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MAJOR ARTICLE

Projected Increases in Older People With HIV in the United States Through 2040

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Background. People with diagnosed HIV (PWDH) live longer but have increased co-morbidities than peers without HIV and premature ageing. In 2021, 54% of United States PWDH were aged ≥50 years. PWDH age distribution projections beyond 2030 are needed to plan future HIV and ageing care.

Methods. Our life table-based model used 2020–2021 Centers for Disease Control and Prevention National HIV Surveillance System data to project PWDH age distributions from 2021–2040 across three modeled scenarios, varying annual percentage change (APC) in HIV diagnoses (new infections proxy) and PWDH mortality rate.

Results. The median age of PWDH increased from 51 years (2021) to 55–60 years (2040) when diagnoses decreased. Numbers of older PWDH increased across racial/ethnic groups and regions, regardless of decreasing or increasing diagnoses or reducing mortality. Reducing diagnoses 90% by 2040 with reduced mortality estimated 75% (695 912) of PWDH would be aged ≥50 years, 42% (388 639) aged ≥65 years, and 20% (190 600) aged ≥75 years. Extending −3% APC reductions in diagnoses projected 64% (670 977) aged ≥50 years, 33% (350 025) aged ≥65 years, and 16% (168 139) aged ≥75 years. Modestly increasing diagnoses projected 53% (761 194) aged ≥50 years, 26% (371 244) aged ≥65 years, and 12% (171 233) aged ≥75 years. Across scenarios, the number of PWDH aged ≥50, ≥65, and ≥75 years, respectively, increased 18%–34%, 144%–171%, and 565%–654%.

Conclusions. By 2040, the estimated number of older PWDH will increase substantially, regardless of decreasing or increasing HIV diagnoses. The healthcare sector must prepare now to ensure future ageing-related care needs of PWDH are met.

Keywords. age distribution; HIV; model; older adults.

People with HIV (PWH) receiving effective antiretroviral therapy (ART) are living longer, with life expectancy approaching that of the general population [1–12]. In 2022, the Centers for Disease Control and Prevention (CDC) National HIV Surveillance System (NHSS) data estimated that 54% of 1 079 751 adults and adolescents with diagnosed HIV (PWDH) in the United States (US) were aged ≥50 years, 15% aged ≥65 years, and 3% aged ≥75 years [1]. Despite increased longevity, PWH experience increased numbers and earlier onset of non-communicable co-morbidities and premature ageing related to multiple factors, including persistent inflammation and the side effects of past ART regimens [4, 13–23]. Yet, relevant ageing and geriatric care, as well as preventative care for co-morbidities, are insufficiently incorporated into the general care of PWH [24–27]. Additional resources, healthcare and community infrastructure, and provider training are needed to deliver both HIV and ageing care for all, including older PWH, defined as aged ≥50 years. Forecasts of the age distribution of PWH in the US beyond 2030 are needed to inform healthcare planning, with additional forecasts for US subpopulations and regions. To fill these gaps, we used the proposed HIV Surveillance And Life Table-based HIV Ageing (HIV-SALT) model to project the national and subpopulation age distribution of all adult and adolescent PWDH in the US through 2040.

METHODS

Model Description and Assumptions

Our study applied the life table-based, cohort-component HIV-SALT model using a workbook developed in Microsoft Excel® to project annual age distributions of PWDH, numbers of all-cause deaths (PWDH deaths), and numbers and proportions of PWDH aged ≥50 years, ≥65 years, and ≥75 years from 2021 (baseline year) through 2040 in 5- and 10-year age groups, overall and by self-identified race/ethnicity and US geographic region of residence [28, 29]. The Supplementary Material, Supplementary HIV-SALT model methods, provides additional model methodology details. The model incorporated CDC

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Table 1. Assumptions for Modeled Scenarios[a] Projecting Age Distribution of Adult and Adolescent People With Diagnosed HIV in the United States[b] From 2021 Through 2040

Model Scenario[a,b]	APC in HIV Diagnoses 2021–2030	APC In HIV Diagnoses 2030–2040	Reduction in HIV Diagnoses	PWDH-MR Change Over 2021–2040
A (status quo)	−3.0%	−3.0%	Extended pre-COVID-19 trend (before 2020)	0%
B (optimistic)	−11.2%	−11.2%	Reach 90% reduction in 2040	Linear decrease to gpMR
C (pessimistic)	+3.0%	+3.0%	–	0%

Abbreviations: APC, annual percentage change; gpMR, relevant general population, subpopulation-specific, or regional population-specific mortality rate; PWDH, people aged ≥13 y diagnosed with HIV; PWDH-MR, PWDH mortality rate.

[a]Modeled scenario assumptions for reducing or increasing HIV diagnoses (a proxy for new infections) from the Ending the HIV Epidemic in the United States initiative (EHE) baseline year estimated number of new infections, with or without reduction in PWDH-MR, from 2021 through 2040: Scenario A (status quo): Held −3.0% APC (proximate pre-COVID-19 trend, before 2020) in HIV diagnoses over 2021–2040, with 0% change in 2021 PWDH-MR throughout 2021–2040; Scenario B (optimistic): Held −11.2% APC in HIV diagnoses over 2021–2040 to reach 90% reduction (from EHE baseline) by 2040, with linear decrease in PWDH-MR from 2021–2040 to reach the relevant gpMR by 2040; Scenario C (pessimistic): Set +3.0% APC over both 2021–2030 and 2030–2040, with 0% change in 2021 PWDH-MR throughout 2021–2040 [34]. Assumptions for modeled scenarios D, E, and F are found in the Supplementary Material, Supplementary Table 1.

[b]In the 50 states and District of Columbia, as of year-end.

NHSS data from 50 states and the District of Columbia and assumed minimal change in US internal migration trends. Using HIV diagnoses as a proxy for new infections, we projected age distributions for six scenarios (A through F) that varied the assumed annual percentage change (APC) in HIV diagnoses and the PWDH mortality rate (PWDH-MR) over time. The model separately fixed the assumed APC in HIV diagnoses for the periods 2021–2030 and 2030–2040, and assumed either a fixed PWDH-MR set at the 2021 value, or a linear decrease in PWDH-MR to reach the relevant 2021 general population, subpopulation-specific, or regional population-specific MR in 2040 [30–33]. This report presents the results of modeling Scenarios A, B, and C; Supplementary Material shows projections applying Scenarios D, E, and F.

Scenario A (status quo) extended the −3.0% APC pre-COVID-19 (before 2020) trend in HIV diagnoses and the 2021 PWDH-MR from 2021 through 2040. This modeled the effects of continuing small annual reductions in HIV diagnoses and new HIV infections with stable PWDH deaths (Table 1).

Scenario B (optimistic) fixed the APC in HIV diagnoses at −11.2% from 2021 through 2040 to model reaching a 90% reduction in diagnoses (from the Ending the HIV Epidemic in the US (EHE) initiative baseline year estimated number of new HIV infections) in 2040; the EHE goal was to reach 90% reduction in new HIV infections by 2030. It also assumed the PWDH-MR linearly decreased from 2021 through 2040 to equal the relevant 2021 general, subpopulation, or regional population MR in 2040 [31–34].

Scenario C (pessimistic) fixed the APC in HIV diagnoses at +3.0% from 2021 through 2040 to conservatively estimate the effect of potential increases in new HIV infections if HIV prevention efforts or their effectiveness decrease. It also extended the 2021 PWDH-MR through 2040.

The Supplementary Material describes additional HIV-SALT methodology details and a model workbook that can generate updates and subnational projections (Supplementary Material, HIV-SALT model methods). It also presents Scenarios D, E, and F projected age distributions, modeling reductions in HIV diagnoses that fall between the assumed rates in Scenarios A, B and C, with or without reductions in PWDH-MR (Supplementary Table 1, Supplementary Figure 1).

Data Sources and Validation

We input the following NHSS year-end data for each age group, overall and by race/ethnicity and region: 1) 2020 number of PWDH; 2) 2021 number of reported HIV diagnoses; and 3) 2021 number of PWDH deaths [30]. We also input the 2021 complete period US life tables for each age-specific general population, racial/ethnic subpopulation, and regional population MR [31–33]. The HIV-SALT modeled 2021 estimates were validated against 2021 NHSS and historical surveillance data [30]. This activity was reviewed by CDC, deemed not

research, and conducted consistent with applicable federal law and CDC policy.

RESULTS

Overall

The HIV-SALT model estimated that among 1 053 316 PWDH in the US in the model base year 2021, 54.0% were aged ≥50 years, 13.6% aged ≥65 years, and 2.4% aged ≥75 years; the median age was 51 years (Supplementary Table 2). All scenarios forecast a progressive rightward shift of the PWDH age distribution curve toward older ages from 2021 through 2040, but Scenario C also projected a larger increase in the numbers of PWDH aged 20–49 years by 2040 (Figure 1).

Scenario A (status quo) projected a 0.4% increase (from 2021) in the overall number of PWDH to 1 057 478 in 2040 after increasing to 1 116 598 PWDH in 2030. The median age increased to 53 years by 2030 and 55 years by 2040 (Supplementary Table 2). The estimated proportions and numbers of older PWDH steadily increased from 2021 through 2040, to 63.5% (670 977) aged ≥50 years, 33.1% (350 025) aged ≥65 years, and 15.9% (168 139) aged ≥75 years in 2040. In 2040, an estimated 84.5% of PWDH deaths occurred at age ≥50 years and 62.1% at age ≥65 years (Supplementary Figure 2).

Scenario B (optimistic) projected a 12% decrease (from 2021) in the overall number of PWDH to 929 758 in 2040, after increasing to 1 057 057 in 2030. The median age increased to 55 years in 2030 and 60 years in 2040. The estimated proportions and numbers of older PWDH increased to 74.8% (695 912) aged ≥50 years, 41.8% (388 639) aged ≥65 years, and 20.5% (190 600) aged ≥75 years in 2040. In 2040, an estimated 80.9% of PWDH deaths occurred at age ≥65 years and 57.4% of deaths at age ≥75 years.

Scenario C (pessimistic) projected a 37% (385 615) increase (from 2021) in the overall number of PWDH to 1 438 931 in 2040. The median age was 52 years in 2030 and 51 years in 2040. Although the estimated proportion of PWDH aged ≥50 years decreased slightly, the absolute number increased, with 52.9% (761 194) aged ≥50 years in 2040. However, both the proportions and absolute numbers of PWDH aged 65 years or older increased from 2021 to 2040, with 25.8% (371 244) aged ≥65 years and 11.9% (171 233) aged ≥75 years in 2040. In 2040, an estimated 78.6% of PWDH deaths occurred at age ≥50 years, and 55.5% at age ≥65 years.

From 2021 through 2040, all three modeled scenarios projected substantial increases in the number of older PWDH, greatest among those aged ≥75 years. The estimated percentage increase in the number of older PWDH ranged from 18%–34% (102 169–192 386) among those aged ≥50 years, 144%–171% (206 774–245 388) among those aged ≥65 years, and 565%–654% (142 859–165 321) among PWDH aged ≥75 years (Figure 2).

Racial/Ethnic Subpopulations. In the model base year 2021, an estimated 39.9% (420 251) of 1 053 316 PWDH were non-Hispanic Black/African American (Black) persons, 24.0% (252 693) Hispanic/Latino (Hispanic) persons of any race, 28.6% (301 520) non-Hispanic White (White) persons, and 7.5% (78 852) non-Hispanic All Other races/ethnicities (Supplementary Table 3). Furthermore, 50.1%, 47.5%, 66.1%, and 49.6% of Black, Hispanic, White, and All Other PWDH, respectively, were aged ≥50 years, 10.3%–18.0% aged ≥65 years, and 1.9%–3.2% aged ≥75 years. Median ages were respectively 50, 48, 55, and 49 years. From 2021 through 2040, Scenarios A and B assumptions projected a progressive rightward shift in the age distribution of all racial/ethnic subpopulations to older ages (Figure 3). Scenario C assumptions also forecast a rightward shift to older ages along with a large rise in the number of PWDH aged 20–49 years.

Scenario A (status quo) estimated the proportions of Black, Hispanic, White, and All Other PWDH aged ≥50 years respectively increased to 59.1%, 61.3%, 72.3%, and 63.3% in 2040, with 28.9%, 29.5%, 44.1%, and 29.4% of Black, Hispanic, White, and All Other PWDH aged ≥65 years, and 13.5%, 12.6%, 23.6%, and 12.3% aged ≥75 years (Supplementary Tables 3–4). Supplementary Figure 3 shows the percentage increase in numbers of PWDH aged ≥50 years, ≥65 years, and ≥75 years for each modeled scenario.

Scenario B (optimistic) projected the proportions of Black, Hispanic, White, and All Other PWDH increased to 70.3%, 73.1%, 82.2%, and 75.6% aged ≥50 years in 2040, with 36.3%, 37.7%, 53.2%, 39.0% aged ≥65 years, and 17.3%, 16.6%, 29.2%, and 17.3% aged ≥75 years in 2040.

In contrast, from 2021 to 2040 Scenario C (pessimistic) projected slight decreases in the proportions of Black and White PWDH but increases in the proportions of Hispanic and All Other PWDH aged ≥50 years; however, the absolute numbers of Black, Hispanic, White, and All Other PWDH aged ≥50 years steadily increased through 2040 (Supplementary Tables 3–4). From 2021 to 2040, both the proportions and numbers of PWDH aged ≥65 years and ≥75 years increased across all four racial/ethnic subpopulations. By 2040, the projected proportions of Black, Hispanic, White, and All Other PWDH were respectively 48.8%, 50.2%, 62.2%, and 52.7% aged ≥50 years, with 22.6%, 22.6%, 35.0%, and 23.1% aged ≥65 years, and 10.1%, 9.4%, 18.0%, and 9.4% aged ≥75 years.

Regions. In the model base year 2021, the model estimated that 12.1% (126 945) of PWDH resided in the Midwest, 21.8% (229 408) in the Northeast, 46.0% (484 783) in the South, and 20.1% (212 180) in the West (Supplementary Table 5). The median ages were respectively 49, 54, 50, and 52 years.

Model Scenarios A (status quo) and B (optimistic) projected steady rightward shifts to older ages in all regional age distributions throughout 2021 to 2040 (Figure 4). For 2040, Scenarios

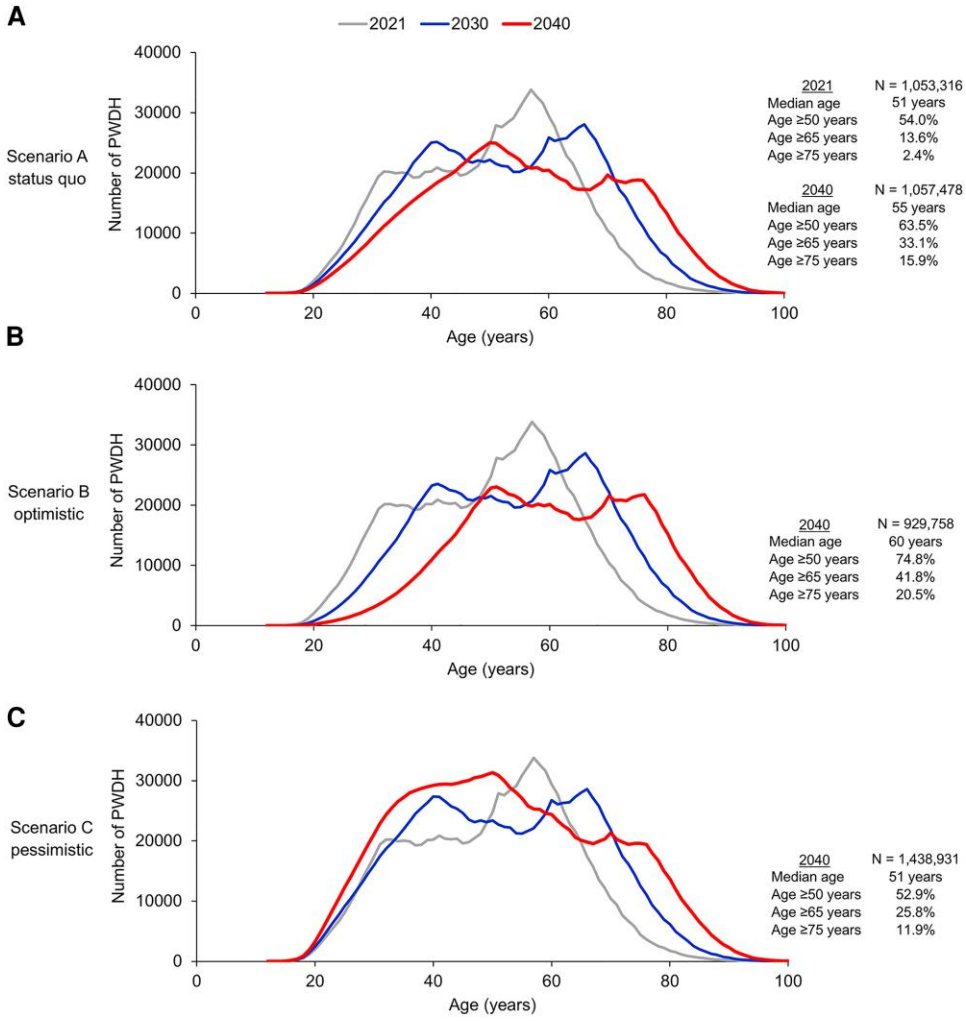

Figure 1. Projected change in age distribution of adults and adolescents with diagnosed HIV in the United States from 2021 through 2040, by year and modeled scenario.[a,b] [a]Modeled scenario assumptions for reducing or increasing HIV diagnoses (a proxy for new infections) from the Ending the HIV Epidemic initiative (EHE) baseline year estimated number of new HIV infections, with or without reducing the mortality rate (MR) of people aged ≥13 y with HIV (PWDH, PWDH-MR) in the United States (50 states and District of Columbia) as of year-end, from 2021 through 2040: (A) Scenario A (status quo): Held −3.0% annual percentage change (APC) in HIV diagnoses (proximate pre-COVID-19 trend, before 2020) over 2021 through 2040, with 0% change in 2021 PWDH-MR throughout 2021–2040; (B) Scenario B (optimistic): Held −11.2% APC in HIV diagnoses over 2021 through 2040 to reach 90% reduction (from EHE baseline) by 2040, with linear decrease in PWDH-MR from 2021–2040 to reach the general population mortality rate (gpMR) by 2040; (C) Scenario C (pessimistic): Set +3.0% APC in HIV diagnoses over 2021–2030 and 2030–2040, with 0% change in 2021 PWDH-MR throughout 2021–2040 [29–31, 34]. [b]PWDH age distributions under modeled Scenarios D, E, and F are found in the Supplementary Material, Supplementary Figure 1.

A and B projected that 47% and 48% (504 592 and 436 004), respectively, of all PWDH would reside in the South, with another 18%–22% residing in both the Northeast and West regions (Supplementary Table 5). Furthermore, both the proportions and numbers of PWDH aged ≥50 years, ≥65 years, and ≥75 years steadily increased in all four regions (Supplementary Table 4).

From 2021–2040, model Scenario C (pessimistic) projected slight decreases in the proportions of PWDH aged ≥50 years residing in the South and West, but increases in the proportions aged ≥65 years and ≥75 years in all four regions (Supplementary Table 4). The absolute numbers of PWDH aged ≥50 years, ≥65 years, and ≥75 years, however, increased in all four regions (Supplementary Table 4, Supplementary Figure 3). In 2040, model Scenarios A, B, and C projected the largest proportion of PWDH aged ≥50 years would reside in the Northeast, but the greatest absolute number aged ≥50 years would remain highest in the South.

DISCUSSION

Remarkable achievements in HIV research, care, and public health interventions have helped transform the lives of people with HIV. HIV infection need no longer forecast a life expectancy of only a few years; instead, HIV has become a chronic condition. With antiretroviral treatment and viral suppression, the life expectancy of PWDH now approaches the life

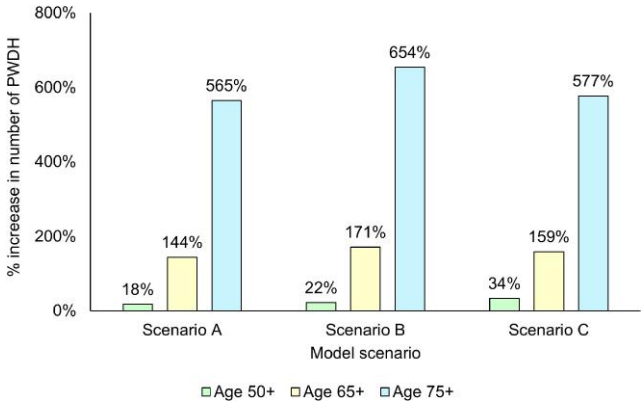

Figure 2. Estimated percentage change in the overall number of older people with diagnosed HIV in the United States[a] from model base year 2021 through 2040, by age and modeled scenario.[b] Abbreviations: PWDH, people aged ≥13 y diagnosed with HIV. [a]In the 50 states and District of Columbia, as of year-end. [b]Modeled scenario assumptions for reducing or increasing HIV diagnoses (a proxy for new infections) from the Ending the HIV Epidemic in the United States initiative (EHE) baseline year estimated number of new HIV infections, with or without reducing mortality rate (MR) of PWDH (PWDH-MR), from 2021 through 2040: Scenario A (status quo): Held −3.0% annual percentage change (APC) in HIV diagnoses (proximate pre-COVID-19 trend, before 2020) over 2021–2040, with 0% change in PWDH-MR throughout 2021–2040; Scenario B (optimistic): Held −11.2% APC in HIV diagnoses over 2021–2040 to reach 90% reduction (from EHE baseline) by 2040, with linear decrease in 2021 PWDH-MR from 2021–2040 to reach the general population-specific MR (gpMR) by 2040; Scenario C (pessimistic): Set +3.0% APC in HIV diagnoses from 2021–2030 and 2030–2040, with 0% change in 2021 PWDH-MR throughout 2021–2040 [29–31, 34].

expectancy of people without HIV [1–20]. To assist the healthcare system, public health, and communities plan for the care of ageing PWDH, our model projected changes in the numbers of PWDH through 2040, particularly among older age groups and across racial/ethnic groups and regions under different assumptions.

Main Findings

Leveraging recent national HIV surveillance data, we used the newly developed, life table-based HIV-SALT model to forecast the age distribution of PWDH in the US from 2021 through 2040, modeling three scenarios and focusing attention on older age groups and changes across racial/ethnic subpopulations and geographic regions.

We found the overall absolute number of PWDH in 2040 would continue changing as expected—increasing if there is no change in recent HIV diagnosis (proxy for new infections) and PWDH mortality trends, decreasing if diagnoses and PWDH mortality decrease, and substantially increasing with even a modest annual increase in the number of diagnoses and no change in PWDH mortality. Key study findings show a progressive rightward shift in the age distribution of PWDH to older ages from 2021 through 2040, regardless of whether HIV diagnoses decrease or increase and irrespective of improvements in PWDH longevity; although an increase in diagnoses also substantially increased the number of PWDH under age 50 years. Notably, regardless of the scenario modeled, the absolute number of older (aged ≥50 years) PWDH would grow through 2040, with the number aged ≥65 years increasing to around two and one-half times or more the number in 2021, and the number aged ≥75 years substantially increasing to around seven times the number in 2021. Differences by race/ethnicity and geography would persist, but numbers of older PWDH substantially increase in all subpopulations and regions.

Despite methodologic differences, our findings from modeling reductions in HIV diagnoses are largely consistent with the ProjEcting Age, multimoRbidity, and poLypharmacy (PEARL) simulation model results, which found increases in ART users through 2030 [11, 35]. The results of modeling a modest increase in diagnoses is consistent with two recently published transmission models that assessed the effects of decreased national HIV prevention efforts producing increases in new HIV infections through 2030 [36, 37].

Our findings highlight the anticipated substantial growth in the number of older PWDH, particularly those aged ≥65 or ≥75 years, over the next 15 years. Providing HIV care and primary prevention appropriate for an ageing population disproportionately affected by more non-infectious co-morbidities and premature ageing than people without HIV will be essential [4, 13–24, 38–40]. The rightward age shift with increased numbers of older PWDH will place increasingly larger demands on healthcare systems, HIV care providers, and communities. While not addressed by this model, evidence also indicates that attention to earlier onset of co-morbidities in PWDH with long-standing HIV infection following perinatal, childhood, adolescent, or early adulthood HIV infection is needed [41–44].

A number of analyses indicate the US healthcare sector is unprepared to meet these demands, although several integrated models of care are being piloted [24–27]. Additional providers and provider training, clinical resources, and infrastructure will be required. Furthermore, the persisting racial/ethnic and regional differences in the numbers of ageing and older PWDH may place additional and differing demands on communities and regions, influenced by underlying socioeconomic factors and differential healthcare access [45]. Some analyses indicate the total future healthcare costs of caring for PWDH—HIV care plus care for non-HIV co-morbidities and all other conditions—will be substantially greater than those for people without HIV, potentially up to six to seven times greater [46–48]. Planning for the financing of these additional costs now would be prudent.

The modest increase in HIV diagnoses modeled by our Scenario C (pessimistic) estimated a substantial 36% (381 453) increase in the number of PWDH by 2040 compared

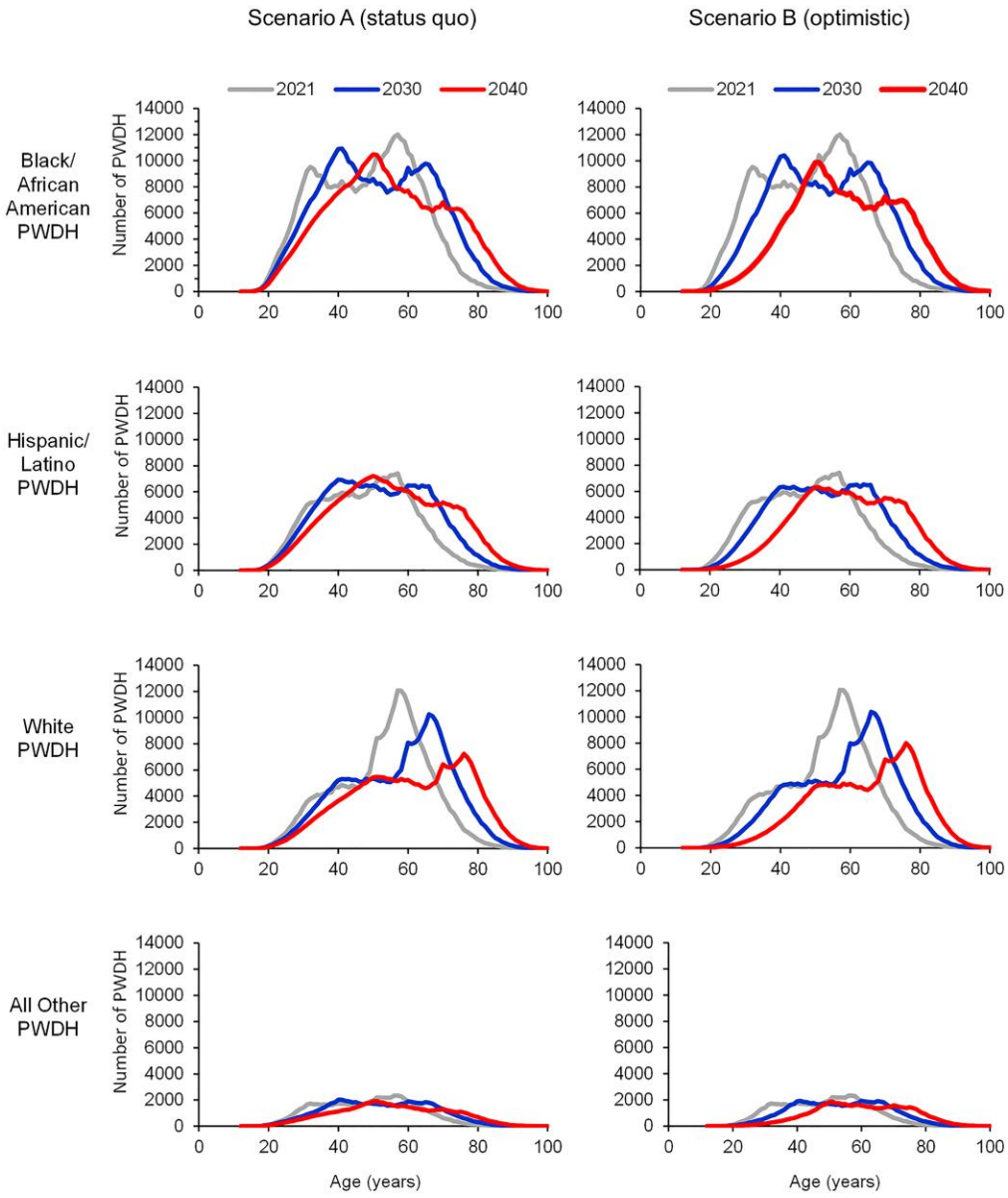

Figure 3. Projected age distribution of adult and adolescent people with diagnosed HIV in the United States[a] from 2021 through 2040, by year, race/ethnicity,[b] and modeled scenario.[c] Abbreviations: PWDH, people aged ≥13 y with diagnosed HIV. [a]In the 50 states and District of Columbia, as of year-end. [b]Race/ethnicity categories are defined as people who self-identified as non-Hispanic Black/African American, Hispanic/Latino (any race), non-Hispanic White, or non-Hispanic All Other (any other) race/ethnicity. [c]Modeled scenario assumptions for reducing or increasing HIV diagnoses (a proxy for new infections) from the Ending the HIV Epidemic in the United states initiative (EHE) baseline estimated number of new HIV infections, with or without reduction in the mortality rate (MR) of PWDH (PWDH-MR), from 2021 through 2040: Scenario A (status quo): Held −3.0% annual percentage change (APC) in HIV diagnoses (proximate pre-COVID-19 trend, before 2020) over 2021–2040, with 0% change in 2021 PWDH-MR through 2040; Scenario B (optimistic): Held −11.2% APC in HIV diagnoses over 2021–2040 to reach 90% reduction (from EHE baseline) by 2040, with linear decrease in 2021 PWDH-MR from 2021–2040 to reach each race/ethnicity-specific population MR (gpMR) by 2040 [29–31, 33, 34].

to our Scenario A (status quo). Applying the estimated additional lifetime medical costs, ranging from $500 000 to $1M per person with HIV, to our findings results in total additional lifetime medical costs between $190B—$380B [46, 47, 49]. In addition to preparing for the higher medical costs of caring for the ageing population of PWDH, maintaining a robust and effective domestic HIV prevention agenda could save billions of additional and potentially preventable medical costs.

We did not model an increase in PWDH mortality concurrent with an increase in HIV diagnoses in the US, the potential result of reducing both HIV treatment and HIV prevention programs. However, a recent publication modeling brief, prolonged, and complete interruptions of Ryan White HIV/AIDS

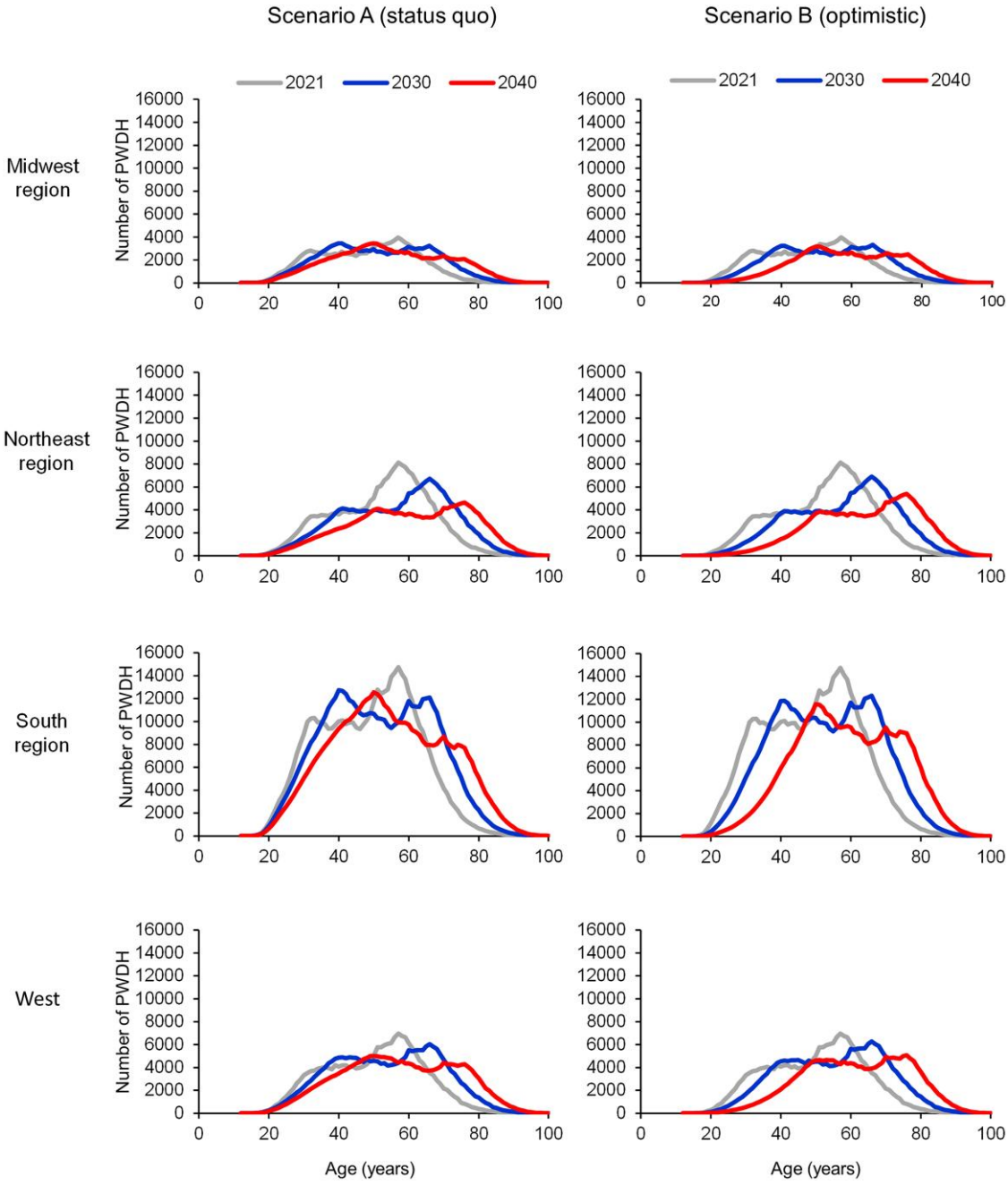

Figure 4. Projected age distribution of adults and adolescents with diagnosed HIV in the United States[a] from 2021 through 2040, by region of residence,[b] and modeled scenario.[c] Abbreviations: PWDH, people aged ≥13 y with diagnosed HIV. [a]In the 50 states and District of Columbia, as of year-end. [b]United States Census Bureau major geographic regions: Midwest; Northeast; South; and West [29]. [c]Modeled scenario assumptions for reducing or increasing HIV diagnoses (a proxy for new infections) from the Ending the HIV Epidemic in the United States initiative (EHE) baseline year estimated number of new infections, with or without reduction in the mortality rate (MR) of PWDH (PWDH-MR), during 2021 through 2040: Scenario A: Held −3.0% annual percentage change (APC) in HIV diagnoses (proximate pre-COVID-19 trend, before 2020) over 2021–2040, with 0% change in 2021 PWDH-MR through 2040; Scenario B: Held −11.2% APC in HIV diagnoses over 2021–2040 to reach 90% reduction (from EHE baseline) by 2040, with linear decrease in PWDH-MR from 2021–2040 to reach each region-specific population MR (gpMR) by 2040 [29–32, 34].

Program funding during 2025 estimated that interruption of HIV treatment and care services might result in approximately 29 000–75 000 excess HIV infections across the 31 high-burden US cities during 2025–2030; the greatest increase occurred among PWH aged <25 years, with an estimated 15% increase in PWH mortality [50].

Regardless of the immediate future of HIV prevention, HIV diagnoses, and new HIV infections, the number of people with

HIV requiring specialty care related to advancing age and non-infectious co-morbidities will substantially increase from present levels, especially if mortality continues to improve in all racial/ethnic subpopulations and regions.

Limitations

Our findings are subject to several limitations. We focused on projecting the numbers of PWDH and their age distribution through 2040 by applying relatively simple life table-based, cohort-component methodology utilizing NHSS aggregated observed data [28, 30–33]. The HIV-SALT model fixed the APC in HIV diagnoses over 2021–2030 and 2030–2040, and assumed improvement in PWDH-MR would be linear, also without accounting for COVID-19 contributions to PWDH-MR. Additionally, projections modeling increasing HIV diagnoses provided a preliminary, conservative estimate of potential increases in numbers of overall and older PWDH if HIV prevention efforts decreased or stopped. We used HIV diagnoses as a proxy for new HIV infections and assumed factors separately affecting incidence and diagnosis remained stable, such as HIV testing and time from infection to diagnosis. We also did not incorporate estimates for people with undiagnosed HIV, including older PWDH with undiagnosed HIV or delayed HIV diagnosis, numbers that might increase with reductions in HIV testing and prevention outreach; and we did not model a potential increase in mortality that might result [1].

Finally, the HIV-SALT model offers a simplified approach to allow frequent updates and local projections, but does not incorporate co-morbidities, ART use, or changes to other factors reflected in the surveillance data used to validate the model. If major changes in underlying factors affect HIV exposure risk or infection prevention, diagnosis rates (eg, HIV testing efforts), HIV treatment, or viral suppression, the relative accuracy of the model projections might change and would require re-evaluation, particularly for changes differing by age, race/ethnicity, region, or internal US migration.

CONCLUSION

The HIV-SALT model projected rightward shifts in the age distribution of US PWDH toward older ages through 2040, with consistently increasing numbers of older PWDH, particularly those aged ≥75 years, and irrespective of decreases or moderate increases in diagnoses (proxy for new infections) or reductions in mortality. Although differences between racial/ethnic subpopulations and geographic regions persisted, the number of older PWDH increased in all subpopulations and regions. Regardless of any immediate future changes to HIV prevention efforts, the number of PWDH requiring specialty care related to advancing age and greater burden of non-infectious co-morbidities would increase substantially from present levels, especially if PWDH mortality continues to improve. There is a pressing need to plan for ART and appropriate ageing and geriatric care, as well as timely primary prevention for the growing and increasingly older population of people with HIV. The healthcare sector must prepare now to ensure that appropriate care for ageing people with HIV (including comprehensive and multi-disciplinary care) will meet future needs.

Supplementary Data

Supplementary materials are available at *Open Forum Infectious Diseases* online. Consisting of data provided by the authors to benefit the reader, the posted materials are not copyedited and are the sole responsibility of the authors, so questions or comments should be addressed to the corresponding author.

Notes

Author Contributions. Concept and design: Brooks, Buchacz, Farnham, Lyles, O'Connor, Song, Viguerie. Acquisition, analysis, or interpretation of data: All authors. Drafting of the manuscript: Brooks, Buchacz, Lyles, O'Connor. Critical review of the manuscript for important intellectual content: All authors. Current data access: O'Connor, Byrd.

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For federal law regarding research determination, see eg, 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. §241(d); 5 U.S.C. §552a; 44 U.S.C. §3501 et seq.

Disclaimer. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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Data Sharing. Source data are publicly available [30–33]. The model workbook may be available in 2025 on request by contacting sbo5@cdc.gov or gdn8@cdc.gov.

Potential conflicts of interest. All authors: All authors report no conflicts of interest.

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