIV-positive persons initiating ART in 2013 by 28%, from 1.8 million to 2.3 million.

The TB and HIV syndemic continues to pose a challenge to global public health. Although there have been substantial gains in global TB control and in expansion of HIV care and treatment programs, many countries with high rates of TB and HIV have not yet reached treatment targets. To achieve the vision of an AIDS-Free Generation (*8*) and a world with zero TB deaths (*9*), concerted efforts are needed to close the ART coverage gap among all persons with TB disease and HIV infection.

**TABLE. Percentage of HIV-positive TB patients on antiretroviral therapy (ART) — 19 countries supported by the President's Emergency Plan for AIDS Relief, sub-Saharan Africa, 2013**

| Country | No. of reported TB patients with known HIV status | No. of TB patients who were HIV-positive | % of HIV-positive TB patients on ART | Estimated no. of new HIV-positive TB patients | % of estimated new HIV-positive TB patients on ART |
|---|---|---|---|---|---|
| Botswana | 6,321 | 3,832 | 72 | 5,000 | 55 |
| Cameroon | 21,371 | 8,161 | 64 | 19,000 | 28 |
| Côte d'Ivoire | 22,502 | 5,506 | 55 | 8,000 | 38 |
| Democratic Republic of the Congo | 49,816 | 6,984 | 48 | 16,000 | 21 |
| Ethiopia | 93,356 | 10,374 | 68 | 22,000 | 32 |
| Ghana | 11,387 | 2,737 | 37 | 3,600 | 28 |
| Kenya | 84,178 | 31,650 | 84 | 48,000 | 55 |
| Lesotho | 9,756 | 7,234 | 70 | 15,000 | 34 |
| Malawi | 17,820 | 9,998 | 88 | 15,000 | 59 |
| Mozambique | 51,172 | 28,585 | 72 | 81,000 | 25 |
| Namibia | 9,727 | 4,343 | 80 | 7,700 | 45 |
| Nigeria | 88,317 | 19,423 | 67 | 140,000 | 9 |
| Rwanda | 5,882 | 1,447 | 79 | 2,500 | 46 |
| South Africa | 294,504 | 181,736 | 66 | 270,000 | 45 |
| Swaziland | 6,416 | 4,747 | 80 | 13,000 | 29 |
| Uganda | 43,318 | 20,648 | 65 | 32,000 | 42 |
| Tanzania | 54,504 | 20,320 | 73 | 30,000 | 50 |
| Zambia | 41,305 | 25,476 | 67 | 37,000 | 46 |
| Zimbabwe | 32,460 | 22,442 | 77 | 56,000 | 31 |
| **Total** | **944,112** | **415,643** | **69** | **820,800** | **38** |

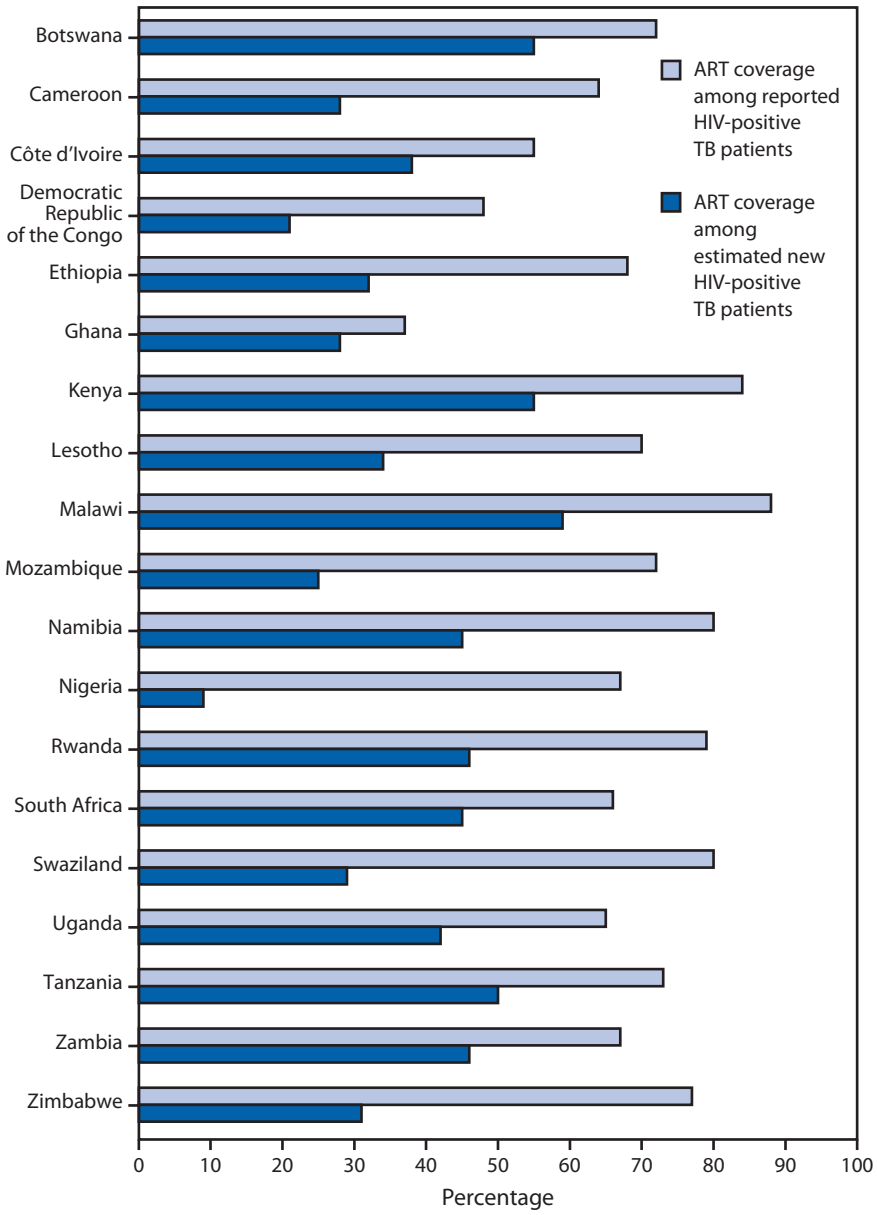
**Abbreviations:** HIV = human immunodeficiency virus; TB = tuberculosis.
**Source:** World Health Organization global TB database. Available at http://www.who.int/tb/country/en.

Finding and diagnosing patients with TB and HIV is a prerequisite for timely TB treatment and ART initiation, and there is a survival benefit associated with early initiation of ART among profoundly immunosuppressed HIV-positive patients with TB (*5*). High rates of routine provider-initiated HIV testing and counseling need to be sustained for all persons with presumptive TB infection or TB disease, to enable diagnosis of HIV infection and to ensure linkage to HIV treatment programs for timely initiation of ART. HIV-positive TB patients typically access separate care and treatment systems for management of TB and HIV. When TB patients receive HIV counseling and testing and are diagnosed with HIV, they are then referred to HIV care and treatment services to be started on ART. HIV-positive TB patients can be lost to follow up because they are referred from one system to the other, and this referral process poses a challenge to patient linkage, ART initiation, and retention in HIV care and treatment. Integration of TB and HIV service delivery is critical to ensure identification of TB among persons living with HIV and diagnosis of HIV among TB patients, as well as timely TB treatment, ART initiation, and treatment adherence among HIV-positive TB patients.

TB often goes undiagnosed among persons living with HIV; therefore, intensified case-finding for TB should be a routine part of HIV care and treatment programs. Current recommendations call for persons living with HIV to be routinely screened for TB at every clinical encounter using a standard four-symptom screen of cough, fever, night sweats, and weight loss (or poor weight gain for children) at a minimum, plus TB contact history for children (*6*). Access to appropriate TB diagnostic tests for persons living with HIV who have TB symptoms and timely turn-around of results are critical to improving TB case detection among persons living with HIV.

Although reducing the ART gap is critical, emphasis also needs to be placed on the timing of ART provision so that treatment is initiated within 8 weeks of TB treatment for all HIV-positive TB patients, and within 2 weeks for those with CD4 <50 cells/$\mu$L to achieve the mortality reduction benefits of ART. Although studies have shown an increased risk for TB immune reconstitution inflammatory syndrome with earlier initiation of ART among such cases, the risk for mortality from this syndrome has been found to be negligible (*10*).

**FIGURE 2. Percentage of reported HIV-positive TB patients on antiretroviral therapy (ART) compared with estimated new HIV-positive TB cases — 19 countries supported by the President's Emergency Plan for AIDS Relief, sub-Saharan Africa, 2013**




**Abbreviations:** HIV = human immunodeficiency virus; TB = tuberculosis.
**Source:** World Health Organization global TB database. Available at http://www.who.int/tb/country/en.

The findings in this report are subject to at least two limitations. First, the proportion of HIV-positive TB patients reported to be on ART is based on national TB surveillance systems of these countries. These systems report the proportion of HIV-positive TB patients receiving ART during TB treatment and do not account for HIV-positive TB patients who might have been started on ART after completion of their TB treatment. Second, the estimated numbers of new HIV-positive TB patients used in the report are based on complex modeling

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

Persons living with human immunodeficiency virus (HIV) are vulnerable to tuberculosis (TB), which is the leading cause of mortality among persons living with HIV worldwide. Antiretroviral therapy (ART) reduces the incidence of HIV-associated TB, reduces mortality among HIV-positive TB patients, and is recommended for all HIV-positive TB patients, regardless of CD4 count.

**What is added by this report?**

In 19 countries in sub-Saharan Africa with high numbers of TB patients with HIV, provision of ART for reported HIV-positive TB patients increased from 37% in 2009 to 69% in 2013. However, many TB cases among persons who are HIV-positive go unreported, and only 38% of the estimated number of HIV-positive new TB patients received ART in 2013.

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

The ART coverage gap of 62% of HIV-positive TB patients represents the proportion of persons with TB disease and HIV infection who should be on life-saving ART but are not yet receiving treatment. Continued scale-up of ART provision for HIV-positive TB patients is needed to reduce the morbidity and mortality of HIV-associated TB and decrease the global burden of TB and HIV.

conducted by WHO using multiple data sources. The effect of varying HIV testing coverage and changing HIV prevalence with increasing HIV testing coverage has not been accounted for in this model and might affect the estimates in the future.

TB and HIV data frequently come from separate TB and HIV reporting and recording systems, which are not harmonized in many settings. Improving TB and HIV monitoring and evaluation, with better integration and interoperability of TB and HIV data systems, would enhance data exchange and also improve the quality of ART coverage data for TB patients. This would facilitate early detection of treatment gaps and challenges, improve routine monitoring, inform quality improvement efforts, and help guide resource allocation to improve ART provision for HIV-positive TB patients.

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# Current Cigarette Smoking Among Adults — United States, 2005–2013

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Tobacco use is the leading cause of preventable disease and death in the United States, resulting in more than 480,000 premature deaths and $289 billion in direct health care expenditures and productivity losses each year (*1*). Despite progress over the past several decades, millions of adults still smoke cigarettes, the most commonly used tobacco product in the United States (*2*). To assess progress made toward the *Healthy People 2020* target of reducing the proportion of U.S. adults who smoke cigarettes to ≤12.0% (objective TU-1.1),* CDC used data from the 2013 National Health Interview Survey (NHIS) to provide updated national estimates of cigarette smoking prevalence among adults aged ≥18 years. Additionally, for the first time, estimates of cigarette smoking prevalence were assessed among lesbian, gay, or bisexual persons (LGB) using NHIS data. The proportion of U.S. adults who smoke cigarettes declined from 20.9% in 2005 to 17.8% in 2013, and the proportion of daily smokers declined from 16.9% to 13.7%. Among daily cigarette smokers, the proportion who smoked 20–29 cigarettes per day (CPD) declined from 34.9% to 29.3%, and the proportion who smoked ≥30 CPD declined from 12.7% to 7.1%. However, cigarette smoking remains particularly high among certain groups, including adults who are male, younger, multiracial or American Indian/Alaska Native, have less education, live below the federal poverty level, live in the South or Midwest, have a disability/limitation, or who are LGB. Proven population-based interventions, including tobacco price increases, comprehensive smoke-free policies in worksites and public places, high-impact anti-tobacco mass media campaigns, and easy access to smoking cessation assistance, are critical to reducing cigarette smoking and smoking-related disease and death among U.S. adults, particularly among subpopulations with the greatest burden (*3*).

NHIS is an annual, nationally representative, in-person survey of the noninstitutionalized U.S. civilian population. The NHIS core questionnaire is administered to a randomly selected adult in each sampled household. The 2013 NHIS included 34,557 respondents aged ≥18 years; the response rate was 61.2%. Current cigarette smokers were respondents who reported smoking ≥100 cigarettes during their lifetime and, at the time of interview, reported smoking every day or some days. The mean number of cigarettes smoked per day was calculated among daily smokers.

Data were adjusted for nonresponse and weighted to provide nationally representative estimates. Current cigarette smoking was assessed overall and by sex, age, race/ethnicity, education, poverty status,† U.S. Census region,§ and disability/limitation status.¶ Current smoking was also assessed by sexual orientation**; starting in 2013, sexual orientation questions were added to NHIS for the first time. Differences between groups were assessed using the chi-square test. Logistic regression was used to analyze trends during 2005–2013, and the Wald test was used to determine statistical significance ($p<0.05$).

Current cigarette smoking among U.S. adults declined from 20.9% (an estimated 45.1 million persons) in 2005 to 17.8% (42.1 million) in 2013 ($p<0.05$ for trend) (Table). In 2013, current cigarette smoking prevalence was higher among males (20.5%) than females (15.3%). Prevalence was highest among adults aged 25–44 years (20.1%) and lowest among those aged ≥65 years (8.8%). By race/ethnicity, prevalence was highest

* Additional information available at https://www.healthypeople.gov/2020/topics-objectives/topic/tobacco-use/objectives.

† Based on reported family income. 2005 estimates are based on reported family income and 2004 poverty thresholds published by the U.S. Census Bureau, and 2013 estimates are based on reported family income and 2012 poverty thresholds published by the U.S. Census Bureau.

§ *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *Midwest:* Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. *South:* Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *West:* Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

¶ Disability/limitation was defined based on self-reported presence of selected impairments, including vision, hearing, cognition, and movement. Limitations in performing activities of daily living was defined based on response to the question, "Because of a physical, mental, or emotional problem, does [person] need the help of other persons with personal care needs, such as eating, bathing, dressing, or getting around inside this home?" Limitations in performing instrumental activities of daily living was defined based on response to the question, "Because of a physical, mental, or emotional problem, does [person] need the help of other persons in handling routine needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?" Any disability/limitation was defined as a "yes" response pertaining to at least one of the disabilities/limitations listed (i.e., vision, hearing, cognition, movement, activities of daily living, or instrumental activities of daily living). In 2013, the American Community Survey disability questions were asked of a random half of families at the end of the family interview, with proxy reporting permitted for family members not present during the interview. For population estimates, the sample adult weight was doubled to account for the half of respondents for whom the disability questions were not asked.

** For the question used to determine sexual orientation, response options were "straight, that is, not gay" for men, "straight, that is, not gay or lesbian" for women, "gay" for men, "gay or lesbian" for women, and "bisexual" for either men or women.

**TABLE. Percentage of persons aged ≥18 years who were current cigarette smokers,* by selected characteristics — National Health Interview Survey, United States, 2005 and 2013**

| | Men | | | | Women | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2005 (n = 13,762) | | 2013 (n =15,440 ) | | 2005 (n = 17,666) | | 2013 (n =19,117 ) | | 2005 (N = 31,428) | | 2013 (N = 34,557) | |
| Characteristic | % | (95% CI) | % | (95% CI) | % | (95% CI) | % | (95% CI) | % | (95% CI) | % | (95% CI) |
| **Overall** | **23.9** | **(22.9–24.8)** | **20.5†** | **(19.5–21.4)** | **18.1** | **(17.4–18.9)** | **15.3†** | **(14.6–16.1)** | **20.9** | **(20.3–21.5)** | **17.8†** | **(17.2–18.4)** |
| **Age group (yrs)** | | | | | | | | | | | | |
| 18–24 | 28.0 | (25.0–31.1) | 21.9† | (19.0–24.8) | 20.7 | (18.3–23.1) | 15.4† | (12.9–17.9) | 24.4 | (22.4–26.4) | 18.7† | (16.9–20.5) |
| 25–44 | 26.8 | (25.4–28.2) | 23.3† | (21.7–24.9) | 21.4 | (20.2–22.6) | 17.1† | (16.0–18.2) | 24.1 | (23.1–25.1) | 20.1† | (19.1–21.1) |
| 45–64 | 25.2 | (23.7–26.7) | 21.9† | (20.5–23.4) | 18.8 | (17.7–20.0) | 18.1 | (16.8–19.3) | 21.9 | (21.0–22.9) | 19.9† | (19.0–20.9) |
| ≥65 | 8.9 | (7.6–10.2) | 10.6 | (9.2–11.9) | 8.3 | (7.3–9.3) | 7.5 | (6.5–8.4) | 8.6 | (7.8–9.3) | 8.8 | (8.0–9.7) |
| **Race/Ethnicity§** | | | | | | | | | | | | |
| White | 24.0 | (22.8–25.2) | 21.2† | (19.9–22.4) | 20.0 | (19.1–20.9) | 17.8† | (16.8–18.8) | 21.9 | (21.1–22.7) | 19.4† | (18.6–20.2) |
| Black | 26.7 | (23.9–29.4) | 21.8† | (19.2–24.3) | 17.3 | (15.5–19.0) | 15.4† | (13.7–17.0) | 21.5 | (19.8–23.1) | 18.3† | (16.8–19.7) |
| Hispanic | 21.1 | (19.3–23.0) | 17.3† | (15.3–19.2) | 11.1 | (9.8–12.4) | 7.0† | (6.0–7.9) | 16.2 | (15.1–17.4) | 12.1† | (11.0–13.2) |
| American Indian/ Alaska Native | 37.5 | (20.7–54.3) | 32.1 | (20.9–43.3) | 26.8 | (15.6–38.1) | 22.0 | (12.2–31.8) | 32.0 | (22.2–41.7) | 26.1 | (18.5–33.7) |
| Asian¶ | 20.6 | (15.7–25.5) | 15.1 | (12.1–18.1) | 6.1 | (3.7–8.5) | 4.8 | (3.2–6.5) | 13.3 | (10.4–16.3) | 9.6 | (7.9–11.4) |
| Multiple race | 26.1 | (16.3–36.0) | 29.1 | (22.0–36.2) | 23.5 | (14.8–32.2) | 24.8 | (18.0–31.5) | 24.8 | (17.7–31.8) | 26.8 | (21.9–31.8) |
| **Education level**** | | | | | | | | | | | | |
| 0–12 years (no diploma) | 29.5 | (27.2–31.8) | 30.6 | (27.7–33.5) | 21.9 | (20.0–23.7) | 18.0 | (16.1–20.0) | 25.5 | (24.0–27.1) | 24.2 | (22.5–25.9) |
| 8th grade or less | 21.0 | (17.7–24.3) | 21.9 | (17.3–26.5) | 13.4 | (11.1–15.6) | 9.2 | (6.8–11.6) | 17.1 | (15.1–19.0) | 15.4 | (12.8–17.9) |
| 9–11th grade | 36.8 | (33.3–40.2) | 40.0† | (36.0–44.0) | 29.0 | (26.1–31.8) | 26.6 | (23.2–29.9) | 32.6 | (30.4–34.9) | 33.2 | (30.6–35.8) |
| 12th grade, no diploma | 30.2 | (23.5–36.9) | 24.2 | (18.3–30.1) | 22.2 | (16.9–27.5) | 15.4 | (11.1–19.8) | 26.0 | (21.8–30.2) | 19.7 | (16.0–23.5) |
| GED | 47.5 | (41.5–53.6) | 42.9 | (36.4–49.3) | 38.8 | (33.6–44.0) | 39.7 | (33.5–45.9) | 43.2 | (39.1–47.4) | 41.4 | (36.8–45.9) |
| High school diploma | 28.8 | (27.0–30.7) | 26.7 | (24.6–28.8) | 20.7 | (19.3–22.2) | 17.6 | (16.1–19.2) | 24.6 | (23.4–25.7) | 22.0 | (20.7–23.3) |
| Some college, no diploma | 26.2 | (24.0–28.4) | 22.4† | (20.4–24.4) | 21.1 | (19.2–22.9) | 19.5 | (17.8–21.3) | 23.5 | (22.1–24.9) | 20.9 | (19.4–22.3) |
| Associate degree | 26.1 | (23.2–28.9) | 17.8† | (15.5–20.2) | 17.1 | (15.0–19.3) | 17.7 | (15.5–20.0) | 20.9 | (19.2–22.6) | 17.8† | (16.0–19.6) |
| Undergraduate degree | 11.9 | (10.5–13.3) | 10.4† | (9.0–11.9) | 9.6 | (8.3–10.8) | 7.9 | (6.9–9.0) | 10.7 | (9.8–11.6) | 9.1† | (8.3–10.0) |
| Graduate degree | 6.9 | (5.3–8.5) | 5.7 | (4.5–7.0) | 7.4 | (5.9–8.8) | 5.5 | (4.1–6.8) | 7.1 | (6.0–8.3) | 5.6† | (4.7–6.5) |
| **Poverty status††** | | | | | | | | | | | | |
| At or above poverty level | 23.7 | (22.6–24.7) | 18.7† | (17.7–19.7) | 17.6 | (16.8–18.5) | 13.8† | (13.0–14.6) | 20.6 | (19.9–21.3) | 16.2† | (15.6–16.8) |
| Below poverty level | 34.3 | (31.0–37.5) | 33.8 | (30.7–36.8) | 26.9 | (24.5–29.3) | 25.8 | (23.8–27.8) | 29.9 | (27.9–31.9) | 29.2 | (27.5–31.0) |
| Unspecified | 21.2 | (19.2–23.2) | 19.9† | (17.2–22.5) | 16.1 | (14.8–17.5) | 12.6† | (10.7–14.6) | 18.4 | (17.2–19.6) | 16.0† | (14.3–17.7) |
| **U.S. Census region§§** | | | | | | | | | | | | |
| Northeast | 20.7 | (18.6–22.9) | 18.0† | (15.8–20.2) | 17.9 | (16.4–19.5) | 15.8† | (14.0–17.7) | 19.2 | (17.8–20.6) | 16.9† | (15.6–18.1) |
| Midwest | 27.3 | (25.3–29.3) | 23.6† | (21.6–25.6) | 21.3 | (19.8–22.8) | 17.4† | (15.5–19.3) | 24.2 | (23.0–25.3) | 20.5† | (19.1–21.9) |
| South | 25.3 | (23.6–27.0) | 22.7 | (21.1–24.4) | 18.5 | (17.3–19.7) | 16.2 | (15.1–17.3) | 21.8 | (20.6–23.0) | 19.2† | (18.2–20.3) |
| West | 20.1 | (18.3–21.9) | 15.8† | (14.0–17.5) | 13.9 | (12.6–15.2) | 11.5† | (10.3–12.7) | 17.0 | (16.0–18.0) | 13.6† | (12.5–14.7) |
| **Disability/Limitation¶¶** | | | | | | | | | | | | |
| Yes | —*** | —*** | 26.1 | (23.6—28.7) | —*** | —*** | 20.4 | (18.5—22.3) | —*** | —*** | 23.0 | (21.4—24.5) |
| No | —*** | —*** | 19.9 | (18.6—21.2) | —*** | —*** | 14.5 | (13.5—15.5) | —*** | —*** | 17.0 | (16.2—17.7) |
| **Sexual orientation†††** | | | | | | | | | | | | |
| Straight | —*** | —*** | 20.3 | (19.3–21.2) | —*** | —*** | 15.0 | (14.3–15.8) | —*** | —*** | 17.6 | (16.9–18.2) |
| Lesbian/Gay/Bisexual | —*** | —*** | 26.4 | (19.9–32.9) | —*** | —*** | 26.7 | (20.1–33.4) | —*** | —*** | 26.6 | (22.4–30.8) |

See table footnotes on next page.

among adults reporting multiple races (26.8%) and among American Indians/Alaska Natives (26.1%), and lowest among non-Hispanic Asians (9.6%). By education (among adults aged ≥25 years), prevalence was highest among persons with a General Education Development (GED) certificate (41.4%) and lowest among those with a graduate degree (5.6%). Among groups by family income, prevalence was higher among persons living below the poverty level (29.2%) than those at or above this level (16.2%). By region, prevalence was highest in the Midwest (20.5%) and lowest in the West (13.6%). Adults who reported having a disability/limitation had a higher prevalence (23.0%) than those reporting no disability/limitation (17.0%). Cigarette smoking prevalence was higher among LGB adults (26.6%) than straight adults (17.6%). Among straight adults, males (20.3%) had a higher smoking prevalence than females (15.0%); however, among LGB adults, prevalence did not differ by sex (Figure 1).

Among all U.S. adults, the proportion of daily smokers declined from 16.9% to 13.7% during 2005–2013. Among current cigarette smokers, every day smoking decreased from 80.8% (36.5 million persons) in 2005 to 76.9% (32.4 million) in 2013 ($p<0.05$ for trend), and some day smoking increased from 19.2% (8.7 million) in 2005 to 23.1% (9.7 million) in 2013 ($p<0.05$ for trend). Among daily smokers, mean CPD

**TABLE. (*Continued*) Percentage of persons aged ≥18 years who were current cigarette smokers,* by selected characteristics — National Health Interview Survey, United States, 2005 and 2013**

**Abbreviations:** CI = confidence interval; GED = General Education Development certificate.

* Persons who reported smoking ≥100 cigarettes during their lifetime and who, at the time of interview, reported smoking every day or some days. Excludes 296 (2005) and 121 (2013) respondents whose smoking status was unknown.

† Denotes significant linear trend during 2005–2013 (p<0.05), adjusted for sex, age, and race/ethnicity as applicable.

§ Excludes 45 (2005) and 73 (2013) respondents of unknown race. Unless indicated otherwise, all racial/ethnic groups are non-Hispanic; Hispanics can be of any race.

¶ Does not include Native Hawaiians or Other Pacific Islanders.

** Among persons aged ≥25 years. Excludes 339 (2005) and 155 (2013) persons whose educational level was unknown.

†† Family income is reported by the family respondent who might or might not be the same as the sample adult respondent from whom smoking information is collected. 2005 estimates are based on reported family income and 2004 poverty thresholds published by the U.S. Census Bureau, and 2013 estimates are based on reported family income and 2012 poverty thresholds published by the U.S. Census Bureau.

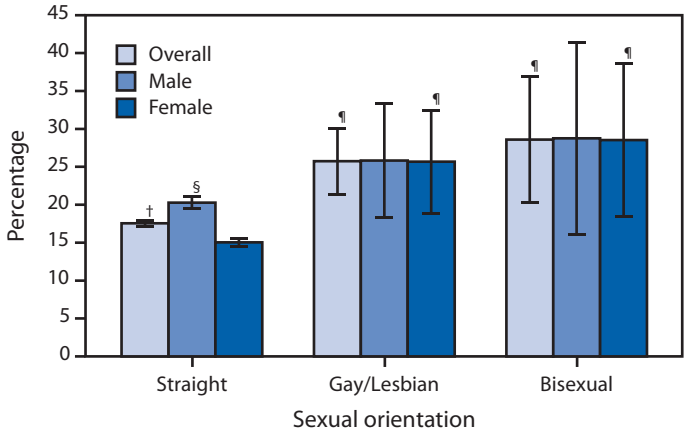
§§ *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *Midwest:* Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. *South:* Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *West:* Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

¶¶ Disability/limitation was defined based on self-reported presence of selected impairments, including vision, hearing, cognition, and movement. Limitations in performing activities of daily living was defined based on response to the question, "Because of a physical, mental, or emotional problem, does [person] need the help of other persons with personal care needs, such as eating, bathing, dressing, or getting around inside this home?" Limitations in performing instrumental activities of daily living was defined based on response to the question, "Because of a physical, mental, or emotional problem, does [person] need the help of other persons in handling routine needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?" Any disability/limitation was defined as a "yes" response pertaining to at least one of the disabilities/limitations listed (i.e., vision, hearing, cognition, movement, activities of daily living, or instrumental activities of daily living). In 2013, the American Community Survey disability questions were asked of a random half of families at the end of the family interview, with proxy reporting permitted for family members not present during the interview. For population estimates, the sample adult weight was doubled to account for the half of respondents for whom the disability questions were not asked.

*** Questions for pertaining to disabilities/limitations and sexual orientation were not included in the 2005 National Health Interview Survey.

††† Response option were "straight, that is, not gay" for men, "straight, that is, not gay or lesbian" for women, "gay" for men, "gay or lesbian" for women, and "bisexual" for either men or women.

**FIGURE 1. Current cigarette smoking among persons aged ≥18 years, by sex and sexual orientation* — National Health Interview Survey, United States, 2013**



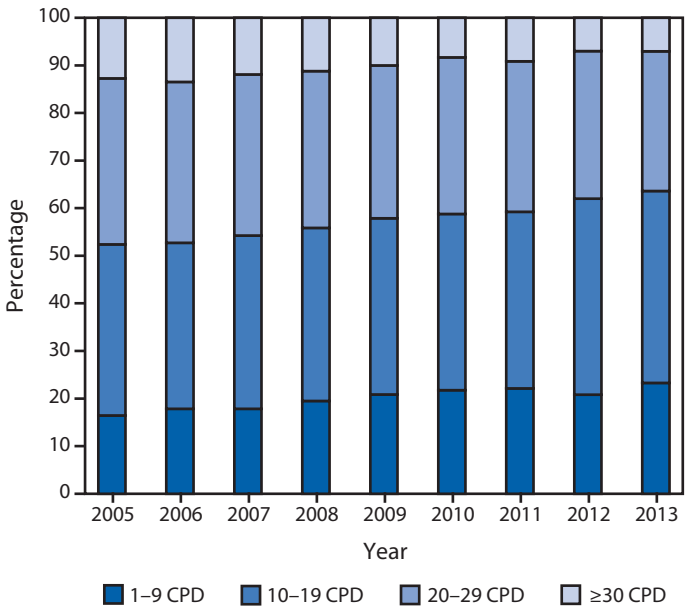

* Sexual orientation was assessed with the following specified categories: "straight, that is, not gay" for men, "straight, that is, not gay or lesbian" for women, "gay" for men, "gay or lesbian" for women, and "bisexual" for either men or women.

† 95% confidence interval.

§ Significantly different from straight females (p<0.05).

¶ Significantly different from straight (p<0.05).

**FIGURE 2. Percentage of daily smokers* aged ≥18 years smoking 1–9, 10–19, 20–29, or ≥30 cigarettes per day (CPD), by year — National Health Interview Survey, United States, 2005–2013**




* Persons who reported smoking ≥100 cigarettes during their lifetime and who, at the time of the survey, reported smoking cigarettes every day.

declined from 16.7 in 2005 to 14.2 in 2013 (p<0.05 for trend). During 2005–2013, increases occurred in the proportion of daily smokers who smoked 1–9 CPD (16.4% to 23.3%) or 10–19 CPD (36.0% to 40.3%), whereas declines occurred among those who smoked 20–29 CPD (34.9% to 29.3%) or ≥30 CPD (12.7% to 7.1%) (p<0.05 for trend) (Figure 2).

## Discussion

During 2005–2013, declines occurred in the prevalence of cigarette smoking among U.S. adults and the proportion of daily smokers who smoked the heaviest (i.e., ≥30 CPD). Cigarette smoking prevalence was higher among certain

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

Tobacco use is the leading cause of preventable disease and death in the United States, resulting in more than 480,000 premature deaths and $289 billion in direct health care expenditures and productivity losses each year. Despite progress over the past several decades, millions of adults still smoke cigarettes, the most commonly used tobacco product in the United States.

**What is added by this report?**

Cigarette smoking among U.S. adults declined from 20.9% in 2005 (an estimated 45.1 million persons) to 17.8% in 2013 (42.1 million). Among smokers who smoke daily, the average number of cigarettes smoked per day declined from 16.7 in 2005 to 14.2 in 2013, and the proportions of daily smokers who smoked 20–29 or ≥30 cigarettes per day also declined. In 2013, cigarette smoking prevalence was higher among lesbian, gay, or bisexual adults (26.6%) than straight adults (17.6%).

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

These findings underscore the importance of continued implementation of effective public health interventions that can reduce smoking-related disparities and accelerate progress toward meeting the *Healthy People 2020* target to reduce the proportion of U.S. adults who smoke cigarettes to ≤12.0%. These evidence-based interventions include increasing the price of tobacco products, implementing and enforcing comprehensive smoke-free laws, warning about the dangers of tobacco use with high-impact antismoking media campaigns, and increasing access to help with quitting.

subpopulations, including adults who are male, younger, multiracial or American Indian/Alaska Native, have less education, live below the federal poverty level, live in the South or Midwest, have a disability/limitation, or are LGB.

Observed disparities in smoking prevalence are consistent with previous studies (*2*). Differences by race/ethnicity might be partly explained by sociocultural influences and practices related to the acceptability of tobacco use (*4*). Differences by education might be partly attributable to variations in exposure and understanding of information about the health hazards of smoking (*5*). Responses to newly added questions on sexual orientation in the 2013 NHIS questionnaire[††] revealed that LGB adults have higher cigarette smoking prevalence than their straight counterparts, which might be attributed to multiple factors, including, for example, greater stress due to social stigma and discrimination, and targeted marketing toward this population by the tobacco industry (*6*). These disparities underscore the importance of enhancing the implementation and reach of proven strategies to prevent and reduce tobacco use among these groups, as well as expanding questions on surveillance tools to better capture data on subpopulations with the greatest burden of tobacco use.

The 50th anniversary Surgeon General's report on the health consequences of smoking concluded that disease and death from tobacco use are overwhelmingly caused by cigarettes and other combusted products, and that rapid elimination of their use will dramatically reduce this burden (*1*). Although the decline in overall cigarette smoking prevalence during 2005–2013 from 20.9% to 17.8% is encouraging, approximately 42.1 million adults still smoke cigarettes; this underscores the need for continued implementation of evidence-based interventions outlined in the World Health Organization MPOWER package.[§§] These interventions include increasing the price of tobacco products, implementing and enforcing comprehensive smoke-free laws, warning about the dangers of tobacco use with high-impact antismoking media campaigns, and increasing access to help with quitting. Such population-based interventions have been shown to reduce population smoking prevalence (*3*). For example, in 2013, CDC's national tobacco education campaign, *Tips from Former Smokers* (TIPS),[¶¶] resulted in a 75% increase in average weekly calls to the national telephone quitline portal 1-800-QUIT-NOW, and the number of unique visitors to the Tips website (http://www.cdc.gov/tips) increased nearly 38-fold compared with the 4 weeks before the campaign (*7*). Additionally, the Surgeon General recently called for consideration of further strategies that could significantly accelerate the decline in smoking, including the reduction of nicotine content in cigarettes to nonaddictive levels and greater restrictions on sales, particularly at the local level, including bans on entire categories of tobacco products (*1*).

The findings in this report are subject to at least six limitations. First, cigarette smoking status was self-reported and not validated by biochemical testing; however, self-reported smoking status correlates highly with serum cotinine levels (*8*). Second, because NHIS does not include institutionalized populations and persons in the military, results are not generalizable to these groups. Third, the NHIS response rate of 61.2% might have resulted in nonresponse bias. Fourth, the questionnaire did not assess gender identity; the inclusion of transgender persons in addition to LGB persons would be expected to yield higher estimates of use among sexual minorities. Fifth, this report does not include estimates of cigar or other combustible tobacco use, which have generally not declined in recent years, and have even increased in some populations (*1*). Finally, these estimates might differ from those from other surveillance systems. These differences can

[††] Additional information available at http://www.cdc.gov/nchs/data/nhsr/nhsr077.pdf.

[§§] Additional information available at http://www.who.int/tobacco/mpower/mpower_report_full_2008.pdf.

[¶¶] Additional information available at http://www.cdc.gov/tobacco/campaign/tips.

be partially explained by varying survey methodologies, types of surveys administered, and definitions of current smoking; however, trends in prevalence are comparable across surveys (*1*).

Sustained, comprehensive state tobacco control programs funded at CDC-recommended levels accelerate progress towards reducing the health and economic burden of tobacco-related diseases in the United States (*3*). However, in 2014, despite combined revenue of more than $25 billion from settlement payments and tobacco excise taxes for all states, states will spend only $481.2 million (1.9%) on comprehensive tobacco control programs,*** representing <15% of the CDC-recommended level of funding for all states combined (*3*). Moreover, only two states (Alaska and North Dakota) currently fund tobacco control programs at CDC-recommended levels. Implementation of comprehensive tobacco control policies and programs can result in substantial reductions in tobacco-related morbidity and mortality and billions of dollars in savings from averted medical costs (*3*).

*** Information available at http://www.tobaccofreekids.org/what_we_do/state_local/tobacco_settlement.

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# Vital Signs: HIV Diagnosis, Care, and Treatment Among Persons Living with HIV — United States, 2011

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## Abstract

**Background:** Infection with human immunodeficiency virus (HIV), if untreated, leads to acquired immunodeficiency syndrome (AIDS) and premature death. However, a continuum of services including HIV testing, HIV medical care, and antiretroviral therapy (ART) can lead to viral suppression, improved health and survival of persons infected with HIV, and prevention of HIV transmission.

**Methods:** CDC used data from the National HIV Surveillance System and the Medical Monitoring Project to estimate the percentages of persons living with HIV infection, diagnosed with HIV infection, linked to HIV medical care, engaged in HIV medical care, prescribed ART, and virally suppressed in the United States during 2011.

**Results:** In 2011, an estimated 1.2 million persons were living with HIV infection in the United States; an estimated 86% were diagnosed with HIV, 40% were engaged in HIV medical care, 37% were prescribed ART, and 30% achieved viral suppression. The prevalence of viral suppression was significantly lower among persons aged 18–24 years (13%), 25–34 years (23%), and 35–44 years (27%) compared with those aged ≥65 years (37%).

**Conclusions:** A comprehensive continuum of services is needed to ensure that all persons living with HIV infection receive the HIV care and treatment needed to achieve viral suppression. Improvements are needed across the HIV care continuum to protect the health of persons living with HIV, reduce HIV transmission, and reach prevention and care goals.

**Implications for public health practice:** State and local health departments, community-based organizations, and health care providers play essential roles in improving outcomes on the HIV care continuum that increase survival among persons living with HIV and prevent new HIV infections. The greatest opportunities for increasing the percentage of persons with a suppressed viral load are reducing undiagnosed HIV infections and increasing the percentage of persons living with HIV who are engaged in care.

## Introduction

In the United States, an estimated 1.2 million persons are living with human immunodeficiency virus (HIV), a serious infection that, if untreated, leads to illness and premature death. Persons living with HIV who use antiretroviral therapy (ART) and achieve very low levels of the virus (suppressed viral load) can have a nearly normal life expectancy (*1*) and have very low risk for transmitting HIV to others (*2*). However, each year in the United States, nearly 50,000 persons become infected with HIV (*3*). Each step along the HIV care continuum (HIV diagnosis, prompt and sustained HIV medical care, and ART) is essential for achieving a suppressed viral load.

To accelerate progress toward reaching the goals of the National HIV/AIDS Strategy (NHAS), which include reducing new HIV infections, improving health outcomes among persons living with HIV, and reducing HIV-related disparities, the President issued an executive order in July 2013 directing federal agencies to improve outcomes along the HIV care continuum, with the goal of increasing viral suppression among persons living with HIV. This report estimates the number of persons living with HIV who received selected services along the HIV care continuum in the United States and the overall percentage of persons with suppressed viral load.

## Methods

Data reported through December 2013 to the National HIV Surveillance System (NHSS) from 50 states and the District of Columbia were used to estimate the number of persons living with HIV infection and the number living with diagnosed HIV by year-end 2011. The number of persons living with HIV infection (prevalence) was estimated as previously described (*4*). NHSS data from 19 jurisdictions (18 states and

the District of Columbia)* with complete laboratory reporting were used to estimate linkage to HIV medical care. Linkage to HIV medical care was defined as one or more documented viral load or CD4+ T-lymphocyte (CD4+) count test within 3 months after HIV diagnosis and was estimated among persons aged ≥13 years newly diagnosed with HIV in 2011.

Data from the Medical Monitoring Project were used to estimate the number of persons aged ≥18 years with HIV engaged in care, prescribed ART, and with a suppressed viral load (*5*). Numbers are weighted, nationally representative population estimates from a complex sample survey of persons in HIV medical care in the United States. Being engaged in care was defined as having had an HIV medical care visit during the survey's sampling period of January–April 2011. ART was defined as documentation in the medical record of an ART prescription during the 12 months preceding interview. Viral suppression was defined as documentation in the medical record of viral load <200 copies/mL at last viral load test in the 12 months preceding interview. Statistical testing of differences between groups was conducted using the delta method (*6*).

## Findings

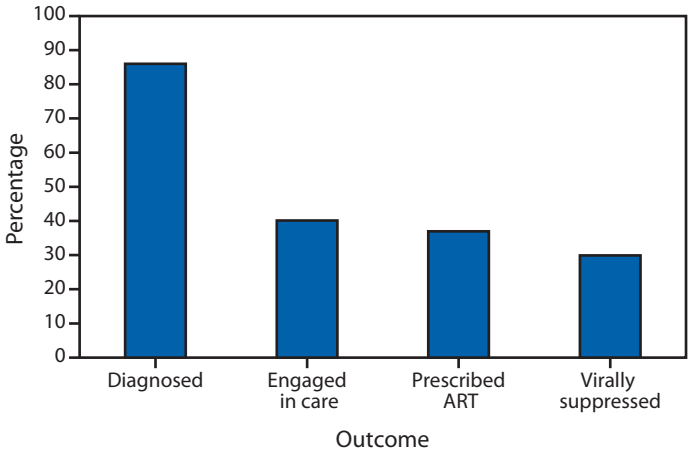
In 2011, an estimated 1.2 million persons were living with HIV infection in the United States; an estimated 86% were diagnosed with HIV, 40% were engaged in HIV medical care, 37% were prescribed ART, and 30% achieved viral suppression (Figure 1).

The prevalence of viral suppression was significantly lower among persons aged 18–24 years (13%), 25–34 years (23%), and 35–44 years (27%) compared with those aged ≥65 years (37%). (Table 1). An estimated 28% of blacks achieved viral suppression, compared with 32% of whites, a difference that was not statistically significant.

Of 15,449 persons newly diagnosed with HIV in the 19 surveillance areas in 2011, 80% were linked to HIV medical care within 3 months. Linkage to care was lowest among persons aged 13–24 years (73%) and blacks (76%) (Table 2).

Of the estimated 1.2 million persons living with HIV, an estimated 839,336 (70%) had not achieved viral suppression. Of these 839,336, an estimated 20% had never been diagnosed with HIV, 66% had been diagnosed but were not engaged in HIV medical care, 4% were in HIV medical care but had not been prescribed ART, and 10% had been prescribed ART but had not achieved viral suppression (Figure 2).

**FIGURE 1. Estimated percentage of persons living with HIV infection,* by outcome along the HIV care continuum — United States, 2011**




**Abbreviations:** HIV = human immunodeficiency virus; ART = antiretroviral therapy.
* N = 1,201,100.

## Discussion

Of persons living with HIV in the United States in 2011, 30% achieved viral suppression. This percentage was relatively stable from 2009 (26%) to 2011 (*4*). Improvements are needed across the HIV care continuum to protect the health of persons living with HIV, reduce HIV transmission, and reach national prevention and care goals. The greatest opportunities for increasing the percentage of persons with a suppressed viral load are reducing undiagnosed HIV infections and increasing the percentage of persons living with HIV who are engaged in care.

HIV diagnosis is the entry point of the HIV care continuum. All adolescents and adults should be tested for HIV infection at least once. Pregnant women should be tested, including those presenting at labor with an unknown HIV status. Persons at increased risk for HIV infection should be tested at least annually, including men who have sex with men (MSM), persons who inject drugs, and persons presenting for sexually transmitted disease testing (*7,8*).

Persons living with HIV must receive HIV medical care to benefit from being prescribed ART, becoming virally suppressed, and receiving prevention counseling to reduce risk behaviors. Approximately 66% of persons who did not have a suppressed viral load were diagnosed with HIV but not engaged in HIV medical care. Thus, interventions that increase the likelihood that such persons will seek and receive ongoing medical care are essential. Strategies include strengths-based case management (i.e., encouraging patients to identify and use internal strengths and assets to overcome obstacles), provider notification systems, co-located medical and support services, clinic materials promoting engagement in care, clinic staff who have expertise serving affected subpopulations (e.g., youths and

* The 19 jurisdictions were California (Los Angeles County and San Francisco only), Delaware, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New York, North Dakota, South Carolina, West Virginia, Wyoming, and the District of Columbia. Data from these areas represent 37% of data on diagnoses of HIV infection among persons aged ≥13 years during 2011 in the United States.

**TABLE 1. Estimated numbers and percentages of persons living with HIV, diagnosed with HIV, engaged in HIV medical care, prescribed ART, and virally suppressed by selected characteristics — National HIV Surveillance System and Medical Monitoring Project, United States and Puerto Rico, 2011**

| | Total* | | Diagnosed† | | Engaged in care§ | | Prescribed ART¶ | | Virally suppressed** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Characteristic | No. | (%) | No. | (%) | No. | (%) | No. | (%) | No. | (%) | p value |
| **Total††** | **1,201,100** | **(100)** | **1,032,800** | **(86)** | **478,433** | **(40)** | **441,661** | **(37)** | **361,764** | **(30)** | |
| **Sex§§** | | | | | | | | | | | |
| Male | 920,900 | (77) | 784,900 | (85) | 352,523 | (38) | 326,061 | (35) | 271,358 | (29) | Referent |
| Female | 280,200 | (23) | 247,900 | (88) | 125,691 | (45) | 115,381 | (41) | 90,188 | (32) | 0.47 |
| **Age group (yrs)** | | | | | | | | | | | |
| 18–24¶¶ | 62,400 | (5) | 30,400 | (49) | 13,976 | (22) | 11,338 | (18) | 7,834 | (13) | <0.01 |
| 25–34 | 165,500 | (14) | 122,500 | (74) | 55,934 | (34) | 49,105 | (30) | 37,667 | (23) | <0.01 |
| 35–44 | 287,200 | (24) | 246,200 | (86) | 108,247 | (38) | 98,754 | (34) | 78,271 | (27) | 0.04 |
| 45–54 | 426,700 | (36) | 390,900 | (92) | 185,376 | (43) | 173,350 | (41) | 144,004 | (34) | 0.51 |
| 55–64 | 206,600 | (17) | 192,700 | (93) | 91,483 | (44) | 86,274 | (42) | 74,565 | (36) | 0.87 |
| ≥65 | 52,600 | (4) | 49,900 | (95) | 23,416 | (45) | 22,840 | (43) | 19,423 | (37) | Referent |
| **Race/Ethnicity** | | | | | | | | | | | |
| Black/African American | 491,100 | (41) | 417,500 | (85) | 195,159 | (40) | 178,237 | (36) | 137,740 | (28) | 0.55 |
| Hispanic or Latino*** | 242,000 | (20) | 205,600 | (85) | 97,169 | (40) | 90,132 | (37) | 74,734 | (31) | 0.91 |
| White | 411,000 | (34) | 362,100 | (88) | 160,777 | (39) | 150,675 | (37) | 129,891 | (32) | Referent |
| Other††† | 57,000 | (5) | 47,600 | (84) | 25,328 | (44) | 22,617 | (40) | 19,399 | (34) | — |
| **Transmission category§§§** | | | | | | | | | | | |
| Male-to-male sexual contact | 647,700 | (54) | 543,900 | (84) | 246,545 | (38) | 227,015 | (35) | 191,190 | (30) | Referent |
| Injection drug use | | | | | | | | | | | |
| Male | 109,500 | (9) | 101,400 | (93) | 39,740 | (36) | 36,853 | (34) | 30,494 | (28) | 0.70 |
| Female | 70,100 | (6) | 65,600 | (94) | 32,703 | (47) | 29,706 | (42) | 23,784 | (34) | 0.45 |
| Male-to-male sexual contact and injection drug use | 64,800 | (5) | 60,300 | (93) | 30,817 | (48) | 28,532 | (44) | 22,789 | (35) | 0.31 |
| Heterosexual contact¶¶¶ | | | | | | | | | | | |
| Male | 94,200 | (8) | 76,200 | (81) | 33,607 | (36) | 31,848 | (34) | 25,502 | (27) | 0.62 |
| Female | 209,700 | (17) | 180,600 | (86) | 90,989 | (43) | 83,676 | (40) | 65,072 | (31) | 0.70 |

**Abbreviations:** HIV = human immunodeficiency virus; ART = antiretroviral therapy.

* National HIV Surveillance System: Estimated number of HIV-infected persons who were aged ≥13 years and alive at year-end 2011. Numbers have been statistically adjusted to account for reporting delays and missing transmission category, but not for incomplete reporting.

† National HIV Surveillance System: Estimated number and percentage of HIV-infected persons who were aged ≥13 years, whose HIV infection had been diagnosed by year-end 2011. Numbers have been statistically adjusted to account for reporting delays and missing transmission category, but not for incomplete reporting.

§ Medical Monitoring Project: Estimated number and percentage of HIV-infected persons who were aged ≥18 years and received medical care during January–April 2011.

¶ Medical Monitoring Project: Estimated number and percentage of HIV-infected persons who were aged ≥18 years, received medical care during January–April 2011, and had documentation of ART prescription in the medical record.

** Medical Monitoring Project: Estimated number and percentage of HIV-infected persons who were aged ≥18 years, received medical care during January–April 2011, and whose most recent HIV viral load in preceding 12 months was undetectable or <200 copies/mL.

†† Numbers have been estimated and might not sum to total.

§§ Includes an estimated 6,674 persons whose self-identified sex differs from sex at birth.

¶¶ Estimated number of persons living with HIV and estimated number and percentage diagnosed includes persons aged 13–24 years.

*** Hispanics or Latinos can be of any race.

††† Includes American Indian/Alaska Native (N = 3,700 living with HIV; N = 3,000 diagnosed), Asian (N = 14,900 living with HIV; N = 11,600 diagnosed), Native Hawaiian/Other Pacific Islander (N = 1,200 living with HIV; N = 900 diagnosed), and multiple races (N = 37,200 living with HIV; N = 32,100 diagnosed).

§§§ Data have been statistically adjusted to account for missing transmission category. Transmission categories exclude persons whose HIV infection is attributed to hemophilia, blood transfusion, or perinatal exposure.

¶¶¶ Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.

gay men), and appointment scheduling (*9*). Patient navigation and outreach services might also be helpful (*10*).

To prevent deterioration of immune function, prolong life, and decrease transmission risk, all persons diagnosed with HIV should receive medical care and be offered ART as soon as possible after diagnosis with HIV infection, regardless of CD4+ count or HIV viral load (*11*). HIV medical care and treatment have multiple benefits. Most persons in HIV medical care are prescribed ART (92%) and achieve viral suppression (76%). Persons who are diagnosed with HIV at age 20 years and initiate ART immediately and consistently throughout their lives can expect to live an additional 51 years, which approaches the life expectancy of a person aged 20 years in the general population (*1*). Early ART has been shown to reduce the likelihood of sexual transmission of HIV by 96% (*2*). However, one in five newly diagnosed persons was not linked to care within 3 months, missing an important opportunity to receive early HIV treatment and care.

Outcomes along the HIV care continuum were associated with age. The lower percentages of younger people diagnosed, engaged in care, and on ART might reflect shorter duration of infection and less time for diagnosis. Further, the low percentage (13%) of persons aged 18–24 years achieving viral suppression

**TABLE 2. Linkage to HIV medical care within 3 months after HIV diagnosis by selected characteristics—National HIV Surveillance System, 19 jurisdictions,* United States, 2011†**

| Characteristic | No. of HIV diagnoses | Linkage to care§ | |
|---|---|---|---|
| | | No. | (%) |
| **Total** | **15,449** | **12,333** | **(80)** |
| **Sex** | | | |
| Male | 12,255 | 9,701 | (79) |
| Female | 3,194 | 2,632 | (82) |
| **Age group (yrs)** | | | |
| 13–24 | 3,445 | 2,528 | (73) |
| 25–34 | 4,482 | 3,509 | (78) |
| 35–44 | 3,381 | 2,804 | (83) |
| 45–54 | 2,826 | 2,381 | (84) |
| ≥55 | 1,315 | 1,111 | (84) |
| **Race/Ethnicity** | | | |
| Black/African American | 7,880 | 5,983 | (76) |
| Hispanic or Latino¶ | 3,004 | 2,458 | (82) |
| White | 3,829 | 3,260 | (85) |
| Other** | 736 | 632 | (86) |
| **Transmission category††** | | | |
| Male-to-male sexual contact | 9,943 | 7,874 | (79) |
| Injection drug use | | | |
| Male | 665 | 524 | (79) |
| Female | 455 | 371 | (82) |
| Male-to-male sexual contact and injection drug use | 436 | 344 | (79) |
| Heterosexual contact§§ | | | |
| Male | 1,198 | 946 | (79) |
| Female | 2,732 | 2,256 | (83) |

**Abbreviation:** HIV = human immunodeficiency virus.

* The 19 jurisdictions were California (Los Angeles County and San Francisco only), Delaware, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New York, North Dakota, South Carolina, West Virginia, Wyoming, and the District of Columbia.

† Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis.

§ One or more CD4+ T-lymphocyte or viral load test within 3 months after HIV diagnosis.

¶ Hispanics or Latinos can be of any race.

** Includes American Indian/Alaska Native, Asian, Native Hawaiian/Other Pacific Islander, and multiple races.

†† Transmission categories exclude persons whose HIV infection is attributed to hemophilia, blood transfusion, or perinatal exposure.

§§ Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.

is largely driven by the lower percentage diagnosed compared with other age groups. Although there were no significant differences in viral suppression by race/ethnicity, blacks had lower percentages than whites of being diagnosed and achieving viral suppression. Disparities along the HIV care continuum might reflect differences in access to and use of health care and treatment (*12,13*). Both targeted interventions and efforts to address underlying social determinants of health, such as increased access to health care and supportive services, could increase HIV diagnosis, engagement in care, ART, and viral suppression.

These findings are subject to limitations. First, linkage to care is based on persons newly diagnosed in 2011 using data from only 19 areas with complete laboratory reporting so might not be representative of the United States as a whole. Second, engagement in care might be underestimated, because only persons receiving HIV medical care during January–April, 2011 were considered engaged in care. Weighted population estimates of persons on ART and virally suppressed were only calculated among persons engaged in care, so an underestimate of engagement in care might also lead to underestimates of ART and viral suppression. Third, percentages of persons on ART might also reflect guidelines in effect in 2011 recommending ART initiation for persons with CD4+ count <500 cells/$\mu$L, which were revised in 2012 and now recommend treatment for all persons with HIV regardless of immune status. Fourth, viral suppression was defined based on laboratory results at last test and might not indicate durable viral suppression. Fifth, the number of persons living with HIV infection was estimated using NHSS data and was calculated for persons aged ≥13 years. Medical Monitoring Project data include persons aged ≥18 years, so persons aged 13–17 years are included in the denominator, but not the numerator, for estimates of percentages engaged in care, on ART, and virally suppressed. However, there were fewer than 5,000 persons aged 13–17

### *Key Points*

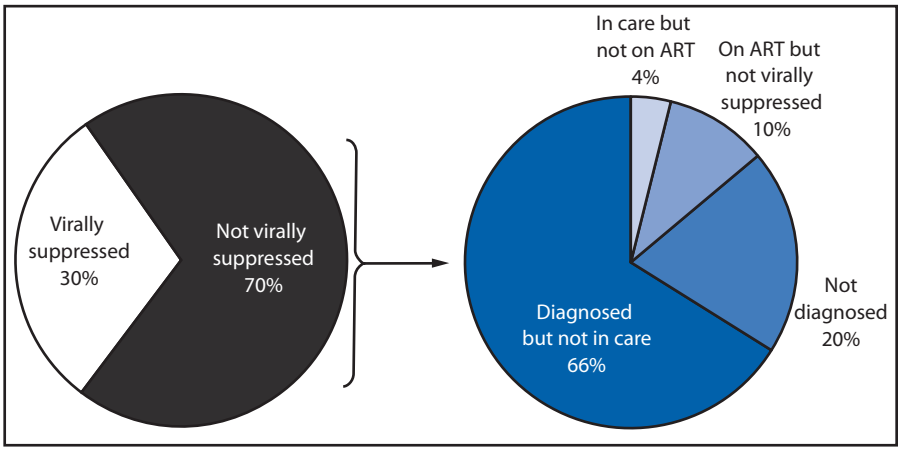
- An estimated 1.2 million persons are living with human immunodeficiency virus (HIV) in the United States. Early HIV diagnosis, timely treatment, and HIV medical care can lead to viral suppression, which improves the health of persons living with HIV, increases survival, and prevents transmission to others.
- An estimated 30% of persons living with HIV in the United States were virally suppressed in 2011, compared with 26% in 2009.
- Persons aged 18–24 years, 25–34 years, and 35–44 years were less likely to have suppressed viral load compared with those aged ≥65 years.
- Among persons whose viral load was not suppressed, 20% had never been diagnosed with HIV, 66% were diagnosed but not engaged in HIV medical care, 4% were engaged in HIV medical care but not prescribed antiretroviral therapy (ART), and 10% were prescribed ART but had not achieved viral suppression.
- Increasing viral suppression will require increasing the percentages of persons with HIV who are aware of their infection (86% in 2011), engaged in HIV medical care (40% in 2011), and prescribed ART (37% in 2011).
- Additional information is available at http://www.cdc.gov/vitalsigns.

years living with diagnosed HIV in 2011, so this limitation is unlikely to substantially influence estimates.

State and local health departments, community-based organizations, and health care providers should work to reduce undiagnosed HIV infections and ensure that comprehensive services promoting linkage to, and engagement in, HIV medical care are available to all persons diagnosed with HIV. To support these efforts, CDC provides funding and technical assistance to reduce undiagnosed HIV infection, improve initial linkage and continued engagement in HIV medical care, increase viral suppression, and address disparities along the HIV care continuum. CDC is also working with state and local health departments to expand the use of HIV surveillance data in aggregate and on the individual level to improve engagement in HIV medical care and reduce viral load. The U.S. Department of Health and Human Services is supporting a range of projects to improve outcomes along the HIV care continuum, including research, Special Projects of National Significance, the Care and Prevention in the United States Demonstration Project, Partnerships for Care, Steps to Care,† and other innovative programs.

The findings in this report indicate that continued and intensified efforts are needed along the HIV care continuum. Only with success at each step in the continuum (i.e., diagnosing those with HIV, linking them to and engaging them in care, and ensuring they receive optimal treatment and prevention services) can the ultimate goals of improving health, reducing disparities, extending lives, and preventing further HIV transmission be achieved.

**FIGURE 2. Estimated percentage of persons living with HIV infection,* by viral suppression status, and estimated percentage of persons living with HIV infection who were not virally suppressed,† by diagnosis and treatment status — United States, 2011**




**Abbreviations:** HIV = human immunodeficiency virus; ART = antiretroviral therapy.
* N = 1,201,100.
† N = 839,336.

[1]Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC (Corresponding author: Heather Bradley, hmbradley@cdc.gov, 404-639-8373)

† Additional information on these programs available online: Special Projects of National Significance (http://hab.hrsa.gov/abouthab/partfspns.html), the Care and Prevention in the United States Demonstration Project (http://www.cdc.gov/hiv/prevention/demonstration/capus), Partnerships for Care (http://www.cdc.gov/hiv/prevention/demonstration/p4c/index.html), and STEPS to Care (http://www.cdc.gov/hiv/pdf/policies_dhap_annualreport_2013.pdf).

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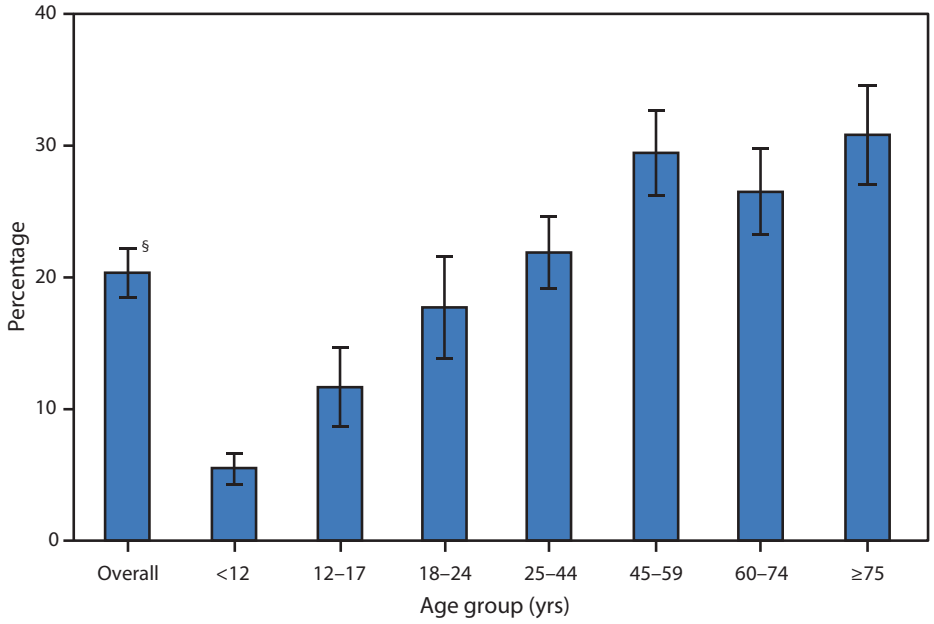
# QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

## Percentage of Mental Health–Related* Primary Care† Office Visits, by Age Group — National Ambulatory Medical Care Survey, United States, 2010




* A mental health visit was defined by at least one of the following: ordering or provision of depression screening, psychotherapy, or other mental health counseling; a mental health diagnosis or reason for visit; or a psychotropic medication that was ordered, supplied, administered, or continued at the visit. Mental health diagnosis, reason for visit, and psychotropic medications were based on certain categories. Source: Olfson M, Kroenke K, Wang S, Blanco C. Trends in office-based mental health care provided by psychiatrists and primary care physicians. J Clin Psychiatry 2014;75:247–53.

† Includes physicians in primary care specialties: general and family practice, internal medicine, pediatrics, and obstetrics/gynecology.

§ 95% confidence interval.

In 2010, 20% of all visits to primary care physicians included at least one of the following mental health indicators: depression screening, counseling, a mental health diagnosis or reason for visit, psychotherapy, or provision of a psychotropic drug. The percentage of mental health–related visits to primary care physicians increased with age through age 59 years and then stabilized. Approximately 6% of visits for children aged <12 years and approximately 31% of visits for adults aged ≥75 years were associated with mental health care.

**Source:** 2010 National Ambulatory Medical Care Survey. Available at http://www.cdc.gov/nchs/ahcd.htm.

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