

Supplementary Material

Projected Increases in Older and Elderly People with HIV in the United States Through 2040

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Supplementary Methods

Supplementary HIV-SALT model methods

We developed the new life table-based, cohort-component, HIV Surveillance And Life Table-based HIV Aging (HIV-SALT) model to project changes in the age distribution of people aged ≥ 13 years living with diagnosed HIV (PWDH) in the United States (U.S.) spanning 2021-2040. The model uses the observed single-year mortality rate for age in a specific calendar year, and inputs derived from national surveillance data.¹ Model assumptions vary the annual percentage change (APC) in HIV diagnoses (a proxy for new HIV infections) paired with stable or reduced PWDH mortality rate (PWDH-MR). The combined assumptions model different percentage reductions in the number of diagnosed HIV infections with stable or improved lifespan of PWDH to project the future age distribution and number of PWDH, proportions of PWDH in each age group, and numbers of deaths among PWDH that year. Results are presented by age group for the overall national population of PWDH, select sub-populations of PWDH, and different U.S. regions. Race/ethnicity was defined as an individual's self-identified race/ethnicity as non-Hispanic Black/African American (Black), Hispanic/Latino or any race (Hispanic), non-Hispanic White, or non-Hispanic All Other (any other/none of the first three subgroups). Region was defined as the geographic region of residence at the time of data collection, in one of the following four major U.S. Census Bureau-defined regions: Midwest; Northeast; South; and West.²

1. Notation

a is the age in years of an individual person living with diagnosed HIV.

$P_y(a)$ is the number of PWDH alive at the end of calendar year y (as of December 31).

$N_y(a)$ is the number of people aged a years at the beginning of calendar year y who are diagnosed with HIV during that calendar year.

$D_y(a)$ and $R_y(a)$, respectively, are the number and percent of PWDH aged a years at the beginning of calendar year y who died during that calendar year.

2. Projection of future age distribution

The age-specific number of PWDH for a given year y is calculated from the number of PWDH (living) at year-end the preceding year (0, or $y - 1$) and number of HIV diagnoses and PWDH deaths during year y .

$$P_y(a + 1) = P_{y-1}(a) + N_y(a) - D_y(a) \quad [\text{EQ1}]$$

The age-specific death rate for the given year y can be calculated as follows.

$$R_y(a) = D_y(a) / (P_{y-1}(a) + N_y(a)) \quad [\text{EQ2}]$$

Given the death rates of PWDH during a given year y , the age-specific number of PWDH for that year can be calculated as follows.

$$P_y(a + 1) = (P_{y-1}(a) + N_y(a)) \cdot (1 - R_y(a)) \quad [\text{EQ3}]$$

Example:

If the following are provided

- Age-specific number of PWDH at the end of year 0, and
- Age-specific number of HIV diagnoses during year 1, and
- Age-specific death rate among these two groups during year 1,

then we can calculate the age-specific number of PWDH at the end of year 1. P2021 (a), based on EQ3, as follows:

$$P2021(a+1) = (P2020(a) + N2021(a)) \cdot (1 - R2021(a)),$$

with $a = 12, 13$, and older ages, in years.

For each modeled scenario, calculation of the number of PWDH at the end of year 1 can be carried forward to project the number and age distribution of PWDH in future years and estimate the numbers of PWDH and PWDH deaths in 10-year or 5-year age groups under different modeled scenarios. The assumptions reflect the expected efficacy or effectiveness of select HIV prevention interventions and prevention programs and different PWDH-MR (static or decreasing to reach the general population MR [gpMR]). Specifically, different combinations of any APC in HIV diagnoses and different PWDH MR can be input. However, the model is also pre-linked to Ending the HIV Epidemic in the United States initiative (EHE) goals with scenarios that project different results. Those scenarios base assumptions on the U.S. reaching its EHE goals of 75% reduction (from 2017 EHE baseline year) in new HIV infections by 2025 or 90% reduction by 2030, or reaching these reductions in 2040.³ The model also varies the PWDH-MR, either maintaining the 2021 model base year PWDH-MR, or setting it to linearly decrease from the 2021 PWDH-MR to reach the relevant, age-specific general population, subpopulation-, or regional population-specific MR (all considered the gpMR for that population/subpopulation/region) in the target year.⁴⁻⁶

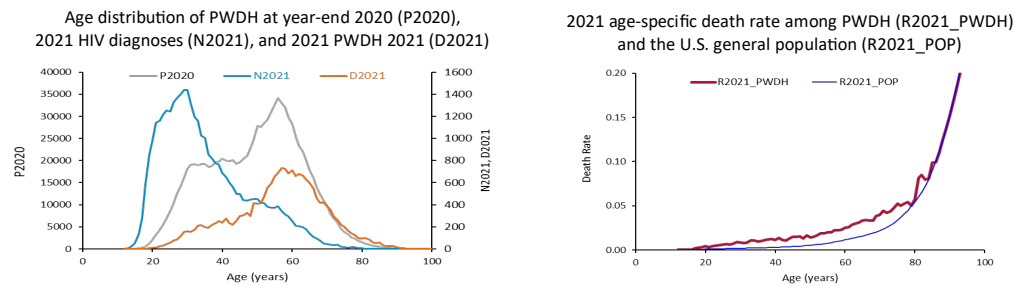
3. Input data

This analysis used 2021 as the model base year y to account for the 12-month delay in completion and validation of U.S. local and state HIV surveillance reporting to the Centers for Disease Control and Prevention (CDC) and calculation of national estimates from HIV surveillance estimates, including verification of PWDH deaths.

U.S. national surveillance data provided inputs:

- CDC U.S. National HIV Surveillance System (NHSS) data on all people with diagnosed HIV in the U.S. (50 states and District of Columbia) as of year-end (December 31) for each of the following: a) number of PWDH in 2020 (P2020, $n=1,053,300$); b) number of HIV diagnoses in 2021 (N2021, $n= 35,670$); and c) number of PWDH deaths in 2021 (D2021, $n= 20,071$)¹
- 2021 U.S. Life Tables of general population mortality estimates (overall population, subpopulation-specific, and regional population-specific), based on final numbers of deaths in the general population (R2021G) and calculated as $R2021G = D2021G/P2021G$ using the number of deaths in the general population in 2021 (D2021G)), and the July 1, 2021, population estimates (P2021G) produced by the U.S. Census Bureau.⁴⁻⁶
- R2021H, the 2021 age-specific death rate among PWDH, derived from the NHSS data and U.S. Life Tables R2021G (2021 death rate in the general population) using the formula:

$$R2021H = \max(D2021/(P2020+N2021), R2021G).$$



4. Workbook to project future overall age distribution of PWDH

We developed a Microsoft Excel® workbook that automatically computes the following, based on input data: a) projected annual age distributions of PWDH from 2021-2040 in 5- and 10-year age groups; and b) estimated numbers and proportions of PWDH and numbers of PWDH deaths by 10-year age groups. The workbook can be modified to project changes in the age distribution of PWDH by age group at sub-national or jurisdiction levels (e.g., state, city, county) by replacing national surveillance data inputs with jurisdiction-level inputs. There are separate worksheets for Input data, Projection assumptions (i.e., assumed APC and MR), and the Output displays.

4.1. Input data worksheet

This analysis inputs NHSS and U.S. Life Table data from: 2020 year-end age-specific number of PWDH (P2020); 2021 year-end number of HIV diagnoses (N2021); 2021 year-end number of reported deaths among PWDH (D2021); and 2021 death rate in the U.S. general population (R2021G).^{1,3}

4.2. Projection assumption worksheet

The analyst may enter any negative or positive APC in HIV diagnoses and PWDH MR or select a pre-coded APC (aligned with EHE goal for reducing new HIV infections) and PWDH MR from a menu.

Example: If N2040 is the number of HIV diagnoses in target year 2040 and APC is a constant, then

$$APC = 1 - (N2040/N2021)^{(1/(2040-2021))}.$$

- If the Death Weight Change (DWC) of the death rate weight between the baseline year PWDH death rate (R2021H) and population rate R2021G:

$$DWC = DW(y+1) - DW(y) \text{ for } y = 2021, 2022, \dots, 2039.$$
 - If $[DW(2021) = 0, DW(2040) = 1]$, then $DW(y) = (y-2021)/(2040-2021)$ and $DWC = 1/19$.
 - Given $DW(y)$, the death rate for year y is

$$R(y) = R2021H \times DW(y) + R2040H \times (1-DW(y)).$$

4.3. WS3 – Computation worksheet

- Section showing the calculated age-specific number of PWDH each year during 2021-2040

- Section showing the calculated age-specific numbers of HIV diagnoses each year during 2021-2040 based on N2021 and the APC selected in WS2 – Projection assumptions.
- Section showing the calculated age-specific numbers of deaths among PWDH each year during 2021-2040, based on the previous year number of PWDH deaths and death rates based on the DWC selection in WS2 – Projection assumptions.
- Output worksheet displays
 - Frequency tables for the 2021-2040 projections
 - Estimated number of PWDH by age group and year, with proportion of PWDH in each age group and overall median age and average age for the respective year; and
 - Estimated number of PWDH deaths by age group and year, with proportion of deaths by age group and overall median age and average age of the deaths.
- Graphic figures of the projections
 - Line graphs displaying the series of PWDH age distributions and deaths among PWDH for each year during 2021-2040; and
 - Bar graphs showing changes in the number and proportion of PWDH and deaths among PWDH, in 10-year age groups for each year during 2021-2040.

Model Scenarios D, E, and F

As described in Supplementary Methods, the HIV Surveillance And Life Table-based HIV Aging (HIV-SALT) model allowed assumptions that varied the annual percentage change (APC) in HIV diagnoses (a proxy for new HIV infections) and the mortality rate in people aged ≥ 13 years with diagnosed HIV (PWDH, PWDH-MR) in the United States (U.S.). Modeled Scenario D used the same reduction in HIV diagnoses as Scenario C (result shown in main report), but maintains the 2021 PWDH-MR through 2040 instead of reducing the PWDH-MR to reach the relevant gpMR in 2040. Modeled Scenario E assumed the Ending the HIV Epidemic in the United States (EHE) goal to reduce HIV infections 75% by 2025 would instead be reached in 2040, while Scenario F assumed the 75% reduction goal would be reached in 2030 followed by no further reductions, as might occur with decreased effectiveness, availability, or use of HIV prevention efforts. Both model Scenarios E and F assumed PWDH-MR decreases to the relevant 2021 gpMR over 2021 through 2040.

As reference, Scenario A (status quo) modeled extending a more recent (pre-COVID-19, pre-2020) trend in small (-3.0% APC) annual reductions in HIV diagnoses while maintaining the 2021 PWDH-MR through 2040; and Scenario B (optimistic) modeled reaching 90% reduction in HIV diagnoses (proxy for new infections) from the EHE baseline year estimated number of infections by 2040 instead of 2030. In contrast, Scenario C (pessimistic) modeled a modest increase in HIV diagnoses (proxy for new infections) through 2040 while maintaining the 2021 PWDH MR through 2040.

Supplementary Table s1. HIV-SALT model assumptions to project age distribution of adults and adolescents with diagnosed HIV in the United States^a from 2021 through 2040.

Model scenario ^b	APC in HIV diagnoses 2021-2030	APC in HIV diagnoses 2030-2040	Reduction in HIV diagnoses ^c	PWDH-MR change over 2021-2040
A	-3.0%	-3.0%	Extending pre-COVID-19 trend (before 2020)	0%
B	-11.2%	-11.2%	Reach 90% reduction in 2040	Linear decrease to gpMR
C	+3.0%	+3.0%	—	0%
D	-11.2%	-11.2%	Reach 90% reduction in 2040	0%
E	-6.9%	-6.9%	Reach 75% reduction in 2040	Linear decrease to gpMR
F	-13.9%	0%	Reach 75% reduction in 2030, 0% reduction from 2030-2040	Linear decrease to gpMR

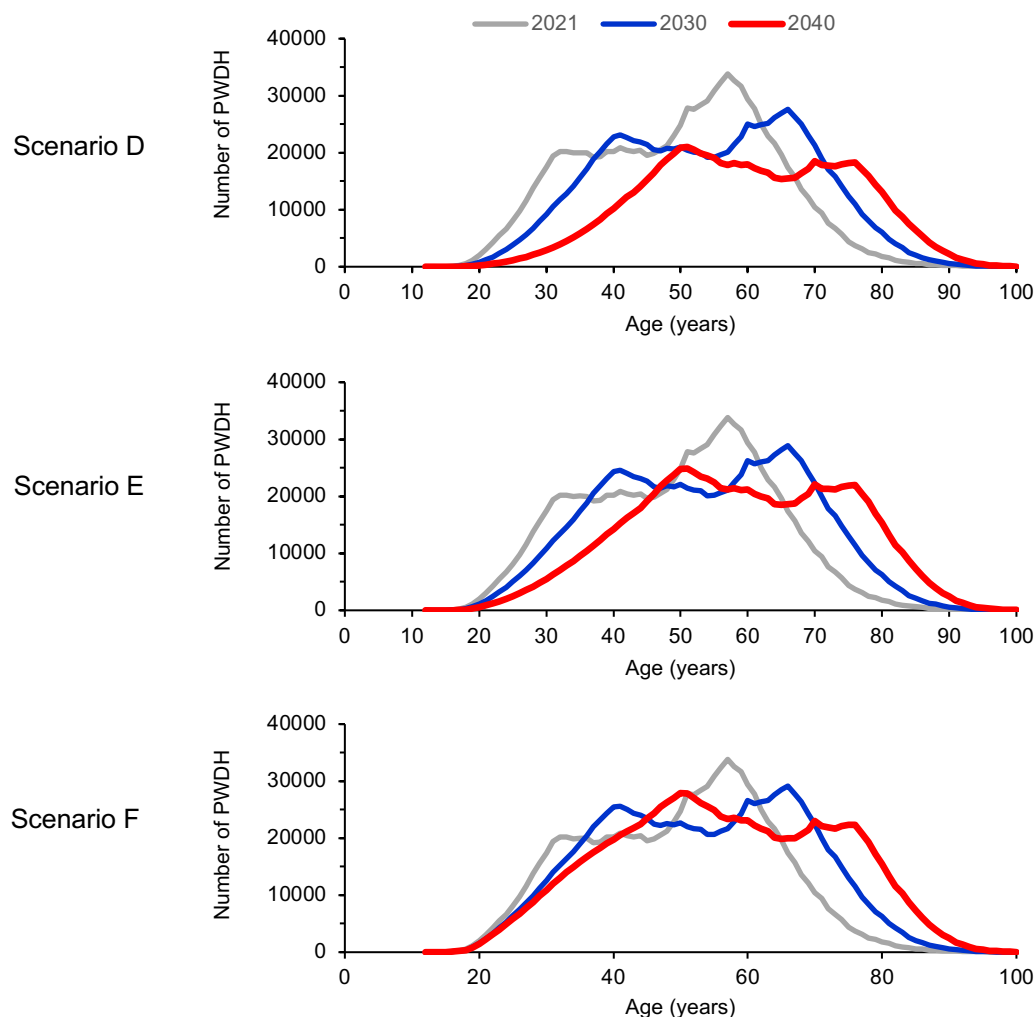
Abbreviations: APC, annual percentage change; gpMR, relevant general population, subpopulation-, or regional population-specific mortality rate; PWDH, people aged ≥ 13 years with diagnosed HIV; PWDH-MR, PWDH mortality rate.

^aIn the 50 states and District of Columbia, as of year-end.¹

^bResults of modeling scenarios A, B, and C were presented in the main research publication.

^cReduction in HIV diagnoses (a proxy for new infections) from the Ending the HIV Epidemic in the United States initiative (EHE) baseline year number of infections over 2021 through 2040.³

Supplementary Figure s1. Projected age distributions for adults and adolescents with diagnosed HIV in the United States from 2021 through 2040, by year and modeled Scenarios D, E, and F^a.



^aModeled Scenarios D, E, and F assumptions for reductions in HIV diagnoses (proxy for new HIV infections) during 2021 through 2040 fall between Scenarios A and B assumptions, with or without reduction in the mortality rate (MR) of people aged ≥ 13 years with diagnosed HIV PWDH) in the United States (50 states and District of Columbia), as of year-end (PWDH-MR).
 Scenario D: Held -11.2% annual percentage change (APC) in HIV diagnoses over 2021-2040 to reach 90% reduction (from the Ending HIV in the United States initiative (EHE) baseline year number of infections) by 2040, with 0% change in 2021 PWDH-MR through 2040;
 Scenario E: Held -6.9% APC in HIV diagnoses over 2021-2040 to reach 75% reduction (from EHE baseline year number of infections) by 2040, with linear decrease in PWDH-MR over 2021-2040 to reach the general population mortality rate (gpMR) by 2040;
 Scenario F: Held -13.9% APC in HIV diagnoses over 2021-2030 to reach 75% reduction (from EHE baseline year number of infections) by 2030, with linear decrease in PWDH-MR over 2021-2040 to reach gpMR by 2040.^{1,3-4}

Supplementary Table s2. Projected numbers and percentage of adults and adolescents with diagnosed HIV in the United States^a from 2021 through 2040, by year and modeled scenario.^b

	Number of PWDH by modeled scenario ^b and year												
	Base year	Scenario A		Scenario B		Scenario C		Scenario D		Scenario E		Scenario F	
Age group (years)	2021	2030	2040	2030	2040	2030	2040	2030	2040	2030	2040	2030	2040
13-29	82,463	61,426	45,265	38,922	12,025	86,859	116,403	38,675	11,829	49,644	24,674	33,674	19,229
30-39	195,881	182,165	132,510	154,028	60,359	214,229	261,832	151,728	57,473	168,733	92,262	146,560	64,056
40-49	206,164	232,909	208,726	220,793	161,462	250,224	299,066	216,238	148,993	228,913	188,807	216,616	158,778
50-59	298,960	213,966	225,930	208,979	213,019	224,693	276,985	203,812	192,954	213,905	228,179	206,463	211,996
60-69	205,153	260,266	183,144	263,446	186,859	266,122	212,393	254,609	164,189	266,239	195,760	262,022	186,209
≥70	64,695	165,866	261,903	170,889	296,034	167,213	272,252	164,484	254,163	171,579	299,980	170,525	295,035
Total*	1,053,316	1,116,598	1,057,478	1,057,057	929,758	1,209,340	1,438,931	1,029,546	829,601	1,099,013	1,029,662	1,035,860	935,303
Median age (years)	51.0	53.0	55.0	55.0	60.0	52.0	51.0	55.0	60.0	54.0	59.0	55.0	60.0
Percent aged ≥50 years	54.0%	57.3%	63.5%	60.9%	74.8%	54.4%	52.9%	60.5%	73.7%	59.3%	70.3%	61.7%	74.1%
Percent aged ≥65 years	13.6%	26.6%	33.1%	28.8%	41.8%	24.8%	25.8%	28.5%	40.3%	27.9%	38.5%	29.3%	41.4%
Percent aged ≥75 years	2.4%	6.9%	15.9%	7.5%	20.5%	6.4%	11.9%	7.5%	19.8%	7.3%	18.7%	7.7%	20.3%

Abbreviation: PWDH, people aged ≥13 years with diagnosed HIV.

*Totals of estimated numbers of PWDH within and across subgroups may not exactly equal the estimated number of all PWDH in the United States because they are estimates. The number of PWDH aged ≥50 years was defined as the sum of the number of PWDH in the age groups 50-59 years, 60-69 years, and ≥70 years; and the number of PWDH aged ≥65 years and aged ≥75 years was defined as the total number of PWDH multiplied by the respective proportion of PWDH aged ≥65 years or ≥75 years.

^aIn the 50 states and District of Columbia, as of year-end.

^bModeled scenario assumptions for reductions or increases in HIV diagnoses (a proxy for new HIV infections), with or without reduction in 2021 mortality rate (MR) of PWDH (PWDH-MR), during 2021-2040:

Scenario A (status quo) = Fixed -3.0% annual percentage change (APC) in HIV diagnoses (proximate pre-COVID-19 trend, before 2020) from 2021-2040, with 0% change in 2021 PWDH-MR from 2021-2040;

Scenario B (optimistic) = Fixed -11.2% APC in HIV diagnoses from 2021-2040 to reach 90% reduction (from the Ending the HIV Epidemic in the United States initiative (EHE) baseline year estimated number of infections) by 2040, with linear decrease in PWDH-MR from 2021 PWDH-MR to reach the general population mortality rate (gpMR) by 2040;³

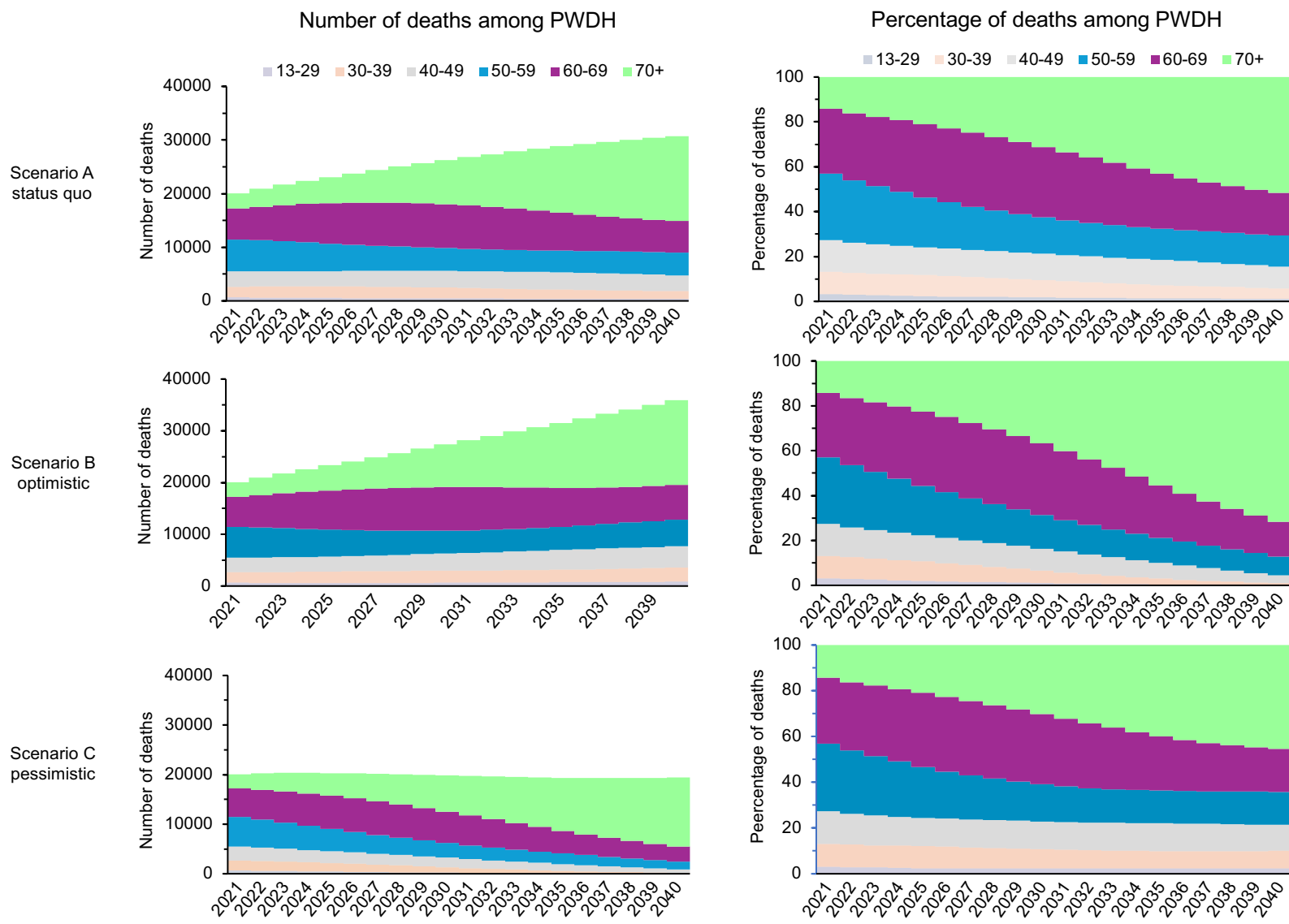
Scenario C (pessimistic) = Set +3.0% APC over 2021-2030 and 2030-2040 to model increasing infections, with 0% change in 2021 PWDH-MR throughout 2021-2040.

Scenario D = Fixed -11.2% APC in HIV diagnoses from 2021-2040 to achieve 90% reduction (from EHE baseline year estimated number of infections) by 2040, with 0% change in 2021 PWDH-MR from 2021-2040;

Scenario E = Fixed -6.9% APC in HIV diagnoses from 2021-2040 to achieve 75% reduction (from EHE baseline year estimated number of infections) by 2040, with linear decrease in PWDH-MR over 2021-2040 to reach gpMR by 2040;

Scenario F = Held -13.9% APC in HIV diagnoses over 2021-2030 to reach 75% reduction (from EHE baseline year estimated number of infections) by 2030 followed by fixed 0% APC over 2030-2040, with linear decrease in PWDH-MR from 2021 PWDH-MR to reach the gpMR by 2040.^{1,3-4}

Supplementary Figure s2. Projected age distribution of deaths among adults and adolescents with diagnosed HIV in the United States^a from 2021 through 2040, by year, age group, and modeled scenario.^b



Abbreviation: PWDH, people aged ≥ 13 years with diagnosed

Year HIV.

Year

^aIn the 50 states and District of Columbia, as of year-end.

^bModeled scenario assumptions for reductions or increases in HIV diagnoses (a proxy for new infections) during 2021 through 2040, with or without reduction in the mortality rate (MR) of people aged ≥ 13 years with diagnosed HIV (PWDH) in the United States (50 states and District of Columbia) as of year-end (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 the Ending the HIV Epidemic in the United States initiative (EHE) baseline year estimated number of infections) by 2040, with linear decrease in PWDH-MR from 2021-2040 to reach the general population mortality rate (gpMR) by 2040^{1,3-4}

Scenario C (pessimistic) = Set +3.0% APC over 2021-2030 and 2030-2040 to model increasing infections, with 0% change in 2021 PWDH-MR throughout 2021-2040.

Supplementary Table s3. Projected number and percentage of adults and adolescents with diagnosed HIV in the United States^a from 2021 through 2040, by year, race/ethnicity,^b and modeled scenario^c

Age group (years)	Number of PWDH by year, race/ethnicity, ^b and scenario ^c											
	2021				2030				2040			
	Black/ African American	Hispanic/ Latino	White	All Other	Black/ African American	Hispanic/ Latino	White	All Other	Black/ African American	Hispanic / Latino	White	All Other
Scenario A (status quo)												
13-29	41,514	21,927	12,761	6,261	31,157	17,225	9,090	3,958	22,945	12,725	6,676	2,917
30-39	86,778	52,673	40,037	16,393	81,044	52,716	35,566	12,897	58,984	39,544	25,503	8,542
40-49	81,428	58,190	49,439	17,107	95,578	66,495	52,410	18,420	87,373	62,723	44,387	14,383
50-59	109,083	69,170	98,779	21,928	81,219	60,962	55,297	16,594	89,601	66,186	53,284	17,024
60-69	77,665	38,863	75,323	13,302	92,145	61,147	90,012	17,368	67,327	53,355	49,894	12,972
70+	23,783	11,870	25,181	3,861	59,488	32,801	63,919	9,369	87,994	62,379	96,992	14,505
Total*	420,251	252,693	301,520	78,852	440,631	291,346	306,294	78,606	414,224	296,912	276,736	70,343
Median age (years)	50.0	48.0	55.0	49.0	51.0	51.0	60.0	52.0	53.0	54.0	61.0	55.0
Percent aged ≥50	50.1%	47.5%	66.1%	49.6%	52.8%	53.2%	68.6%	55.1%	59.1%	61.3%	72.3%	63.3%
Percent aged ≥65	12.8%	10.3%	18.0%	11.3%	23.8%	21.2%	36.7%	22.5%	28.9%	29.5%	44.1%	29.4%
Percent aged ≥75	2.1%	1.9%	3.2%	1.8%	6.3%	5.1%	10.0%	5.3%	13.5%	12.6%	23.6%	12.3%
Scenario B (optimistic)												
13-29	41,514	21,927	12,761	6,261	20,032	10,769	5,590	2,504	6,181	3,327	1,716	785
30-39	86,778	52,673	40,037	16,393	70,167	43,847	28,787	11,080	28,326	17,442	10,475	3,885
40-49	81,428	58,190	49,439	17,107	91,635	62,310	48,701	17,775	70,753	46,701	31,521	11,501
50-59	109,083	69,170	98,779	21,928	79,468	59,424	53,154	16,494	85,606	60,795	47,728	16,930
60-69	77,665	38,863	75,323	13,302	92,559	61,478	90,500	17,973	67,535	53,731	48,287	14,410
70+	23,783	11,870	25,181	3,861	60,740	33,492	65,247	9,998	95,928	68,569	105,757	18,849
Total*	420,251	252,693	301,520	78,852	414,601	271,320	291,979	75,824	354,329	250,565	245,484	66,360
Median age (years)	50.0	48.0	55.0	49.0	53.0	53.0	61.0	53.0	58.0	59.0	66.0	60.0
Percent aged ≥50	50.1%	47.5%	66.1%	49.6%	56.1%	56.9%	71.5%	58.6%	70.3%	73.1%	82.2%	75.6%
Percent aged ≥65	12.8%	10.3%	18.0%	11.3%	25.8%	23.1%	39.2%	24.6%	36.3%	37.7%	53.2%	39.0%
Percent aged ≥75	2.1%	1.9%	3.2%	1.8%	6.8%	5.6%	10.7%	5.9%	17.3%	16.6%	29.2%	17.3%

Age group (years)	Number of PWDH by year, race/ethnicity, ^b and scenario ^c											
	2021				2030				2040			
	Black/ African American	Hispanic/ Latino	White	All Other	Black/ African American	Hispanic/ Latino	White	All Other	Black/ African American	Hispanic/ Latino	White	All Other
Scenario C (pessimistic)												
13-29	41,514	21,927	12,761	6,261	43,610	24,550	13,110	5,594	58,409	32,936	17,548	7,503
30-39	86,778	52,673	40,037	16,393	93,401	62,574	43,313	14,996	112,222	79,008	53,784	16,925
40-49	81,428	58,190	49,439	17,107	101,411	71,806	57,523	19,467	119,280	90,857	69,009	20,097
50-59	109,083	69,170	98,779	21,928	84,870	63,681	58,970	17,263	106,807	80,454	69,789	20,141
60-69	77,665	38,863	75,323	13,302	94,410	62,318	92,136	17,664	77,986	59,894	60,406	14,544
70+	23,783	11,870	25,181	3,861	60,034	33,037	64,387	9,436	91,963	64,439	100,774	15,012
Total*	420,251	252,693	301,520	78,852	477,736	317,966	329,439	84,420	566,667	407,588	371,310	94,222
Median age (years)	50.0	48.0	55.0	49.0	50.0	50.0	58.0	51.0	49.0	50.0	56.0	51.0
Percent aged ≥50	50.1%	47.5%	66.1%	49.6%	50.1%	50.0%	65.4%	52.6%	48.8%	50.2%	62.2%	52.7%
Percent aged ≥65	12.8%	10.3%	18.0%	11.3%	22.3%	19.6%	34.5%	21.1%	22.6%	22.6%	35.0%	23.1%
Percent aged ≥75	2.1%	1.9%	3.2%	1.8%	5.8%	4.7%	9.3%	5.0%	10.1%	9.4%	18.0%	9.4%

Abbreviation: PWDH, people aged ≥13 years with diagnosed HIV.

*Totals of estimated numbers of PWDH within and across subpopulations may not exactly equal the estimated number of all PWDH in the United States because they are estimates. The number of PWDH aged ≥50 years was defined as the sum of the number of PWDH in the age groups 50-59 years, 60-69 years, and ≥70 years; and the number of PWDH aged ≥65 years and aged ≥75 years were defined as the total number of PWDH multiplied by the respective proportion of PWDH aged ≥65 years or ≥75 years.

^aIn the 50 states and District of Columbia, as of year-end.

^bRace/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.

^cModeled scenario assumptions for reductions or increases in HIV diagnoses (a proxy for new infections) from 2021 through 2040, with or without reduction in PWDH mortality rate (PWDH-MR) during 2021 through 2040:

Scenario A (status quo) = Fixed -3.0% annual percentage change (APC) in HIV diagnoses (proximate pre-COVID-19 trend, before 2020) from 2021-2040, with 0% change in 2021 PWDH-MR from 2021-2040;

Scenario B (optimistic) = Fixed -11.2% APC in HIV diagnoses from 2021-2040 to reach 90% reduction (from the Ending the HIV Epidemic in the United States initiative (EHE) baseline year estimated number of infections) by 2040, with linear decrease in PWDH-MR to reach relevant general population or race/ethnicity-specific mortality rate (gpMR) by 2040.^{1,3-5}

Scenario C (pessimistic) = Set +3.0% APC over 2021-2030 and 2030-2040 to model increasing infections, with 0% change in 2021 PWDH-MR throughout 2021-2040.

Supplementary Table s4. Projected percentage and numbers of older people with diagnosed HIV in the United States^a from 2021 through 2040, by modeled scenario,^b and race/ethnicity^c or region^d

Subpopulation of PWDH by race/ethnicity or region	Proportion (%) and number of older PWDH by age group, scenario, ^b and race/ethnicity ^c or region ^d							
	2021 (base scenario)		Scenario A (2040) (status quo)		Scenario B (2040) (optimistic)		Scenario C (2040) (pessimistic)	
	%	Number*	%	Number*	%	Number*	%	Number*
Aged ≥50 years								
Race/ethnicity								
Black/African American	50.1%	210,531	59.1%	244,922	70.3%	249,069	48.8%	276,756
Hispanic/Latino	47.5%	119,903	61.3%	181,920	73.1%	183,095	50.2%	204,787
White	66.1%	199,283	72.3%	200,180	82.2%	201,772	62.2%	230,969
All Other	49.6%	39,091	63.3%	44,501	75.6%	50,189	52.7%	49,697
Subtotal*	—	568,808	—	671,513	—	684,125	—	762,209
Region								
Midwest	49.7%	63,127	60.3%	81,105	72.0%	84,141	50.1%	93,099
Northeast	62.6%	143,655	72.7%	140,253	82.3%	149,668	62.8%	154,311
South	50.4%	244,216	59.6%	300,645	71.6%	312,367	49.1%	345,038
West	55.5%	117,810	65.7%	145,975	77.1%	155,861	55.1%	165,948
Subtotal*	—	568,808	—	667,978	—	702,038	—	758,396
Aged ≥65 years								
Race/ethnicity								
Black/African American	12.8%	53,792	28.9%	119,711	36.3%	128,621	22.6%	128,067
Hispanic/Latino	10.3%	26,027	29.5%	87,589	37.7%	94,463	22.6%	92,115
White	18.0%	54,274	44.1%	122,041	53.2%	130,597	35.0%	129,959
All Other	11.3%	4,801	29.4%	20,681	39.0%	25,880	23.1%	21,765
Subtotal*	—	143,003	—	350,021	—	379,562	—	371,905
Region								
Midwest	11.1%	14,091	29.3%	39,383	37.8%	44,182	22.7%	42,197
Northeast	18.1%	41,523	43.7%	84,349	52.2%	94,954	35.8%	87,968
South	11.9%	57,689	28.8%	145,322	37.4%	163,065	22.2%	155,937
West	14.2%	30,130	35.3%	78,391	44.5%	89,932	27.6%	83,109
Subtotal*	—	143,432	—	347,445	—	392,134	—	369,210
Aged ≥75 years								
Race/ethnicity^c								
Black/African American	2.1%	8,825	13.5%	55,920	17.3%	61,299	10.1%	57,233
Hispanic/Latino	1.9%	4,801	12.6%	37,411	16.6%	41,594	9.4%	38,313
White	3.2%	9,649	23.6%	65,310	29.2%	71,681	18.0%	66,836
All Other	1.8%	1,419	12.3%	8,652	17.3%	11,480	9.4%	8,857
Subtotal*	—	24,694	—	167,293	—	186,054	—	171,239
Region								
Midwest	1.7%	2,158	13.1%	17,608	16.1%	18,818	9.7%	18,031
Northeast	3.4%	7,800	23.6%	45,552	28.5%	51,843	18.8%	46,195
South	2.0%	9,696	12.8%	64,588	17.3%	75,429	9.5%	66,730
West	2.5%	5,305	17.0%	37,752	22.4%	45,269	12.8%	38,543
Subtotal*	—	24,958	—	165,500	—	191,359	—	169,500

Abbreviation: PWDH, people aged ≥13 years with diagnosed HIV.

*Totals of estimated numbers of PWDH within and across subpopulations and regions may not exactly equal the estimated number of all PWDH in the United States because they are estimates. The number of PWDH aged ≥50 years was defined as the sum of the number of PWDH in the age groups 50-59 years, 60-69 years, and ≥70 years; and the number of PWDH aged ≥65 years and aged ≥75 years was defined as the total number of PWDH multiplied by the respective proportion of PWDH aged ≥65 years or ≥75 years.

^aIn the 50 states and District of Columbia, as of year-end.

^bModeled scenario assumptions for reductions or increases in HIV diagnoses (a proxy for new infections), with or without reduction in the mortality rate (MR) of PWDH (PWDH-MR), during 2021 through 2040:

Scenario A (status quo) = Fixed -3.0% annual percentage change (APC) in HIV diagnoses (proximate pre-COVID-19 trend, before 2020) in HIV diagnoses from 2021-2040, with 0% change in 2021 PWDH-MR from 2021-2040;

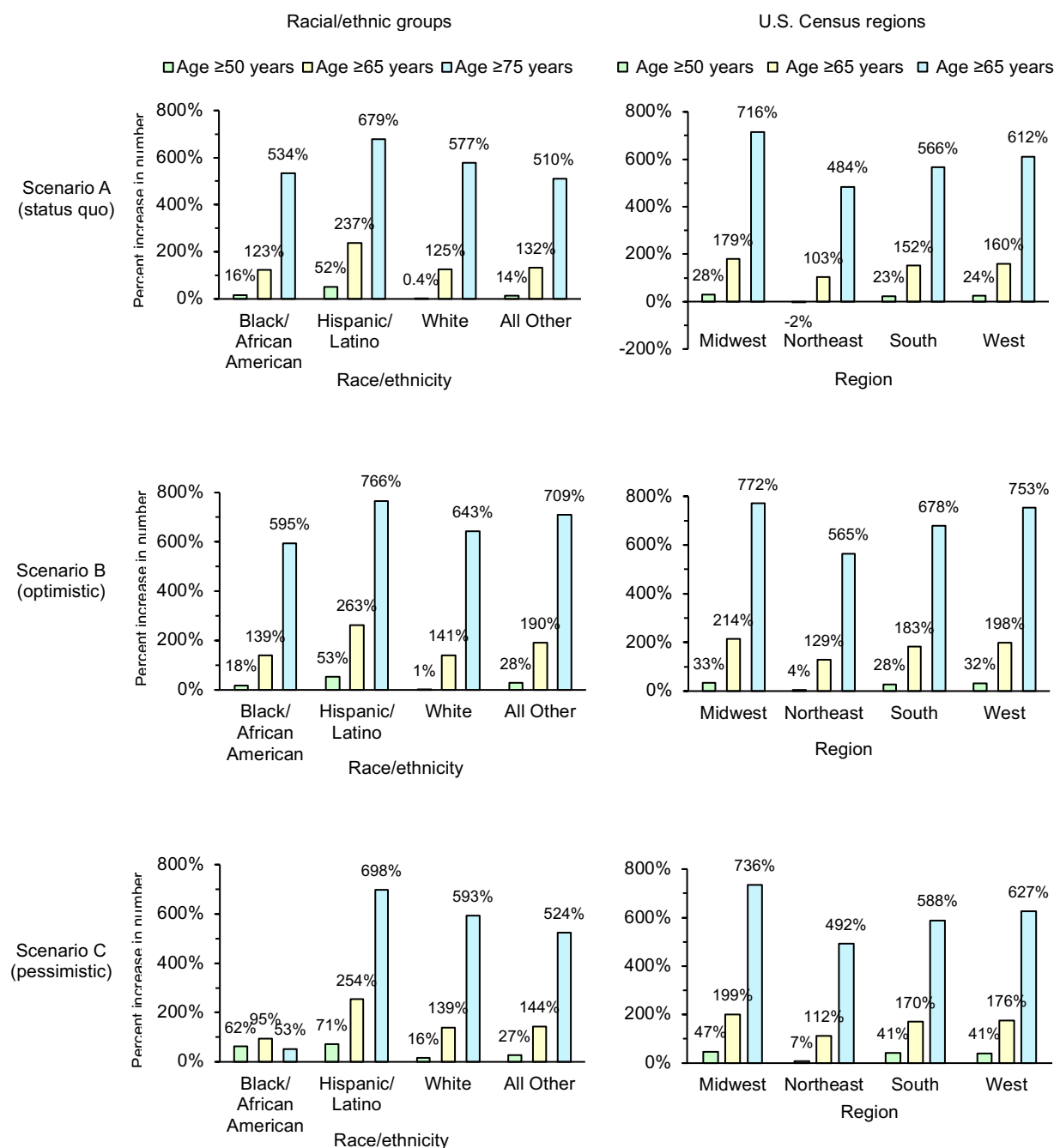
Scenario B (optimistic) = Fixed -11.2% APC in HIV diagnoses from 2021-2040 to reach 90% reduction (from the Ending the HIV Epidemic in the United States initiative (EHE) baseline year estimated number of infections) by 2040, with linear decrease from 2021 PWDH-MR to reach the relevant general population, subpopulation-specific, or regional population-specific MR (gpMR) by 2040.

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 to model increasing infections.¹⁻⁶

^cRace/ethnicity categories were 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.

^dUnited States Census Bureau-defined major geographic regions: Midwest; Northeast; South; and West.²

Supplementary Figure s3. Projected percentage change in number of older people with diagnosed HIV in the United States^a from 2021 through 2040, by estimated age range, modeled scenario,^b and race/ethnicity,^c or region.^d



^aIn the 50 states and District of Columbia, as of year-end.

^bModeled scenario assumptions for reducing or increasing HIV diagnoses (as a proxy for new infections), with or without reducing the mortality rate (MR) of people aged ≥13 years with diagnosed HIV (PWDH) in the United States (50 states and District of Columbia) as of year-end (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 throughout 2021-2040;

Scenario B (optimistic): Held -11.2% APC in HIV diagnoses over 2021-2040 to reach 90% reduction (from the Ending the HIV Epidemic in the United States initiative (EHE) baseline year estimated number of infections) by 2040, with linear decrease in PWDH-MR from 2021-2040 to reach the relevant general population, subpopulation, or regional population-specific mortality rate (gpMR) by 2040;
Scenario C (pessimistic): Fixed +3.0% APC in HIV diagnoses over 2021-2030 and 2030-2040, with 0% change in 2021 PWDH-MR through 2040.²⁹⁻³⁴

^bRace/ethnicity categories are defined as subpopulations 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.

^cUnited States Census Bureau major geographic regions: Midwest; Northeast; South; West.²⁹

Supplementary Table s5. Projected number and percentage of adolescents and adults with diagnosed HIV in the United States^a from 2021 through 2040, by year, region,^b and modeled scenario^c

Age group (years)	Number of PWDH in each region, ^b by year and scenario ^c											
	2021				2030				2040			
	Midwest	Northeast	South	West	Midwest	Northeast	South	West	Midwest	Northeast	South	West
Scenario A (status quo)												
13-29	12,041	11,728	43,908	14,786	8,667	7,664	34,375	10,708	6,373	5,625	25,355	7,913
30-39	25,985	34,232	97,537	38,127	25,458	25,664	95,259	35,703	18,193	17,315	71,235	25,671
40-49	25,792	39,793	99,122	41,457	30,455	39,697	115,263	47,432	28,741	29,825	107,357	42,511
50-59	34,965	69,320	133,052	61,623	27,172	40,873	101,446	44,387	29,778	38,411	110,200	47,310
60-69	22,175	54,895	85,847	42,236	29,927	60,695	113,712	55,846	22,877	34,914	85,448	39,525
70+	5,987	19,440	25,317	13,951	17,035	46,811	65,322	36,126	28,450	66,928	104,997	59,140
Total*	126,945	229,408	484,783	212,180	138,714	221,404	525,377	230,202	134,412	193,018	504,592	222,070
Median age (years)	49.0	54.0	50.0	52.0	51.0	59.0	51.0	54.0	54.0	61.0	53.0	57.0
Percent aged ≥50 years	49.7%	62.6%	50.4%	55.5%	53.4%	67.0%	53.4%	59.2%	60.3%	72.7%	59.6%	65.7%
Percent aged ≥65 years	11.1%	18.1%	11.9%	14.2%	22.9%	35.5%	23.1%	28.0%	29.3%	43.7%	28.8%	35.3%
Percent aged ≥75 years	1.7%	3.4%	2.0%	2.5%	5.4%	10.5%	5.6%	7.4%	13.1%	23.6%	12.8%	17.0%
Scenario B (optimistic)												
13-29	12,041	11,728	43,908	14,786	5,525	4,857	21,852	6,720	1,710	1,501	6,758	2,074
30-39	25,985	34,232	97,537	38,127	21,718	21,805	80,743	30,231	8,418	7,721	33,002	11,338
40-49	25,792	39,793	99,122	41,457	28,864	38,047	109,260	45,509	22,614	23,014	83,877	32,821
50-59	34,965	69,320	133,052	61,623	26,432	40,317	99,061	44,074	27,939	36,941	104,318	45,285
60-69	22,175	54,895	85,847	42,236	30,387	61,987	114,863	57,738	23,572	36,559	87,075	41,053
70+	5,987	19,440	25,317	13,951	17,580	48,320	67,604	38,334	32,630	76,169	120,974	69,523
Total*	126,945	229,408	484,783	212,180	130,506	215,333	493,383	222,606	116,883	181,905	436,004	202,094
Median age (years)	49.0	54.0	50.0	52.0	53.0	60.0	53.0	54.0	59.0	66.0	58.0	58.0
Percent aged ≥50 years	49.7%	62.6%	50.4%	55.5%	57.0%	68.9%	57.1%	63.0%	72.0%	82.3%	71.6%	77.1%
Percent aged ≥65 years	11.1%	18.1%	11.9%	14.2%	25.1%	35.3%	25.3%	30.5%	37.8%	52.2%	37.4%	44.5%
Percent aged ≥75 years	1.7%	3.4%	2.0%	2.5%	5.9%	11.1%	6.2%	8.2%	16.1%	28.5%	17.3%	22.4%

Age group (years)	Number of PWDH in each region, ^b by year and scenario ^c											
	2021				2030				2040			
	Midwest	Northeast	South	West	Midwest	Northeast	South	West	Midwest	Northeast	South	West
Scenario C (pessimistic)												
13-29	12,041	11,728	43,908	14,786	12,225	10,829	48,521	15,278	16,345	14,482	65,036	20,526
30-39	25,985	34,232	97,537	38,127	29,781	30,019	111,792	42,537	35,743	34,513	139,278	52,138
40-49	25,792	39,793	99,122	41,457	32,722	42,110	124,001	51,308	40,702	42,414	153,065	62,508
50-59	34,965	69,320	133,052	61,623	28,648	42,532	106,652	46,759	36,715	46,057	135,198	58,739
60-69	22,175	54,895	85,847	42,236	30,657	61,638	116,640	57,083	26,625	39,596	99,795	45,925
70+	5,987	19,440	25,317	13,951	17,208	47,036	65,996	36,379	29,759	68,658	110,045	61,284
Total*	126,945	229,408	484,783	212,180	151,241	234,164	573,602	249,344	185,889	245,720	702,417	301,120
Median age (years)	49.0	54.0	50.0	52.0	50.0	58.0	50.0	53.0	50.0	56.0	49.0	52.0
Percent aged ≥50 years	49.7%	62.6%	50.4%	55.5%	50.6%	64.6%	50.4%	56.2%	50.1%	62.8%	49.1%	55.1%
Percent aged ≥65 years	11.1%	18.1%	11.9%	14.2%	21.3%	33.8%	21.5%	26.2%	22.7%	35.8%	22.2%	27.6%
Percent aged ≥75 years	1.7%	3.4%	2.0%	2.5%	5.0%	10.0%	5.2%	6.8%	9.7%	18.8%	9.5%	12.8%

Abbreviation: PWDH, peoples aged ≥13 years with diagnosed HIV.

*Totals of estimated numbers of PWDH within and across subgroups may not be exactly equal or sum to exactly equal the estimated number of all PWDH in the United States because they are estimates. The number of PWDH aged ≥50 years was defined as the sum of the number of PWDH in the age groups 50-59 years, 60-69 years, and ≥70 years; and the number of PWDH aged ≥65 years and aged ≥75 years was defined as the total number of PWDH multiplied by the respective proportion of PWDH aged ≥65 years or ≥75 years.

^aIn the 50 states and District of Columbia, as of year-end

^bUnited States Census Bureau-defined major geographic regions: Midwest; Northeast; South; and West.²

^cModeled scenario assumptions for reductions in HIV diagnoses (as a proxy for new infections) during 2021 through 2040, with or without reduction in PWDH mortality rate (PWDH-MR) during 2021-2040:

Scenario A (status quo) = Fixed -3.0% annual percentage change in national HIV diagnoses (APC) in HIV diagnoses (proximate pre-COVID-19 trend, before 2020) from 2021-2040, with 0% change in 2021 PWDH-MR from 2021-2040;

Scenario B (optimistic) = Fixed -11.2% APC in HIV diagnoses from 2021-2040 to reach 90% reduction (from the Ending the HIV Epidemic in the United States initiative (EHE) baseline year estimated number of infections) by 2040, with linear decrease in PWDH-MR to reach the relevant general population or regional population-specific mortality rate (gpMR) by 2040;^{1,3-4,6}

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 to model increasing infections.¹⁻⁶

References for Supplementary Material

1. Centers for Disease Control and Prevention. Estimated HIV incidence and prevalence in the United States, 2018–2022. HIV Surveillance Supplemental Report, 2024; 29(1). Available at: <https://stacks.cdc.gov/view/cdc/156513>. Accessed 21 May 2024.
2. CDC National Center for Health Statistics. Health United States, Geographic division or region. Available at [Geographic division or region - Health, United States](#). Updated 24 Jul 2024. Accessed 25 Apr 2025.
3. CDC. Ending the HIV Epidemic in the US (EHE). <https://www.cdc.gov/ehe/php/about/goals.html>. Accessed 08 May 2025.
4. U.S. Census Bureau. Population and housing unit estimates datasets. <https://www.census.gov/programs-surveys/popest/data/data-sets.html>. Updated November 2023. Accessed 01 June 2024.
5. Arias E, Xu J, Kochanek K. United States Life Tables, 2021. In: National Vital Statistics Reports [Internet]. Hyattsville, MD: National Center for Health Statistics (US). Published 07 Nov 2023. Vol 72 (12). <https://www.ncbi.nlm.nih.gov/books/NBK608062/>. Access 05 June 2024.
6. Arias E, Xu J, Tejada-Vera B, et al. United States Life Tables, 2021. In: National Vital Statistics Reports [Internet]. Hyattsville, MD: National Center for Health Statistics (US); Published Jul 2024. Vol 73 (7). <https://www.ncbi.nlm.nih.gov/books/NBK608062/>. Accessed 05 June 2024.