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**Online Supplement**

**The shifting age distribution of people with HIV using antiretroviral therapy in the United States, 2010 to 2030**

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# PEARL model **overview and parametrization**

The PEARL model is an agent-based simulation model of HIV care in the United States (US). The model leverages the rich North American AIDS Cohort Collaboration on Research and Design (NA-ACCORD) longitudinal cohort collaboration data. Data on 180,000 people (≥18 years of age) with HIV (PWH) are provided from 29 cohorts of people with HIV in the US and Canada. This size of this dataset allows us to treat 15 sub-groups of PWH independently. The PEARL model characterizes population by sex (male and female), race (white, Black/AA, and Hispanic), and HIV acquisition risk (men who have sex with men [MSM], intravenous drug use [IDU], and heterosexual contact). In this supplement, we discuss methods applied in development and calibration of the PEARL model (Figure S1). More information about PEARL can be found at <https://pearlhivmodel.org/method_details.html>.

The PEARL model runs in discrete time steps representing one year. The simulations begin in year 2009 by creating an initial population of PWH receiving ART in the US. The size of this population and the age distributions, ART initiation years, and CD4 count at ART initiation are estimated based on data available from NA-ACCORD and the Centers for Disease Control and Prevention (CDC). At the beginning of each simulated year (2010 – 2030), a population of those newly diagnosed with HIV enter the model, and a specific proportion (modeled as an increasing function of time) of these individuals link to HIV care and initiate ART. The populations’ size, age, and CD4 count distributions at ART initiation are estimated from CDC and NA-ACCORD data. Individuals on ART experience a likelihood of mortality and disengagement from care over time. Upon disengagement, individuals experience an increase in the probability of mortality and a gradual reduction in CD4 count. Time-varying CD4 count is updated for all individuals in the model as a function of their HIV care status (i.e., increasing among those in care and decreasing among those out of care). All simulation parameters have been estimated from CDC and NA-ACCORD data from 2010 to 2017. Simulated outcomes, in terms of age distribution of population in HIV care, are cross-validated against NA-ACCORD data during this period. Model projections are made from year 2018 to 2030.

Diagram

Description automatically generated

Figure S 1: PEARL model conceptual design and main data sources. Shown in the figure are the main components of the PEARL simulation, including input values and dataset informing them (shown on the left), main output measures (shown on the right) and the simulation engine (middle).

**Clarification on terminology:** Given the complexities involved in defining, parametrizing and calibrating all steps of the HIV care continuum for the 15 PWH sub-groups, we have limited the scope of the PEARL model to population of HIV infected individuals who have ever been and/or are currently on ART. Following this definition, the simulated population is divided into two groups including “ART users” (those currently on ART) and “ART non-users” (those previously on ART who disengaged from treatment and are currently off ART). Furthermore, the usage of term “HIV care” in this text is closely related to previous or current instances of “ART usage” and does not include prior steps to ART initiation.

We further underscore the difference in terminology used to refer to “population on ART” (those receiving ART in a given period of time, aka ART users), and “population initiating ART” (those starting ART for the first time, aka first time ART users) throughout the text.

## Data sources

The PEARL model is calibrated against two primary sources of data. First, the NA-ACCORD ([www.naaccord.org](http://www.naaccord.org)) is a collaborative study that pools individual-level data from more than 20 cohorts of adults with HIV in the US and Canada, accumulating more than 1 million person years of follow-up.28 The NA-ACCORD enrolls individuals in clinical cohorts who have successfully linked into HIV clinical care (defined as ≥2 HIV clinical care or study visits within 12 months); participants are observed to disengage and reengage with HIV care while under follow-up in the NA-ACCORD. Participants who have initiated ART in NA-ACCORD-contributing US clinical cohorts from 2009 to 2017 composed the study population used to inform PEARL model functions. The NA-ACCORD data are longitudinal and heterogenous, allowing estimates of functions specific to the 15 subgroups of interest. Participants’ age (from year of birth), race/ethnicity, and HIV acquisition risk are core data for the NA-ACCORD. Those with MSM/IDU or heterosexual/IDU as their HIV acquisition risk group were classified as IDU HIV acquisition risk group.

The CDC HIV Surveillance system provides a secondary data source for PEARL. All 50 states, Washington DC, and numerous territories collect and report HIV data to the CDC. These data are true surveillance data, as they attempt complete ascertainment of specified health indicators among all those with HIV in the US. We used data from publicly available HIV surveillance reports for the years 2009 to 2018 (available at <https://www.cdc.gov/hiv/library/reports/hiv-surveillance.html>) to inform the PEARL model.

**NA-ACCORD Study Population**

The NA-ACCORD study population used to inform most PEARL sub-models was created from the 2017 NA-ACCORD dataset. This dataset was filtered to include only clinical cohorts with a valid cohort close date. NA-ACCORD patients were then excluded that had no record of initiating ART, were < 18 years of age at enrolment into NA-ACCORD, had a viral load <= 400 copies/mL within 180 days before ART initiation, or had no CD4 or viral load measurement. Sex was coded as Men or Women and intersex patients were excluded (n<10). Race was coded as non-Hispanic white (White), non-Hispanic Black/African American (Black/AA), or Hispanic; patients who identified in other race and ethnicity categories were excluded due to insufficient sample size for stable functions. HIV acquisition risk groups included MSM, IDU, and heterosexual contact (HET). If a patient had both MSM and IDU risk, they were classified as IDU. Patients with other HIV acquisition risk factors (e.g. perinatal infection) were excluded due to insufficient sample size for stable functions. Patients were followed from study entry (defined as maximum of cohort open date, enrollment date, ART initiation date, and 1/1/2009) to study exit (defined as minimum of cohort close date, loss to follow-up date (2 consecutive years without a CD4 or VL), death date, age 85, and 12/31/2017). Patients who exited the study population due to loss to follow-up had their study exit date re-set to 1 year after their last CD4/VL. Patients with < 30 days of follow-up time were dropped. The final study population included N=64,359 patients (**Table S1**).

Table S 1: NA-ACCORD Study Population Characteristics

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NA-ACCORD population** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **Total** |
| **ART users** |  |  |  |  |  |  |  |  |  |  |
| **Number receiving ART** |  |  |  |  |  |  |  |  |  |  |
| **White MSM** | 8,371 | 8,857 | 9,268 | 9,614 | 9,820 | 9,984 | 9,110 | 7,747 | 6,045 | **15,942** |
| **Black/AA MSM** | 3,093 | 3,468 | 3,788 | 4,230 | 4,586 | 5,010 | 4,019 | 2,981 | 2,702 | **8,201** |
| **Hispanic MSM** | 1,967 | 2,223 | 2,427 | 2,855 | 3,071 | 3,186 | 2,581 | 1,760 | 1,232 | **4,970** |
| **White IDU Men** | 3,249 | 3,312 | 3,296 | 3,267 | 3,252 | 3,220 | 3,051 | 1,498 | 1,223 | **4,831** |
| **Black/AA IDU Men** | 4,774 | 4,805 | 4,775 | 4,677 | 4,517 | 4,355 | 3,916 | 577 | 542 | **6,296** |
| **Hispanic IDU Men** | 952 | 937 | 919 | 910 | 894 | 831 | 700 | 175 | 144 | **1,410** |
| **White IDU Women** | 480 | 490 | 493 | 487 | 470 | 450 | 399 | 307 | 279 | **750** |
| **Black/AA IDU Women** | 616 | 634 | 642 | 634 | 615 | 602 | 458 | 240 | 219 | **917** |
| **Hispanic IDU Women** | 116 | 119 | 115 | 116 | 100 | 93 | 46 | 11 | 12 | **173** |
| **White HET Men** | 838 | 864 | 882 | 889 | 892 | 901 | 855 | 715 | 583 | **1,519** |
| **Black/AA HET Men** | 2,327 | 2,504 | 2,663 | 2,777 | 2,802 | 2,936 | 2,415 | 1,533 | 1,425 | **4,819** |
| **Hispanic HET Men** | 853 | 911 | 945 | 1,004 | 1,045 | 1,052 | 824 | 363 | 268 | **1,615** |
| **White HET Women** | 936 | 988 | 1,018 | 1,018 | 1,015 | 1,018 | 915 | 708 | 597 | **1,673** |
| **Black/AA HET Women** | 3,145 | 3,425 | 3,623 | 3,872 | 4,000 | 4,239 | 3,418 | 2,166 | 1,999 | **6,353** |
| **Hispanic HET Women** | 815 | 851 | 900 | 953 | 965 | 966 | 719 | 324 | 242 | **1,445** |
| **Median age (years) of persons receiving ART** |  |  |  |  |  |  |  |  |  |  |
| **White MSM** | 47 | 48 | 48 | 49 | 49 | 50 | 51 | 51 | 51 |  |
| **Black/AA MSM** | 43 | 44 | 44 | 43 | 43 | 42 | 41 | 40 | 39 |  |
| **Hispanic MSM** | 42 | 42 | 43 | 43 | 43 | 44 | 44 | 44 | 44 |  |
| **White IDU Men** | 49 | 50 | 51 | 51 | 52 | 53 | 53 | 52 | 53 |  |
| **Black/AA IDU Men** | 54 | 54 | 55 | 56 | 57 | 58 | 58 | 56 | 56 |  |
| **Hispanic IDU Men** | 52 | 53 | 53 | 54 | 54 | 55 | 56 | 48 | 47 |  |
| **White IDU Women** | 46 | 46 | 47 | 48 | 49 | 50 | 50 | 50 | 50 |  |
| **Black/AA IDU Women** | 50 | 51 | 52 | 53 | 54 | 54 | 55 | 54 | 55 |  |
| **Hispanic IDU Women** | 49 | 50 | 51 | 52 | 53 | 53 | 55 | 57 | 60 |  |
| **White HET Men** | 49 | 49 | 50 | 51 | 51 | 52 | 53 | 53 | 53 |  |
| **Black/AA HET Men** | 47 | 48 | 48 | 49 | 49 | 50 | 50 | 51 | 51 |  |
| **Hispanic HET Men** | 44 | 45 | 46 | 47 | 48 | 48 | 48 | 50 | 50 |  |
| **White HET Women** | 45 | 46 | 46 | 47 | 48 | 49 | 49 | 50 | 51 |  |
| **Black/AA HET Women** | 43 | 44 | 45 | 45 | 46 | 46 | 47 | 48 | 48 |  |
| **Hispanic HET Women** | 44 | 44 | 44 | 45 | 46 | 46 | 46 | 46 | 45 |  |
| **Median CD4 count (cells/mm3) of persons receiving ART** |  |  |  |  |  |  |  |  |  |  |
| **White MSM** | 520 | 530 | 561 | 580 | 598 | 616 | 630 | 657 | 672 |  |
| **Black/AA MSM** | 437 | 450 | 475 | 510 | 535 | 555 | 570 | 604 | 612 |  |
| **Hispanic MSM** | 446 | 479 | 502 | 525 | 542 | 557 | 573 | 619 | 624 |  |
| **White IDU Men** | 440 | 457 | 480 | 504 | 520 | 542 | 559 | 562 | 549 |  |
| **Black/AA IDU Men** | 397 | 415 | 445 | 463 | 486 | 504 | 517 | 508 | 542 |  |
| **Hispanic IDU Men** | 385 | 397 | 435 | 463 | 470 | 512 | 526 | 541 | 555 |  |
| **White IDU Women** | 446 | 469 | 468 | 509 | 510 | 530 | 555 | 530 | 537 |  |
| **Black/AA IDU Women** | 484 | 494 | 509 | 551 | 571 | 588 | 632 | 620 | 673 |  |
| **Hispanic IDU Women** | 350 | 408 | 437 | 470 | 518 | 499 | 521 | 561 | 537 |  |
| **White HET Men** | 466 | 491 | 527 | 541 | 559 | 582 | 584 | 604 | 599 |  |
| **Black/AA HET Men** | 405 | 414 | 433 | 456 | 483 | 488 | 500 | 546 | 557 |  |
| **Hispanic HET Men** | 394 | 404 | 428 | 433 | 446 | 469 | 452 | 459 | 500 |  |
| **White HET Women** | 574 | 580 | 617 | 629 | 667 | 679 | 700 | 704 | 748 |  |
| **Black/AA HET Women** | 478 | 504 | 532 | 556 | 590 | 622 | 615 | 656 | 680 |  |
| **Hispanic HET Women** | 480 | 511 | 552 | 576 | 591 | 614 | 634 | 649 | 675 |  |
| **ART initiators** |  |  |  |  |  |  |  |  |  |  |
| **Number of persons starting ART** |  |  |  |  |  |  |  |  |  |  |
| **White MSM** | 842 | 835 | 986 | 884 | 802 | 757 | 567 | 443 | 139 | **6,255** |
| **Black/AA MSM** | 504 | 578 | 730 | 652 | 770 | 679 | 475 | 288 | 147 | **4,823** |
| **Hispanic MSM** | 317 | 318 | 579 | 407 | 337 | 332 | 252 | 162 | 59 | **2,763** |
| **White IDU Men** | 226 | 223 | 180 | 196 | 215 | 184 | 137 | 59 | 30 | **1,450** |
| **Black/AA IDU Men** | 308 | 304 | 240 | 186 | 146 | 137 | 82 | 45 | 48 | **1,496** |
| **Hispanic IDU Men** | 57 | 67 | 86 | 65 | 40 | 57 | 22 | 20 | 6 | **420** |
| **White IDU Women** | 38 | 45 | 36 | 24 | 31 | 22 | 27 | 13 | 3 | **239** |
| **Black/AA IDU Women** | 55 | 54 | 50 | 32 | 38 | 15 | 15 | 14 | 7 | **280** |
| **Hispanic IDU Women** | 12 | 8 | 18 | 6 | 7 | 4 | 0 | 2 | 0 | **57** |
| **White HET Men** | 63 | 85 | 95 | 61 | 69 | 93 | 80 | 58 | 19 | **623** |
| **Black/AA HET Men** | 320 | 353 | 391 | 258 | 364 | 286 | 182 | 119 | 85 | **2,358** |
| **Hispanic HET Men** | 105 | 108 | 151 | 109 | 97 | 92 | 60 | 28 | 7 | **757** |
| **White HET Women** | 94 | 93 | 95 | 78 | 80 | 77 | 48 | 46 | 14 | **625** |
| **Black/AA HET Women** | 422 | 453 | 488 | 363 | 464 | 323 | 254 | 154 | 74 | **2,995** |
| **Hispanic HET Women** | 84 | 98 | 127 | 93 | 72 | 63 | 44 | 12 | 7 | **600** |
| **Median age (years) at ART initiation** |  |  |  |  |  |  |  |  |  |  |
| **White MSM** | 41 | 42 | 42 | 42 | 41 | 41 | 40 | 40 | 38 |  |
| **Black/AA MSM** | 33 | 31 | 31 | 30 | 29 | 29 | 30 | 29 | 29 |  |
| **Hispanic MSM** | 34 | 35 | 38 | 35 | 33 | 33 | 34 | 32 | 31 |  |
| **White IDU Men** | 45 | 44 | 45 | 45 | 47 | 44 | 44 | 45 | 34 |  |
| **Black/AA IDU Men** | 52 | 52 | 53 | 53 | 53 | 54 | 47 | 33 | 28 |  |
| **Hispanic IDU Men** | 46 | 46 | 49 | 45 | 46 | 43 | 44 | 36 | 40 |  |
| **White IDU Women** | 43 | 44 | 45 | 48 | 43 | 42 | 38 | 37 | 48 |  |
| **Black/AA IDU Women** | 48 | 48 | 52 | 50 | 50 | 52 | 45 | 44 | 40 |  |
| **Hispanic IDU Women** | 49 | 46 | 50 | 41 | 49 | 55 | . | 54 | . |  |
| **White HET Men** | 44 | 42 | 47 | 47 | 45 | 48 | 49 | 48 | 41 |  |
| **Black/AA HET Men** | 45 | 43 | 45 | 43 | 47 | 44 | 44 | 42 | 44 |  |
| **Hispanic HET Men** | 39 | 44 | 45 | 44 | 43 | 46 | 44 | 42 | 46 |  |
| **White HET Women** | 40 | 40 | 43 | 38 | 43 | 40 | 45 | 42 | 43 |  |
| **Black/AA HET Women** | 40 | 41 | 43 | 39 | 41 | 41 | 41 | 41 | 43 |  |
| **Hispanic HET Women** | 40 | 39 | 44 | 43 | 41 | 41 | 41 | 50 | 40 |  |
| **Median CD4 count (cells/mm3) at ART initiation** |  |  |  |  |  |  |  |  |  |  |
| **White MSM** | 320 | 356 | 390 | 395 | 424 | 479 | 435 | 496 | 435 |  |
| **Black/AA MSM** | 270 | 304 | 341 | 367 | 372 | 394 | 363 | 402 | 437 |  |
| **Hispanic MSM** | 271 | 307 | 372 | 352 | 393 | 379 | 409 | 405 | 470 |  |
| **White IDU Men** | 292 | 315 | 386 | 350 | 417 | 396 | 362 | 490 | 395 |  |
| **Black/AA IDU Men** | 277 | 286 | 326 | 357 | 362 | 402 | 421 | 350 | 417 |  |
| **Hispanic IDU Men** | 278 | 325 | 314 | 273 | 314 | 391 | 322 | 481 | 741 |  |
| **White IDU Women** | 314 | 290 | 312 | 283 | 339 | 260 | 368 | 331 | 364 |  |
| **Black/AA IDU Women** | 255 | 286 | 360 | 383 | 414 | 209 | 435 | 523 | 528 |  |
| **Hispanic IDU Women** | 292 | 184 | 261 | 557 | 521 | 160 | . | 122 | . |  |
| **White HET Men** | 204 | 239 | 251 | 309 | 215 | 334 | 283 | 370 | 293 |  |
| **Black/AA HET Men** | 206 | 257 | 280 | 278 | 268 | 312 | 288 | 336 | 295 |  |
| **Hispanic HET Men** | 175 | 179 | 215 | 213 | 248 | 212 | 184 | 362 | 439 |  |
| **White HET Women** | 325 | 306 | 368 | 361 | 353 | 357 | 457 | 370 | 397 |  |
| **Black/AA HET Women** | 279 | 295 | 310 | 338 | 358 | 333 | 405 | 385 | 399 |  |
| **Hispanic HET Women** | 267 | 322 | 363 | 336 | 341 | 341 | 327 | 517 | 432 |  |
| **Total study population** |  |  |  |  |  |  |  |  |  |  |
| **Number of persons lost to follow-up** |  |  |  |  |  |  |  |  |  |  |
| **White MSM** | 458 | 561 | 765 | 692 | 832 | 777 | 592 | 411 | 0 | **5,088** |
| **Black/AA MSM** | 159 | 304 | 336 | 374 | 417 | 303 | 249 | 228 | 0 | **2,370** |
| **Hispanic MSM** | 112 | 153 | 186 | 223 | 274 | 211 | 162 | 85 | 0 | **1,406** |
| **White IDU Men** | 97 | 167 | 144 | 157 | 178 | 162 | 84 | 76 | 0 | **1,065** |
| **Black/AA IDU Men** | 95 | 159 | 182 | 164 | 206 | 166 | 41 | 44 | 0 | **1,057** |
| **Hispanic IDU Men** | 51 | 64 | 72 | 66 | 77 | 47 | 17 | 9 | 0 | **403** |
| **White IDU Women** | 20 | 38 | 33 | 34 | 35 | 18 | 22 | 8 | 0 | **208** |
| **Black/AA IDU Women** | 31 | 37 | 44 | 49 | 36 | 21 | 11 | 20 | 0 | **249** |
| **Hispanic IDU Women** | 6 | 11 | 17 | 18 | 10 | 4 | 1 | 1 | 0 | **68** |
| **White HET Men** | 44 | 64 | 78 | 58 | 62 | 53 | 32 | 40 | 0 | **431** |
| **Black/AA HET Men** | 160 | 209 | 266 | 254 | 227 | 147 | 109 | 91 | 0 | **1,463** |
| **Hispanic HET Men** | 44 | 69 | 84 | 86 | 86 | 49 | 30 | 17 | 0 | **465** |
| **White HET Women** | 55 | 71 | 104 | 77 | 84 | 75 | 42 | 44 | 0 | **552** |
| **Black/AA HET Women** | 155 | 260 | 263 | 299 | 249 | 213 | 127 | 130 | 0 | **1,696** |
| **Hispanic HET Women** | 49 | 57 | 81 | 77 | 79 | 34 | 18 | 19 | 0 | **414** |
| **Number of deaths while engaged in HIV care** |  |  |  |  |  |  |  |  |  |  |
| **White MSM** | 114 | 108 | 112 | 122 | 98 | 103 | 85 | 75 | 54 | **871** |
| **Black/AA MSM** | 46 | 47 | 42 | 48 | 46 | 49 | 32 | 23 | 24 | **357** |
| **Hispanic MSM** | 11 | 21 | 24 | 17 | 23 | 18 | 10 | 14 | 10 | **148** |
| **White IDU Men** | 105 | 113 | 106 | 86 | 107 | 103 | 87 | 44 | 39 | **790** |
| **Black/AA IDU Men** | 210 | 196 | 173 | 199 | 126 | 157 | 100 | 15 | 7 | **1,183** |
| **Hispanic IDU Men** | 34 | 32 | 30 | 26 | 31 | 17 | 20 | 2 | 3 | **195** |
| **White IDU Women** | 17 | 12 | 17 | 16 | 19 | 18 | 14 | 15 | 7 | **135** |
| **Black/AA IDU Women** | 15 | 20 | 16 | 8 | 18 | 14 | 12 | 7 | 1 | **111** |
| **Hispanic IDU Women** | 4 | 1 | 1 | 4 | 5 | 2 | 0 | 0 | 1 | **18** |
| **White HET Men** | 16 | 16 | 24 | 25 | 14 | 22 | 14 | 10 | 10 | **151** |
| **Black/AA HET Men** | 39 | 41 | 46 | 36 | 55 | 39 | 31 | 13 | 12 | **312** |
| **Hispanic HET Men** | 10 | 12 | 12 | 3 | 13 | 9 | 9 | 10 | 3 | **81** |
| **White HET Women** | 10 | 13 | 13 | 19 | 16 | 8 | 8 | 5 | 4 | **96** |
| **Black/AA HET Women** | 50 | 57 | 43 | 43 | 42 | 36 | 32 | 20 | 18 | **341** |
| **Hispanic HET Women** | 12 | 7 | 6 | 10 | 6 | 9 | 1 | 2 | 1 | **54** |
| **Number of deaths while disengaged from HIV care** |  |  |  |  |  |  |  |  |  |  |
| **White MSM** | 1 | 7 | 15 | 13 | 18 | 19 | 23 | 8 | 8 | **112** |
| **Black/AA MSM** | 1 | 5 | 2 | 6 | 6 | 10 | 8 | 8 | 6 | **52** |
| **Hispanic MSM** | 0 | 1 | 3 | 1 | 4 | 6 | 5 | 2 | 2 | **24** |
| **White IDU Men** | 0 | 8 | 9 | 11 | 13 | 11 | 20 | 7 | 7 | **86** |
| **Black/AA IDU Men** | 2 | 8 | 11 | 17 | 20 | 19 | 22 | 4 | 1 | **104** |
| **Hispanic IDU Men** | 1 | 2 | 0 | 5 | 8 | 4 | 2 | 3 | 1 | **26** |
| **White IDU Women** | 1 | 0 | 6 | 2 | 3 | 4 | 3 | 2 | 0 | **21** |
| **Black/AA IDU Women** | 0 | 1 | 5 | 1 | 4 | 1 | 3 | 2 | 0 | **17** |
| **Hispanic IDU Women** | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | **2** |
| **White HET Men** | 0 | 1 | 2 | 2 | 2 | 4 | 4 | 2 | 1 | **18** |
| **Black/AA HET Men** | 2 | 5 | 1 | 3 | 4 | 4 | 8 | 7 | 1 | **35** |
| **Hispanic HET Men** | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 3 | 0 | **7** |
| **White HET Women** | 0 | 2 | 3 | 5 | 0 | 4 | 3 | 0 | 4 | **21** |
| **Black/AA HET Women** | 2 | 2 | 3 | 4 | 9 | 4 | 4 | 1 | 4 | **33** |
| **Hispanic HET Women** | 0 | 1 | 2 | 0 | 2 | 2 | 1 | 2 | 1 | **11** |

## Initial Population in year 2009

### Population size

The sizes of the initial sub-groups of PWH using ART in 2009 are estimated from CDC’s HIV Surveillance Reports and the Medical Monitoring Project (MMP). First, the estimated number of persons with diagnosed HIV in 2009 for each of our five sex-and-HIV-acquisition-risk group combination is taken from table 14a in the 2013 HIV Surveillance Report (1). We then used table 17a in the 2010 HIV Surveillance Report (2) to estimate the number of people living with diagnosed HIV by sex-and-HIV-acquisition-risk group combinations within our three race and ethnicity groups. Finally, we adjusted the estimates for the proportion of each sub-group receiving ART in 2009 (Table S2).

Table S 2: Estimating the number of ART users in year 2009

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Population** | **Number with  Diagnosed HIV Per Risk/Sex** | **Proportion By Race** | **Proportion  On ART** | **Total Number On ART in 2009** | **ART Proportion Source** |
| **White MSM** | 414,232 | 0.201 | 0.492 | 40,897 | CDC MMWR, September 26, 2014, Table 3 (3) |
| **Black/AA MSM** | 414,232 | 0.293 | 0.471 | 57,104 | CDC MMWR, September 26, 2014, Table 3 (3) |
| **Hispanic MSM** | 414,232 | 0.474 | 0.496 | 97,464 | CDC MMWR, September 26, 2014, Table 3 (3) |
| **White IDU Men** | 134,962 | 0.275 | 0.455 | 16,900 | Correspondence with Luke Shouse, CDC |
| **Black/AA IDU Men** | 134,962 | 0.429 | 0.340 | 19,679 | CDC MMWR, February 7, 2014, Table 3 (4) |
| **Hispanic IDU Men** | 134,962 | 0.270 | 0.310 | 11,281 | CDC MMWR, October 10, 2014, Table 3 (5) |
| **White IDU Women** | 53,717 | 0.245 | 0.550 | 7,233 | Correspondence with Luke Shouse, CDC |
| **Black/AA IDU Women** | 53,717 | 0.528 | 0.498 | 14,118 | CDC MMWR, February 7, 2014, Table 3 (4) |
| **Hispanic IDU Women** | 53,717 | 0.199 | 0.341 | 3,652 | CDC MMWR, October 10, 2014, Table 3 (5) |
| **White HET Men** | 65,857 | 0.131 | 0.370 | 3,194 | Correspondence with Luke Shouse, CDC |
| **Black/AA HET Men** | 65,857 | 0.632 | 0.421 | 17,516 | CDC MMWR, February 7, 2014, Table 3 (4) |
| **Hispanic HET Men** | 65,857 | 0.212 | 0.459 | 6,398 | CDC MMWR, October 10, 2014, Table 3 (5) |
| **White HET Women** | 148,349 | 0.167 | 0.551 | 13,632 | Correspondence with Luke Shouse, CDC |
| **Black/AA HET Women** | 148,349 | 0.613 | 0.514 | 46,764 | CDC MMWR, February 7, 2014, Table 3 (4) |
| **Hispanic HET Women** | 148,349 | 0.191 | 0.498 | 14,114 | CDC MMWR, October 10, 2014, Table 3 (5) |

### Age distribution

The age distribution function of the 2009 PEARL population was based on the subset of the NA-ACCORD study population that was using ART in year 2009. The age distribution of each sub-group was modeled using a two-component mixed normal distribution (resulting in the best fit among alternative models), as follows:

where

is the normal distribution. Here, is the age of those using ART in year 2009, is the mixing proportion, and ’s and ’s are the means and standard deviations of the bimodal distribution. The *normalmixEM2comp* function of the *mixtools* package for R was used to fit the distributions to the NA-ACCORD data in 2009 for each sub-group. When initializing a simulation run, the ages of the 2009 population agents were drawn from a distribution with the same parameters after being truncated at ages 18 and 85 (Probability from the truncated regions is distributed uniformly in the allowed regions). The coefficients for the age distribution of ART users in each of our 15 sub-groups can be found in Table S3.

Table S 3: Mixed Normal Coefficients for Age Distribution of ART Users in 2009

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Population** |  |  |  |  |  |
| **White MSM** | 0.16 | 46.32 | 46.89 | 3.49 | 10.30 |
| **Black/AA MSM** | 0.14 | 25.90 | 44.15 | 3.36 | 9.00 |
| **Hispanic MSM** | 0.97 | 40.78 | 65.22 | 8.73 | 9.29 |
| **White IDU Men** | 0.02 | 27.46 | 49.40 | 3.20 | 8.27 |
| **Black/AA IDU Men** | 0.02 | 34.53 | 53.74 | 5.96 | 6.39 |
| **Hispanic IDU Men** | 0.15 | 36.20 | 52.77 | 5.08 | 6.55 |
| **White IDU Women** | 0.13 | 33.87 | 46.62 | 4.60 | 7.82 |
| **Black/AA IDU Women** | 0.74 | 47.81 | 53.13 | 7.21 | 3.66 |
| **Hispanic IDU Women** | 0.05 | 29.49 | 49.47 | 2.33 | 6.98 |
| **White HET Men** | 0.19 | 47.15 | 49.45 | 4.27 | 10.86 |
| **Black/AA HET Men** | 0.40 | 46.12 | 47.27 | 6.07 | 11.39 |
| **Hispanic HET Men** | 0.66 | 40.17 | 53.13 | 7.94 | 10.33 |
| **White HET Women** | 0.78 | 42.50 | 53.78 | 8.58 | 10.48 |
| **Black/AA HET Women** | 0.12 | 31.93 | 44.75 | 5.37 | 9.73 |
| **Hispanic HET Women** | 0.19 | 32.32 | 45.71 | 5.07 | 9.53 |

### Year of ART initiation

To estimate the year of ART initiation for the simulated agents we applied data from PWH using ART in year 2009 in the NA-ACCORD study population. Each sub-group was broken into the seven age categories, including <20, [20,30), [30,40), [40,50), [50,60), [60,70), >70 years. Within each category, we estimated the proportion initiating ART in each year between 2000 and 2009 (Table S4). Those initiating ART prior to 2000 were classified as initiating in 2000. If there were no data for a sub-group in a year and age category, the proportions from the white MSM population were used. These groups are white and Hispanic HET men aged < 20, Black/AA IDU women aged <20 and 70+, and white and Hispanic IDU men and women aged < 20 as shown by the highlighted rows in Table S4.

Table S 4: Estimated distributions of ART initiation year (2000-2009) by age category among 15 sub-groups

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **ART initiation year** | | | | | | | | | |
| **Population** | **Age Category** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** |
| White MSM | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| [20, 30) | 0.013 | 0.015 | 0.008 | 0.018 | 0.033 | 0.063 | 0.091 | 0.159 | 0.243 | 0.357 |
| [30, 40) | 0.170 | 0.040 | 0.041 | 0.055 | 0.074 | 0.080 | 0.094 | 0.128 | 0.153 | 0.165 |
| [40, 50) | 0.405 | 0.054 | 0.045 | 0.059 | 0.063 | 0.063 | 0.077 | 0.073 | 0.076 | 0.086 |
| [50, 60) | 0.514 | 0.053 | 0.037 | 0.051 | 0.058 | 0.052 | 0.058 | 0.064 | 0.064 | 0.049 |
| [60, 70) | 0.565 | 0.065 | 0.049 | 0.050 | 0.046 | 0.044 | 0.041 | 0.061 | 0.033 | 0.046 |
| 70+ | 0.604 | 0.045 | 0.045 | 0.027 | 0.090 | 0.054 | 0.036 | 0.045 | 0.045 | 0.009 |
| Black/AA MSM | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| [20, 30) | 0.013 | 0.014 | 0.018 | 0.022 | 0.050 | 0.061 | 0.083 | 0.137 | 0.257 | 0.345 |
| [30, 40) | 0.151 | 0.045 | 0.054 | 0.060 | 0.074 | 0.077 | 0.101 | 0.126 | 0.148 | 0.166 |
| [40, 50) | 0.341 | 0.063 | 0.053 | 0.062 | 0.071 | 0.064 | 0.083 | 0.077 | 0.091 | 0.094 |
| [50, 60) | 0.444 | 0.065 | 0.048 | 0.077 | 0.072 | 0.048 | 0.065 | 0.072 | 0.053 | 0.058 |
| [60, 70) | 0.488 | 0.065 | 0.073 | 0.057 | 0.057 | 0.057 | 0.033 | 0.033 | 0.081 | 0.057 |
| 70+ | 0.444 | 0.056 | 0.111 | 0.000 | 0.000 | 0.167 | 0.000 | 0.056 | 0.167 | 0.000 |
| Hispanic MSM | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| [20, 30) | 0.008 | 0.000 | 0.008 | 0.013 | 0.038 | 0.068 | 0.106 | 0.165 | 0.208 | 0.386 |
| [30, 40) | 0.146 | 0.030 | 0.041 | 0.055 | 0.090 | 0.096 | 0.117 | 0.111 | 0.138 | 0.176 |
| [40, 50) | 0.307 | 0.066 | 0.056 | 0.073 | 0.060 | 0.083 | 0.082 | 0.079 | 0.099 | 0.096 |
| [50, 60) | 0.436 | 0.077 | 0.066 | 0.035 | 0.049 | 0.052 | 0.073 | 0.073 | 0.087 | 0.052 |
| [60, 70) | 0.629 | 0.032 | 0.016 | 0.081 | 0.016 | 0.032 | 0.032 | 0.016 | 0.081 | 0.065 |
| 70+ | 0.650 | 0.000 | 0.050 | 0.050 | 0.000 | 0.100 | 0.100 | 0.000 | 0.000 | 0.050 |
| White IDU Men | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| [20, 30) | 0.016 | 0.016 | 0.016 | 0.016 | 0.016 | 0.095 | 0.111 | 0.190 | 0.238 | 0.286 |
| [30, 40) | 0.201 | 0.057 | 0.046 | 0.036 | 0.075 | 0.101 | 0.070 | 0.157 | 0.119 | 0.139 |
| [40, 50) | 0.454 | 0.054 | 0.032 | 0.055 | 0.069 | 0.060 | 0.072 | 0.062 | 0.074 | 0.069 |
| [50, 60) | 0.543 | 0.057 | 0.051 | 0.055 | 0.060 | 0.047 | 0.041 | 0.051 | 0.054 | 0.041 |
| [60, 70) | 0.619 | 0.028 | 0.031 | 0.071 | 0.048 | 0.043 | 0.031 | 0.043 | 0.048 | 0.037 |
| 70+ | 0.538 | 0.115 | 0.077 | 0.115 | 0.038 | 0.000 | 0.000 | 0.038 | 0.038 | 0.038 |
| Black/AA IDU Men | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| [20, 30) | 0.056 | 0.000 | 0.056 | 0.000 | 0.000 | 0.000 | 0.000 | 0.333 | 0.278 | 0.278 |
| [30, 40) | 0.294 | 0.015 | 0.066 | 0.029 | 0.103 | 0.066 | 0.096 | 0.096 | 0.125 | 0.110 |
| [40, 50) | 0.433 | 0.060 | 0.037 | 0.066 | 0.067 | 0.064 | 0.066 | 0.071 | 0.069 | 0.066 |
| [50, 60) | 0.518 | 0.058 | 0.044 | 0.052 | 0.061 | 0.047 | 0.051 | 0.057 | 0.052 | 0.060 |
| [60, 70) | 0.572 | 0.061 | 0.047 | 0.043 | 0.046 | 0.033 | 0.064 | 0.043 | 0.040 | 0.051 |
| 70+ | 0.667 | 0.000 | 0.015 | 0.030 | 0.061 | 0.030 | 0.045 | 0.076 | 0.061 | 0.015 |
| Hispanic IDU Men | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| [20, 30) | 0.000 | 0.000 | 0.000 | 0.000 | 0.077 | 0.000 | 0.154 | 0.308 | 0.154 | 0.308 |
| [30, 40) | 0.180 | 0.054 | 0.045 | 0.054 | 0.072 | 0.135 | 0.072 | 0.081 | 0.153 | 0.153 |
| [40, 50) | 0.399 | 0.054 | 0.047 | 0.054 | 0.058 | 0.065 | 0.090 | 0.083 | 0.090 | 0.061 |
| [50, 60) | 0.566 | 0.072 | 0.042 | 0.040 | 0.042 | 0.030 | 0.047 | 0.068 | 0.051 | 0.042 |
| [60, 70) | 0.672 | 0.041 | 0.041 | 0.041 | 0.057 | 0.057 | 0.016 | 0.033 | 0.033 | 0.008 |
| 70+ | 0.400 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.200 | 0.400 | 0.000 | 0.000 |
| White IDU Women | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| [20, 30) | 0.062 | 0.062 | 0.000 | 0.000 | 0.062 | 0.062 | 0.062 | 0.250 | 0.062 | 0.375 |
| [30, 40) | 0.286 | 0.067 | 0.059 | 0.050 | 0.101 | 0.118 | 0.050 | 0.076 | 0.109 | 0.084 |
| [40, 50) | 0.349 | 0.086 | 0.043 | 0.077 | 0.105 | 0.067 | 0.091 | 0.062 | 0.053 | 0.067 |
| [50, 60) | 0.384 | 0.058 | 0.051 | 0.094 | 0.080 | 0.065 | 0.051 | 0.072 | 0.087 | 0.058 |
| [60, 70) | 0.462 | 0.000 | 0.000 | 0.154 | 0.000 | 0.000 | 0.154 | 0.000 | 0.231 | 0.000 |
| 70+ | 0.667 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.333 | 0.000 | 0.000 |
| Black/AA IDU Women | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| [20, 30) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.750 | 0.000 | 0.250 |
| [30, 40) | 0.146 | 0.062 | 0.083 | 0.125 | 0.021 | 0.083 | 0.083 | 0.104 | 0.167 | 0.125 |
| [40, 50) | 0.383 | 0.051 | 0.059 | 0.074 | 0.055 | 0.074 | 0.051 | 0.059 | 0.109 | 0.086 |
| [50, 60) | 0.430 | 0.077 | 0.020 | 0.067 | 0.043 | 0.063 | 0.087 | 0.067 | 0.067 | 0.080 |
| [60, 70) | 0.312 | 0.031 | 0.062 | 0.094 | 0.062 | 0.125 | 0.062 | 0.062 | 0.125 | 0.062 |
| 70+ | 0.604 | 0.045 | 0.045 | 0.027 | 0.090 | 0.054 | 0.036 | 0.045 | 0.045 | 0.009 |
| Hispanic IDU Women | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| [20, 30) | 0.000 | 0.000 | 0.000 | 0.250 | 0.000 | 0.000 | 0.000 | 0.500 | 0.000 | 0.250 |
| [30, 40) | 0.182 | 0.000 | 0.182 | 0.000 | 0.000 | 0.000 | 0.182 | 0.000 | 0.273 | 0.182 |
| [40, 50) | 0.271 | 0.062 | 0.021 | 0.083 | 0.062 | 0.083 | 0.083 | 0.167 | 0.104 | 0.062 |
| [50, 60) | 0.471 | 0.020 | 0.039 | 0.098 | 0.039 | 0.059 | 0.020 | 0.118 | 0.059 | 0.078 |
| [60, 70) | 0.286 | 0.000 | 0.143 | 0.000 | 0.000 | 0.000 | 0.000 | 0.143 | 0.143 | 0.286 |
| 70+ | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| White HET Men | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| [20, 30) | 0.000 | 0.000 | 0.000 | 0.000 | 0.167 | 0.111 | 0.000 | 0.056 | 0.333 | 0.333 |
| [30, 40) | 0.184 | 0.026 | 0.044 | 0.026 | 0.079 | 0.070 | 0.105 | 0.132 | 0.193 | 0.140 |
| [40, 50) | 0.369 | 0.036 | 0.057 | 0.069 | 0.112 | 0.051 | 0.076 | 0.076 | 0.079 | 0.076 |
| [50, 60) | 0.395 | 0.057 | 0.073 | 0.069 | 0.084 | 0.057 | 0.057 | 0.077 | 0.077 | 0.054 |
| [60, 70) | 0.440 | 0.037 | 0.018 | 0.119 | 0.064 | 0.083 | 0.073 | 0.064 | 0.083 | 0.018 |
| 70+ | 0.542 | 0.042 | 0.083 | 0.042 | 0.125 | 0.000 | 0.042 | 0.125 | 0.000 | 0.000 |
| Black/AA HET Men | <20 | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.500 | 0.000 |
| [20, 30) | 0.024 | 0.024 | 0.024 | 0.012 | 0.036 | 0.131 | 0.107 | 0.167 | 0.202 | 0.274 |
| [30, 40) | 0.120 | 0.044 | 0.028 | 0.058 | 0.097 | 0.086 | 0.118 | 0.104 | 0.169 | 0.176 |
| [40, 50) | 0.246 | 0.064 | 0.053 | 0.068 | 0.070 | 0.089 | 0.085 | 0.089 | 0.111 | 0.126 |
| [50, 60) | 0.290 | 0.070 | 0.040 | 0.062 | 0.080 | 0.075 | 0.092 | 0.085 | 0.104 | 0.102 |
| [60, 70) | 0.308 | 0.077 | 0.090 | 0.051 | 0.071 | 0.083 | 0.090 | 0.064 | 0.083 | 0.083 |
| 70+ | 0.490 | 0.039 | 0.039 | 0.059 | 0.039 | 0.020 | 0.118 | 0.078 | 0.078 | 0.039 |
| Hispanic HET Men | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| [20, 30) | 0.015 | 0.015 | 0.015 | 0.015 | 0.046 | 0.046 | 0.077 | 0.154 | 0.262 | 0.354 |
| [30, 40) | 0.110 | 0.051 | 0.055 | 0.059 | 0.110 | 0.097 | 0.097 | 0.123 | 0.165 | 0.131 |
| [40, 50) | 0.271 | 0.056 | 0.041 | 0.088 | 0.079 | 0.109 | 0.082 | 0.079 | 0.100 | 0.094 |
| [50, 60) | 0.319 | 0.053 | 0.043 | 0.037 | 0.069 | 0.090 | 0.069 | 0.106 | 0.128 | 0.085 |
| [60, 70) | 0.354 | 0.108 | 0.062 | 0.031 | 0.077 | 0.077 | 0.138 | 0.077 | 0.046 | 0.031 |
| 70+ | 0.500 | 0.100 | 0.050 | 0.050 | 0.100 | 0.000 | 0.050 | 0.000 | 0.100 | 0.050 |
| White HET Women | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 |
| [20, 30) | 0.039 | 0.039 | 0.020 | 0.000 | 0.098 | 0.157 | 0.098 | 0.098 | 0.176 | 0.275 |
| [30, 40) | 0.264 | 0.043 | 0.071 | 0.079 | 0.102 | 0.075 | 0.063 | 0.087 | 0.091 | 0.126 |
| [40, 50) | 0.425 | 0.058 | 0.056 | 0.033 | 0.081 | 0.056 | 0.067 | 0.072 | 0.089 | 0.064 |
| [50, 60) | 0.511 | 0.036 | 0.036 | 0.049 | 0.053 | 0.053 | 0.027 | 0.071 | 0.067 | 0.098 |
| [60, 70) | 0.529 | 0.057 | 0.071 | 0.071 | 0.057 | 0.029 | 0.043 | 0.057 | 0.057 | 0.029 |
| 70+ | 0.357 | 0.071 | 0.143 | 0.071 | 0.071 | 0.071 | 0.071 | 0.000 | 0.071 | 0.071 |
| Black/AA HET Women | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.750 | 0.250 |
| [20, 30) | 0.032 | 0.022 | 0.016 | 0.029 | 0.035 | 0.096 | 0.134 | 0.157 | 0.227 | 0.252 |
| [30, 40) | 0.167 | 0.044 | 0.049 | 0.076 | 0.088 | 0.090 | 0.119 | 0.104 | 0.132 | 0.130 |
| [40, 50) | 0.277 | 0.073 | 0.045 | 0.070 | 0.066 | 0.071 | 0.077 | 0.101 | 0.106 | 0.115 |
| [50, 60) | 0.294 | 0.062 | 0.049 | 0.081 | 0.083 | 0.069 | 0.082 | 0.089 | 0.107 | 0.083 |
| [60, 70) | 0.310 | 0.071 | 0.026 | 0.084 | 0.065 | 0.071 | 0.052 | 0.058 | 0.155 | 0.110 |
| 70+ | 0.351 | 0.081 | 0.081 | 0.081 | 0.054 | 0.108 | 0.081 | 0.027 | 0.135 | 0.000 |
| Hispanic HET Women | <20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.500 | 0.500 |
| [20, 30) | 0.067 | 0.027 | 0.067 | 0.027 | 0.067 | 0.160 | 0.080 | 0.107 | 0.240 | 0.160 |
| [30, 40) | 0.185 | 0.041 | 0.037 | 0.091 | 0.119 | 0.103 | 0.111 | 0.078 | 0.123 | 0.111 |
| [40, 50) | 0.303 | 0.045 | 0.042 | 0.065 | 0.097 | 0.087 | 0.103 | 0.065 | 0.103 | 0.090 |
| [50, 60) | 0.354 | 0.056 | 0.043 | 0.068 | 0.081 | 0.087 | 0.075 | 0.075 | 0.093 | 0.068 |
| [60, 70) | 0.386 | 0.105 | 0.053 | 0.088 | 0.070 | 0.018 | 0.000 | 0.088 | 0.105 | 0.088 |
| 70+ | 0.500 | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

### CD4 count at ART Initiation

To estimate the CD4 count at ART initiation among the simulated population in the year 2009, we data from the NA-ACCORD study population on ART in year 2009. Each sub-group was divided into original ART initiation years between [2000, 2009]. A normal distribution was fit to describe the count at ART initiation in each year. Within each sub-group, a linear regression model was applied to describe changes in the normal distribution parameters ( mean and standard deviation) over time, such that

and

The linear regression was fit using the *glm* function of the *stats* package in base R. Table S5 presents the value of the fitted coefficients.

Table S 5: Estimated regression coefficients for modeling the 2009 simulated population’s CD4 count at ART initiation, within 15 sub-groups of PWH

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Population** |  |  |  |  |
| **White MSM** | -460.54 | 0.24 | 359.29 | -0.18 |
| **Black/AA MSM** | -542.64 | 0.28 | 192.09 | -0.09 |
| **Hispanic MSM** | -408.42 | 0.21 | 308.38 | -0.15 |
| **White IDU Men** | -258.67 | 0.14 | 215.93 | -0.10 |
| **Black/AA IDU Men** | 2.91 | 0.01 | 230.43 | -0.11 |
| **Hispanic IDU Men** | -31.24 | 0.02 | 73.30 | -0.03 |
| **White IDU Women** | -2.80 | 0.01 | 86.22 | -0.04 |
| **Black/AA IDU Women** | -366.97 | 0.19 | 210.59 | -0.10 |
| **Hispanic IDU Women** | 271.90 | -0.13 | 480.09 | -0.24 |
| **White HET Men** | -452.23 | 0.23 | 34.63 | -0.01 |
| **Black/AA HET Men** | 51.51 | -0.02 | 240.87 | -0.12 |
| **Hispanic HET Men** | -185.52 | 0.10 | -179.08 | 0.09 |
| **White HET Women** | -339.12 | 0.18 | 335.03 | -0.16 |
| **Black/AA HET Women** | -377.71 | 0.20 | 130.78 | -0.06 |
| **Hispanic HET Women** | -246.24 | 0.13 | 1.62 | 0.00 |

Figures S2 and S3 show the trajectory of the means and standard deviations, respectively, for the estimated normal distributions of CD4 at ART initiation in each year between 2000 and 2009. When drawing CD4 values, we truncated the normal distribution at 0 and .

Chart, line chart

Description automatically generated

Figure S 2: Linear changes in estimated mean of CD4 at ART initiation for the simulated population in year 2009, within 15 sub-groups. Shown in each plot are the estimated mean CD4 count for each sub-group in each year. In each plot, the green dots represent the estimated value of associated parameter from NA-AACORD data each year between 2000 and 2009, and the blue lines show the linear fit to this data.

Chart, line chart

Description automatically generated

Figure S 3: Linear changes in estimated standard deviation of CD4 at ART initiation for the simulated population in year 2009, within 15 sub-groups. Shown in each plot are the estimated standard deviation in CD4 count for each sub-group in each year. In each plot, the green dots represent the estimated value of associated parameter from NA-AACORD data each year between 2000 and 2009, and the blue lines show the linear fit to this data.

### Initial population of people not using ART in year 2009

In addition to an initial population of people on ART in 2009 the simulation is seeded with an initial population who had previously been on ART but were disengaged from care in 2009, not using ART, and experiencing a likelihood of ART re-engagement in year 2010 and afterward. The size of this population was generated by estimating the number of people linking to care but not initiating ART from 2006 to 2009 as outlined in section 1.3.1. The age distributions and CD4 count distributions at ART initiation for this population is assumed to be identical to those of ART-users in 2009.

## Population initiating ART from 2010 – 2030

### Population size

**New HIV diagnosis:** In order to predict the number of new people linking to HIV care and initiating ART in a given year, we begin with data on the number of new HIV diagnoses per year as estimated by the CDC’s HIV Surveillance Reports as shown in Table S6. Data before 2016 came from Table 1 of the 2015 HIV Surveillance Report (6), while data 2016 and after came from Table 1 of the 2018 HIV Surveillance Report (7).

Table S 6: Reported number of new HIV diagnoses, by sub-group and year

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Population** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** |
| **White MSM** | 8,940 | 8,654 | 8,345 | 8,330 | 7,951 | 7,899 | 7,554 | 6,939 | 6,737 | 6,418 |
| **Black/AA MSM** | 9,803 | 9,701 | 9,688 | 9,572 | 9,550 | 9,960 | 10,096 | 9,839 | 9,639 | 9,496 |
| **Hispanic MSM** | 6,051 | 6,055 | 6,128 | 6,433 | 6,327 | 6,869 | 7,030 | 7,542 | 7,366 | 7,298 |
| **White IDU Men** | 1,204 | 1,087 | 999 | 996 | 965 | 1,018 | 1,121 | 1,129 | 1,171 | 1,239 |
| **Black/AA IDU Men** | 1,634 | 1,436 | 1,142 | 960 | 895 | 782 | 733 | 670 | 675 | 705 |
| **Hispanic IDU Men** | 944 | 847 | 779 | 713 | 624 | 587 | 605 | 638 | 662 | 643 |
| **White IDU Women** | 420 | 412 | 397 | 353 | 363 | 335 | 476 | 435 | 492 | 522 |
| **Black/AA IDU Women** | 845 | 736 | 595 | 551 | 413 | 376 | 335 | 335 | 343 | 320 |
| **Hispanic IDU Women** | 275 | 195 | 193 | 169 | 158 | 163 | 126 | 156 | 140 | 147 |
| **White HET Men** | 506 | 482 | 450 | 446 | 458 | 418 | 411 | 470 | 448 | 417 |
| **Black/AA HET Men** | 2,864 | 2,658 | 2,479 | 2,278 | 2,071 | 2,030 | 2,044 | 2,055 | 1,773 | 1,674 |
| **Hispanic HET Men** | 812 | 720 | 679 | 601 | 640 | 630 | 560 | 614 | 521 | 532 |
| **White HET Women** | 1,137 | 1,055 | 1,017 | 966 | 916 | 992 | 965 | 1,008 | 949 | 999 |
| **Black/AA HET Women** | 5,687 | 5,298 | 4,905 | 4,668 | 4,296 | 4,223 | 4,153 | 4,090 | 3,954 | 3,768 |

Various candidate models were proposed in order to predict the number of new HIV diagnoses from 2006 to 2030; predicted HIV diagnoses prior to 2010 are used to estimate the size of the ART non-using population in 2009. After removing models with inadequate fit (based on AIC values), the data were fit using a Poisson model, a gamma model and a natural cubic spline model with a single knot. Of these models, those resulting in unrealistic projections (>50% increase in new diagnoses from 2020 – 2030) were also removed. The Poisson and gamma fits were accomplished using the glm function of the stats package in base R, while the spline fit was generated using the lm and ns functions of the base R packages stats and splines, respectively. To incorporate additional uncertainties in annual estimates, the 95% prediction intervals around each fit were calculated. These prediction intervals were combined to generate an annual range for the number of new diagnoses in each year for each sub-group. The annual ranges are estimated from the largest upper prediction interval and the lowest lower prediction interval of existing models as shown in Figure S4. For each simulation run, a random number between 0 and 1 is drawn that defines the number of new diagnoses in that simulation. Figure S5 shows the full ranges used to predict the number of new HIV diagnoses.

Diagram

Description automatically generated with medium confidence

Figure S 4: Projecting the number of new HIV diagnoses in each sub-group using various models. Panels shows the trend in reported number of new HIV diagnoses via candidate models. Black dots represent available data on number of new HIV diagnoses by CDC MMP. Three candidate models including Poisson, gamma, and spline regression were selected to predict the number of new HIV diagnoses from 2006 to 2030.

Diagram, shape, arrow

Description automatically generated

Figure S 5: Projecting the range of new HIV diagnoses in each sub-group. Shaded areas mark the 95% confidence intervals around each fit and are used to develop the prediction range for number of new HIV diagnoses.

**Linkage to HIV care and ART initiation:** We estimated percentage of people in each sub-group linking to HIV care in the first 4 months after HIV diagnosis for each year between 2010 – 2015 from CDC estimates of the HIV care continuum (1, 2, 6-12). To project future trends from 2016 to 2030, we applied a linear regression (capped at 95% linkage to care, Figure S6). The linear regression was accomplished using the *ols* function of the *statsmodels* package for Python. Among remaining cases, we further assumed that 40% link to care over the next three years after initial diagnosis. To estimate the population starting ART, we assumed that 70% of those linking to HIV care begin ART in the years prior to the Treat All era (i.e. before 2011) (13). This percentage rises to 85% in 2011 (13) and up to 97% in 2012 and subsequent years (14). Those that link to care but do not begin ART immediately enter the model and initiate ART within the next 7 years as estimated by the ART re-engagement function.

Chart, line chart

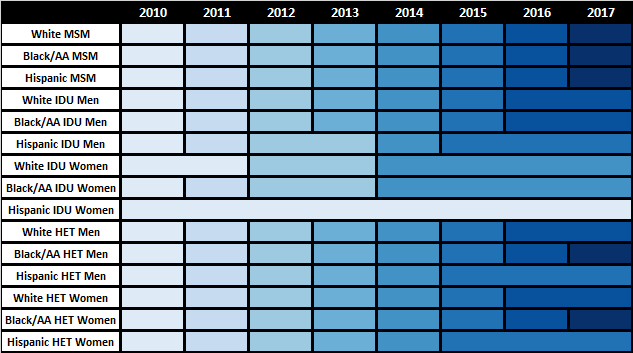
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Figure S 6: Projecting the probability of linkage to HIV care within 4 months of HIV diagnosis following diagnosis within 15 sub-groups. Green dots show the reported proportion of newly diagnosed cases who were linked to care and started ART in the first 4 months in each year. Data is fit using a linear regression model (blue line) and linkage to care probability is capped at 95%.

### Age distribution at ART initiation

The model projecting the age distribution of ART initiators was based on the portion of NA-ACCORD study population participants that initiated ART in the years 2010 – 2017. In order to reach a minimum of 100 patients observed to initiate ART within each sub-group and time period, some years were collapsed as shown in Table S7. The year variable was set to the lowest value in a collapsed period.

Table S 7: Collapsing time periods to ensure a minimum of 100 observed ART initiators in the NA-ACCORD study population in each of the 15 sub-groups



The age distributions of ART initiators in the study population in each year were modeled as two-component mixed normal distributions:

where

is the normal distribution. Here represent age at ART initiation, is the mixing proportion, and the ’s and ’s are the means and standard deviations of the bimodal distribution. A fit was found for each ART initiation year, from 2010 to 2017, and each sub-group using the *normalmixEM* function of the *mixtools* package for R.

To estimate changes in age at ART initiation distribution over time, we modeled changes in the five parameters of the distribution as a linear function of calendar year (Figure S7a-e). For this purpose, each parameter was fit to a linear regression using the *glm* function of the *stats* package in base R (blue dots in Figure S7). Given the sharp rate of change through the linear fit and lack of available data to support predictions from 2018 onward, the predicted value in year 2018 was used as an upper/lower bound to develop a prediction range for future years (shaded areas in Figure S7). Values for were truncated between 0 and 1 and all variables are truncated at 0. These models were applied to generate the value of 5 parameters describing the bimodal normal distribution of age at ART initiation in each year. The distributions themselves were further truncated at ages 18 and 85 when drawing ages for assignment to simulated agents.

Polygon

Description automatically generated

Figure S 7a: Projected values of regression parameters as a function of time in each sub-group of MSM. Shown in each row are the five parameters describing the bimodal normal distribution of age at ART initiation, where is the mixing proportion, and ’s and ’s are the means and standard deviations of the bimodal distribution. In each plot, the green dots represent the estimated value of associated parameter from NA-AACORD data each year between 2010-2017. The data is fit using a linear regression model (blue line). Prediction intervals for years after 2018 are constructed as a range between the 2018 value

**A picture containing polygon

Description automatically generated**

Figure S 7b: Projected values of regression parameters as a function of time in each sub-group of IDU men. Shown in each row are the five parameters describing the bimodal normal distribution of age at ART initiation, where is the mixing proportion, and ’s and ’s are the means and standard deviations of the bimodal distribution. In each plot, the green dots represent the estimated value of associated parameter from NA-AACORD data each year between 2010-2017. The data is fit using a linear regression model (blue line). Prediction intervals for years after 2018 are constructed as a range between the 2018 value

**Shape, polygon

Description automatically generated**

Figure S 7c: Projected values of regression parameters as a function of time in each sub-group of IDU women. Shown in each row are the five parameters describing the bimodal normal distribution of age at ART initiation, where is the mixing proportion, and ’s and ’s are the means and standard deviations of the bimodal distribution. In each plot, the green dots represent the estimated value of associated parameter from NA-AACORD data each year between 2010-2017. The data is fit using a linear regression model (blue line). Prediction intervals for years after 2018 are constructed as a range between the 2018 value

**A picture containing line chart

Description automatically generated**

Figure S 7d: Projected values of regression parameters as a function of time in each sub-group of HET men. Shown in each row are the five parameters describing the bimodal normal distribution of age at ART initiation, where is the mixing proportion, and ’s and ’s are the means and standard deviations of the bimodal distribution. In each plot, the green dots represent the estimated value of associated parameter from NA-AACORD data each year between 2010-2017. The data is fit using a linear regression model (blue line). Prediction intervals for years after 2018 are constructed as a range between the 2018 value

**Polygon

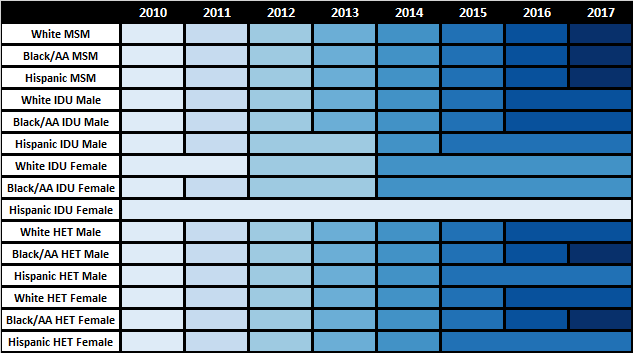
Description automatically generated**

Figure S 7e: Projected values of regression parameters as a function of time in each sub-group of HET women. Shown in each row are the five parameters describing the bimodal normal distribution of age at ART initiation, where is the mixing proportion, and ’s and ’s are the means and standard deviations of the bimodal distribution. In each plot, the green dots represent the estimated value of associated parameter from NA-AACORD data each year between 2010-2017. The data is fit using a linear regression model (blue line). Prediction intervals for years after 2018 are constructed as a range between the 2018 value and the predicted levels through the linear model (shaded area).

### CD4 count at ART Initiation

The model projecting the distribution of CD4 count at ART initiation was based on the portion of the NA-ACCORD study population participants that initiated ART from 2010 to 2017. In order to reach a minimum of 100 patients observed to initiate ART within each sub-group and time period, some years were collapsed as shown in (Table S8). The year variable was set to the lowest value in a collapsed period. CD4 at ART initiation was taken to be the CD4 measurement closest in time to ART initiation in the window of 365 days prior to 30 days after ART initiation and CD4 counts greater than 2000 cells/μL were set equal to 2000 cells/μL.

Table S 8: Collapsing time periods to ensure a minimum of 100 observed ART initiators with CD4 counts at ART initiation in the NA-ACCORD study population in each of the 15 sub-groups



A normal distribution was fit to square root[[1]](#footnote-2) of CD4 count values for each sub-group and in each year. Within each sub-group, a linear regression model was applied to describe changes in the normal distribution parameters ( mean and standard deviation) over time, such that:

and

The fits were estimated using the *glm* function of the *stats* package in base R. Table S9 presents the values of the fitted coefficients and the trends are shown in Figures S8 and S9.

Table S 9: Fitted regression coefficients for modeling CD4 count at ART initiation, within sub-groups

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Population** |  |  |  |  |
| **White MSM** | -636.03 | 0.33 | -300.81 | 0.15 |
| **Black/AA MSM** | -662.01 | 0.34 | -258.47 | 0.13 |
| **Hispanic MSM** | -798.88 | 0.41 | -306.88 | 0.16 |
| **White IDU Men** | -675.49 | 0.35 | -185.07 | 0.10 |
| **Black/AA IDU Men** | -1,220.06 | 0.62 | -24.39 | 0.02 |
| **Hispanic IDU Men** | -1,273.29 | 0.64 | -387.44 | 0.20 |
| **White IDU Women** | -444.52 | 0.23 | -595.34 | 0.30 |
| **Black/AA IDU Women** | -730.97 | 0.37 | -1,056.47 | 0.53 |
| **Hispanic IDU Women** | 16.07 | 0.00 | 6.56 | 0.00 |
| **White HET Men** | -660.41 | 0.34 | -392.63 | 0.20 |
| **Black/AA HET Men** | -609.64 | 0.31 | -240.92 | 0.12 |
| **Hispanic HET Men** | -99.70 | 0.06 | -322.33 | 0.16 |
| **White HET Women** | -791.30 | 0.40 | -357.39 | 0.18 |
| **Black/AA HET Women** | -812.50 | 0.41 | -127.13 | 0.07 |
| **Hispanic HET Women** | -439.80 | 0.23 | -638.65 | 0.32 |

Within PEARL, these models are used to estimate mean and standard deviation of a normal distribution of CD4 at ART initiation in each simulated year. The resulting distribution is applied to draw random values of at ART initiation. When drawing , we truncate the normal distribution at 12§display§0§png§600§FALSE§ and . Similar to the age distribution, the 2018 parameter values are used as a lower bound to create a prediction range for years after 2018.

Polygon

Description automatically generated with low confidence

Figure S 8: Linear changes in estimate of the mean of square root of CD4 count at ART initiation, within each sub-group. Shown in each row are the mean describing the normal distribution of at ART initiation for each sub-group. In each plot, the green dots represent the estimated value of associated parameter from NA-AACORD data between 2010-2017. Parameter values after 2018 are drawn from the blue shaded region.

Shape, polygon

Description automatically generated

Figure S 9: Linear changes in estimate of the standard deviation of square root of CD4 count at ART initiation. Shown in each row are the standard deviation describing the normal distribution of at ART initiation for each sub-group. In each plot, the green dots represent the estimated value of associated parameter from NA-AACORD data between 2010-2017. Parameter values after 2018 are drawn from the blue shaded region.

## Annual Population Dynamics

### Disengagement from HIV care

Participants in the NA-ACCORD study population contributed data in each year they were alive and under observation. A patient was defined to be disengaged from HIV care and ART use if ≥2 years had elapsed without either a CD4 or viral load lab result; the year of disengagement was set to the first year without a lab. A logistic regression and the odds to probability conversion (i.e. the logit function) were used to estimate the probability of the first instance of disengagement as a function of calendar year (), square root of CD4 count at ART initiation (), ART initiation calendar period (=1 if ART was initiated after 2010 and 0 otherwise), and age (). Age was modeled as a restricted quadratic spline with 4 knots. The knots were placed at the 0.05, 0.35, 0.65, and 0.95 quantiles of the variable (Table S10). The knot variables are defined such that

and

Table S 10: Spline knots for age in the disengagement from HIV care and ART use model

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Population** | **k1** | **k2** | **k3** | **k4** |
| **White MSM** | 29 | 45 | 52 | 65 |
| **Black/AA MSM** | 23 | 34 | 47 | 60 |
| **Hispanic MSM** | 26 | 38 | 46 | 59 |
| **White IDU Men** | 33 | 48 | 55 | 65 |
| **Black/AA IDU Men** | 41 | 53 | 58 | 67 |
| **Hispanic IDU Men** | 33 | 49 | 56 | 65 |
| **White IDU Women** | 32 | 44 | 51 | 61 |
| **Black/AA IDU Women** | 38 | 50 | 55 | 64 |
| **Hispanic IDU Women** | 33 | 48 | 54 | 65 |
| **White HET Men** | 32 | 47 | 54 | 69 |
| **Black/AA HET Men** | 30 | 45 | 52 | 65 |
| **Hispanic HET Men** | 30 | 42 | 51 | 66 |
| **White HET Women** | 28 | 43 | 51 | 66 |
| **Black/AA HET Women** | 27 | 41 | 49 | 63 |
| **Hispanic HET Women** | 28 | 40 | 49 | 64 |

The resulting regression equation is

where

is the logit function and is the probability of disengagement from HIV care and ART use.

The coefficients were estimated using a generalized estimating equation (GEE) with a logit link and an exchangeable correlation structure using the *geeglm* function of the *geepack* software package for R. The estimated regression coefficients are shown in Table S11, and the covariance matrices are shown in Table S12.

Table S 11: Regression coefficients for the disengagement from HIV care and ART use model

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Population** | **intercept** | **year** | **init\_sqrt\_cd4** | **art\_period** | **age** | **age\_1** | **age\_2** | **age\_3** |
| **White MSM** | 58.198 | -0.030 | 0.005 | -0.278 | 0.006 | -0.059 | 0.093 | 0.003 |
| **Black/AA MSM** | 116.399 | -0.060 | 0.004 | -0.262 | 0.075 | -0.190 | 0.209 | 0.000 |
| **Hispanic MSM** | 95.799 | -0.050 | 0.020 | -0.347 | 0.076 | -0.182 | 0.270 | -0.104 |
| **White IDU Men** | 32.985 | -0.017 | 0.005 | -0.148 | -0.022 | -0.025 | -0.031 | 0.113 |
| **Black/AA IDU Men** | 14.011 | -0.008 | -0.002 | 0.235 | -0.027 | 0.000 | 0.009 | 0.022 |
| **Hispanic IDU Men** | 106.020 | -0.054 | -0.006 | -0.226 | -0.006 | 0.001 | -0.094 | 0.025 |
| **White IDU Women** | 133.528 | -0.068 | 0.003 | -0.409 | -0.006 | -0.030 | -0.043 | 0.236 |
| **Black/AA IDU Women** | 140.855 | -0.071 | 0.014 | 0.223 | -0.020 | -0.021 | 0.069 | 0.082 |
| **Hispanic IDU Women** | 1.662 | -0.002 | -0.023 | -0.354 | -0.001 | -0.020 | -0.269 | 0.392 |
| **White HET Men** | 151.570 | -0.076 | -0.006 | -0.237 | -0.024 | 0.014 | -0.077 | 0.042 |
| **Black/AA HET Men** | 219.213 | -0.110 | 0.002 | -0.134 | -0.021 | 0.043 | -0.178 | 0.188 |
| **Hispanic HET Men** | 152.542 | -0.078 | 0.025 | -0.179 | 0.022 | -0.085 | 0.118 | -0.014 |
| **White HET Women** | 83.700 | -0.042 | 0.002 | -0.409 | -0.014 | -0.051 | 0.148 | -0.113 |
| **Black/AA HET Women** | 129.471 | -0.066 | 0.004 | -0.236 | -0.008 | -0.018 | 0.007 | 0.050 |
| **Hispanic HET Women** | 220.375 | -0.111 | -0.014 | -0.103 | -0.003 | 0.054 | -0.184 | 0.167 |

Table S 12: Covariance matrices for the disengagement from HIV care and ART use model

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | intercept | year | init\_sqrt\_cd4 | art\_period | age | age\_1 | age\_2 | age\_3 |
| White MSM | intercept | 1.90E+02 | -9.44E-02 | 1.34E-04 | 2.60E-01 | 2.45E-03 | 5.75E-04 | 3.55E-02 | -6.04E-02 |
| year | -9.44E-02 | 4.70E-05 | -1.48E-07 | -1.31E-04 | -2.24E-06 | 1.55E-06 | -2.19E-05 | 3.31E-05 |
| init\_sqrt\_cd4 | 1.34E-04 | -1.48E-07 | 7.36E-06 | -2.31E-05 | 1.08E-06 | -7.08E-07 | 2.57E-07 | 2.14E-07 |
| art\_period | 2.60E-01 | -1.31E-04 | -2.31E-05 | 2.51E-03 | 6.33E-05 | -4.84E-05 | 7.27E-05 | -6.90E-05 |
| age | 2.45E-03 | -2.24E-06 | 1.08E-06 | 6.33E-05 | 6.50E-05 | -1.23E-04 | 2.98E-04 | -2.20E-04 |
| age\_1 | 5.75E-04 | 1.55E-06 | -7.08E-07 | -4.84E-05 | -1.23E-04 | 2.71E-04 | -7.74E-04 | 6.55E-04 |
| age\_2 | 3.55E-02 | -2.19E-05 | 2.57E-07 | 7.27E-05 | 2.98E-04 | -7.74E-04 | 2.90E-03 | -3.07E-03 |
| age\_3 | -6.04E-02 | 3.31E-05 | 2.14E-07 | -6.90E-05 | -2.20E-04 | 6.55E-04 | -3.07E-03 | 3.84E-03 |
| Black/AA MSM | intercept | 4.35E+02 | -2.17E-01 | 7.78E-04 | 5.97E-01 | 4.27E-02 | -8.94E-02 | 1.35E-01 | -5.61E-02 |
| year | -2.17E-01 | 1.08E-04 | -5.22E-07 | -2.99E-04 | -2.57E-05 | 5.48E-05 | -8.07E-05 | 3.31E-05 |
| init\_sqrt\_cd4 | 7.78E-04 | -5.22E-07 | 1.26E-05 | -4.19E-05 | 2.60E-06 | -1.13E-06 | -1.84E-06 | 3.67E-06 |
| art\_period | 5.97E-01 | -2.99E-04 | -4.19E-05 | 4.11E-03 | 1.03E-04 | -5.33E-05 | 1.21E-07 | 4.36E-05 |
| age | 4.27E-02 | -2.57E-05 | 2.60E-06 | 1.03E-04 | 3.55E-04 | -8.36E-04 | 1.14E-03 | -4.53E-04 |
| age\_1 | -8.94E-02 | 5.48E-05 | -1.13E-06 | -5.33E-05 | -8.36E-04 | 2.17E-03 | -3.20E-03 | 1.62E-03 |
| age\_2 | 1.35E-01 | -8.07E-05 | -1.84E-06 | 1.21E-07 | 1.14E-03 | -3.20E-03 | 5.13E-03 | -3.22E-03 |
| age\_3 | -5.61E-02 | 3.31E-05 | 3.67E-06 | 4.36E-05 | -4.53E-04 | 1.62E-03 | -3.22E-03 | 3.35E-03 |
| Hispanic MSM | intercept | 7.30E+02 | -3.63E-01 | -5.03E-03 | 9.57E-01 | 1.78E-02 | -1.16E-02 | 5.72E-02 | -3.49E-02 |
| year | -3.63E-01 | 1.81E-04 | 2.26E-06 | -4.80E-04 | -1.51E-05 | 1.84E-05 | -5.01E-05 | 2.89E-05 |
| init\_sqrt\_cd4 | -5.03E-03 | 2.26E-06 | 2.75E-05 | -1.03E-04 | 9.96E-07 | 7.83E-06 | -3.10E-05 | 2.83E-05 |
| art\_period | 9.57E-01 | -4.80E-04 | -1.03E-04 | 7.30E-03 | 2.65E-04 | -2.80E-04 | 2.96E-04 | 2.00E-06 |
| age | 1.78E-02 | -1.51E-05 | 9.96E-07 | 2.65E-04 | 4.44E-04 | -9.33E-04 | 1.65E-03 | -9.26E-04 |
| age\_1 | -1.16E-02 | 1.84E-05 | 7.83E-06 | -2.80E-04 | -9.33E-04 | 2.23E-03 | -4.53E-03 | 3.11E-03 |
| age\_2 | 5.72E-02 | -5.01E-05 | -3.10E-05 | 2.96E-04 | 1.65E-03 | -4.53E-03 | 1.10E-02 | -9.51E-03 |
| age\_3 | -3.49E-02 | 2.89E-05 | 2.83E-05 | 2.00E-06 | -9.26E-04 | 3.11E-03 | -9.51E-03 | 1.07E-02 |
| White IDU Men | intercept | 9.54E+02 | -4.74E-01 | -8.11E-03 | 1.22E+00 | 2.22E-03 | 3.91E-02 | 4.76E-02 | -1.09E-01 |
| year | -4.74E-01 | 2.36E-04 | 3.64E-06 | -6.14E-04 | -4.39E-06 | -1.35E-05 | -3.79E-05 | 6.54E-05 |
| init\_sqrt\_cd4 | -8.11E-03 | 3.64E-06 | 3.60E-05 | -1.22E-04 | 5.72E-06 | -6.20E-06 | -1.09E-05 | 2.98E-05 |
| art\_period | 1.22E+00 | -6.14E-04 | -1.22E-04 | 1.39E-02 | 3.12E-04 | -1.26E-04 | -4.46E-04 | 1.19E-03 |
| age | 2.22E-03 | -4.39E-06 | 5.72E-06 | 3.12E-04 | 1.90E-04 | -3.69E-04 | 9.49E-04 | -7.96E-04 |
| age\_1 | 3.91E-02 | -1.35E-05 | -6.20E-06 | -1.26E-04 | -3.69E-04 | 9.00E-04 | -2.92E-03 | 2.96E-03 |
| age\_2 | 4.76E-02 | -3.79E-05 | -1.09E-05 | -4.46E-04 | 9.49E-04 | -2.92E-03 | 1.32E-02 | -1.75E-02 |
| age\_3 | -1.09E-01 | 6.54E-05 | 2.98E-05 | 1.19E-03 | -7.96E-04 | 2.96E-03 | -1.75E-02 | 2.89E-02 |
| Black/AA IDU Men | intercept | 1.16E+03 | -5.78E-01 | 1.96E-03 | 1.24E+00 | -5.18E-02 | 1.38E-01 | -8.81E-02 | -1.26E-01 |
| year | -5.78E-01 | 2.87E-04 | -1.41E-06 | -6.26E-04 | 2.32E-05 | -6.33E-05 | 2.96E-05 | 7.33E-05 |
| init\_sqrt\_cd4 | 1.96E-03 | -1.41E-06 | 3.55E-05 | -1.31E-04 | 8.88E-06 | -1.71E-05 | 2.60E-05 | 8.84E-06 |
| art\_period | 1.24E+00 | -6.26E-04 | -1.31E-04 | 1.44E-02 | 3.35E-04 | -4.08E-04 | 9.74E-04 | -6.46E-04 |
| age | -5.18E-02 | 2.32E-05 | 8.88E-06 | 3.35E-04 | 1.25E-04 | -2.90E-04 | 8.31E-04 | -6.74E-04 |
| age\_1 | 1.38E-01 | -6.33E-05 | -1.71E-05 | -4.08E-04 | -2.90E-04 | 9.76E-04 | -3.74E-03 | 3.70E-03 |
| age\_2 | -8.81E-02 | 2.96E-05 | 2.60E-05 | 9.74E-04 | 8.31E-04 | -3.74E-03 | 1.96E-02 | -2.41E-02 |
| age\_3 | -1.26E-01 | 7.33E-05 | 8.84E-06 | -6.46E-04 | -6.74E-04 | 3.70E-03 | -2.41E-02 | 3.47E-02 |
| Hispanic IDU Men | intercept | 2.96E+03 | -1.47E+00 | -2.96E-03 | 3.78E+00 | 1.49E-01 | -3.00E-01 | 1.64E+00 | -2.33E+00 |
| year | -1.47E+00 | 7.34E-04 | 5.79E-07 | -1.90E-03 | -9.10E-05 | 1.76E-04 | -8.77E-04 | 1.21E-03 |
| init\_sqrt\_cd4 | -2.96E-03 | 5.79E-07 | 9.51E-05 | -3.85E-04 | 1.01E-05 | -6.59E-07 | -1.58E-04 | 4.03E-04 |
| art\_period | 3.78E+00 | -1.90E-03 | -3.85E-04 | 3.76E-02 | 8.72E-04 | -6.34E-04 | 1.88E-03 | -3.73E-03 |
| age | 1.49E-01 | -9.10E-05 | 1.01E-05 | 8.72E-04 | 9.54E-04 | -1.56E-03 | 3.90E-03 | -3.55E-03 |
| age\_1 | -3.00E-01 | 1.76E-04 | -6.59E-07 | -6.34E-04 | -1.56E-03 | 2.92E-03 | -8.74E-03 | 9.32E-03 |
| age\_2 | 1.64E+00 | -8.77E-04 | -1.58E-04 | 1.88E-03 | 3.90E-03 | -8.74E-03 | 3.70E-02 | -5.36E-02 |
| age\_3 | -2.33E+00 | 1.21E-03 | 4.03E-04 | -3.73E-03 | -3.55E-03 | 9.32E-03 | -5.36E-02 | 1.03E-01 |
| White IDU Women | intercept | 4.48E+03 | -2.23E+00 | 9.42E-02 | 7.15E+00 | 2.31E-01 | -1.66E-01 | 7.85E-01 | -1.24E+00 |
| year | -2.23E+00 | 1.11E-03 | -4.86E-05 | -3.57E-03 | -1.48E-04 | 1.46E-04 | -5.15E-04 | 7.00E-04 |
| init\_sqrt\_cd4 | 9.42E-02 | -4.86E-05 | 1.75E-04 | 2.54E-04 | 9.31E-06 | 5.69E-05 | -3.60E-04 | 6.87E-04 |
| art\_period | 7.15E+00 | -3.57E-03 | 2.54E-04 | 9.01E-02 | 6.00E-04 | 1.60E-04 | 6.69E-04 | -5.78E-03 |
| age | 2.31E-01 | -1.48E-04 | 9.31E-06 | 6.00E-04 | 1.98E-03 | -4.01E-03 | 8.23E-03 | -5.77E-03 |
| age\_1 | -1.66E-01 | 1.46E-04 | 5.69E-05 | 1.60E-04 | -4.01E-03 | 9.65E-03 | -2.39E-02 | 2.07E-02 |
| age\_2 | 7.85E-01 | -5.15E-04 | -3.60E-04 | 6.69E-04 | 8.23E-03 | -2.39E-02 | 7.58E-02 | -8.54E-02 |
| age\_3 | -1.24E+00 | 7.00E-04 | 6.87E-04 | -5.78E-03 | -5.77E-03 | 2.07E-02 | -8.54E-02 | 1.22E-01 |
| Black/AA IDU Women | intercept | 4.38E+03 | -2.18E+00 | -4.93E-02 | 4.41E+00 | -8.52E-02 | 1.37E-01 | 9.00E-01 | -1.77E+00 |
| year | -2.18E+00 | 1.08E-03 | 2.34E-05 | -2.23E-03 | 2.00E-05 | -2.51E-05 | -5.61E-04 | 9.73E-04 |
| init\_sqrt\_cd4 | -4.93E-02 | 2.34E-05 | 1.41E-04 | -6.50E-04 | -3.37E-06 | 1.59E-05 | -2.30E-05 | 4.91E-05 |
| art\_period | 4.41E+00 | -2.23E-03 | -6.50E-04 | 5.38E-02 | 2.14E-03 | -3.67E-03 | 1.12E-02 | -1.26E-02 |
| age | -8.52E-02 | 2.00E-05 | -3.37E-06 | 2.14E-03 | 1.16E-03 | -2.36E-03 | 6.43E-03 | -5.31E-03 |
| age\_1 | 1.37E-01 | -2.51E-05 | 1.59E-05 | -3.67E-03 | -2.36E-03 | 6.05E-03 | -2.08E-02 | 2.01E-02 |
| age\_2 | 9.00E-01 | -5.61E-04 | -2.30E-05 | 1.12E-02 | 6.43E-03 | -2.08E-02 | 9.67E-02 | -1.15E-01 |
| age\_3 | -1.77E+00 | 9.73E-04 | 4.91E-05 | -1.26E-02 | -5.31E-03 | 2.01E-02 | -1.15E-01 | 1.58E-01 |
| Hispanic IDU Women | intercept | 2.29E+04 | -1.14E+01 | 4.50E-01 | 2.47E+01 | 8.18E-02 | -3.12E-02 | 4.78E+00 | -1.94E+00 |
| year | -1.14E+01 | 5.68E-03 | -2.27E-04 | -1.22E-02 | -1.20E-04 | 1.49E-04 | -2.68E-03 | 1.17E-03 |
| init\_sqrt\_cd4 | 4.50E-01 | -2.27E-04 | 3.44E-04 | -1.38E-03 | 3.12E-06 | 1.04E-04 | -2.42E-04 | 1.82E-04 |
| art\_period | 2.47E+01 | -1.22E-02 | -1.38E-03 | 2.24E-01 | -1.90E-03 | 2.95E-03 | -6.06E-03 | 6.11E-03 |
| age | 8.18E-02 | -1.20E-04 | 3.12E-06 | -1.90E-03 | 4.52E-03 | -7.95E-03 | 1.90E-02 | -1.31E-02 |
| age\_1 | -3.12E-02 | 1.49E-04 | 1.04E-04 | 2.95E-03 | -7.95E-03 | 1.62E-02 | -4.65E-02 | 3.76E-02 |
| age\_2 | 4.78E+00 | -2.68E-03 | -2.42E-04 | -6.06E-03 | 1.90E-02 | -4.65E-02 | 1.93E-01 | -2.11E-01 |
| age\_3 | -1.94E+00 | 1.17E-03 | 1.82E-04 | 6.11E-03 | -1.31E-02 | 3.76E-02 | -2.11E-01 | 2.94E-01 |
| White HET Men | intercept | 2.09E+03 | -1.04E+00 | 1.22E-02 | 2.79E+00 | -4.62E-02 | 2.38E-01 | -3.81E-01 | -4.35E-02 |
| year | -1.04E+00 | 5.16E-04 | -6.89E-06 | -1.40E-03 | 1.38E-05 | -9.99E-05 | 1.48E-04 | 4.89E-05 |
| init\_sqrt\_cd4 | 1.22E-02 | -6.89E-06 | 6.64E-05 | -1.85E-05 | 1.75E-05 | -2.42E-05 | 6.48E-05 | -6.06E-05 |
| art\_period | 2.79E+00 | -1.40E-03 | -1.85E-05 | 2.59E-02 | 5.44E-04 | -3.47E-04 | -2.35E-04 | 7.58E-04 |
| age | -4.62E-02 | 1.38E-05 | 1.75E-05 | 5.44E-04 | 5.42E-04 | -1.16E-03 | 2.69E-03 | -1.85E-03 |
| age\_1 | 2.38E-01 | -9.99E-05 | -2.42E-05 | -3.47E-04 | -1.16E-03 | 2.99E-03 | -8.34E-03 | 6.73E-03 |
| age\_2 | -3.81E-01 | 1.48E-04 | 6.48E-05 | -2.35E-04 | 2.69E-03 | -8.34E-03 | 2.99E-02 | -2.99E-02 |
| age\_3 | -4.35E-02 | 4.89E-05 | -6.06E-05 | 7.58E-04 | -1.85E-03 | 6.73E-03 | -2.99E-02 | 3.55E-02 |
| Black/AA HET Men | intercept | 6.85E+02 | -3.41E-01 | -4.28E-03 | 8.85E-01 | 9.87E-03 | -7.91E-03 | 1.61E-01 | -2.76E-01 |
| year | -3.41E-01 | 1.70E-04 | 2.00E-06 | -4.44E-04 | -8.21E-06 | 1.01E-05 | -9.29E-05 | 1.46E-04 |
| init\_sqrt\_cd4 | -4.28E-03 | 2.00E-06 | 1.83E-05 | -4.89E-05 | 4.07E-07 | -2.82E-07 | -2.94E-06 | 1.65E-06 |
| art\_period | 8.85E-01 | -4.44E-04 | -4.89E-05 | 7.10E-03 | 1.99E-04 | -2.34E-04 | 4.34E-04 | -2.75E-04 |
| age | 9.87E-03 | -8.21E-06 | 4.07E-07 | 1.99E-04 | 2.07E-04 | -4.05E-04 | 9.08E-04 | -6.10E-04 |
| age\_1 | -7.91E-03 | 1.01E-05 | -2.82E-07 | -2.34E-04 | -4.05E-04 | 9.29E-04 | -2.48E-03 | 1.96E-03 |
| age\_2 | 1.61E-01 | -9.29E-05 | -2.94E-06 | 4.34E-04 | 9.08E-04 | -2.48E-03 | 8.48E-03 | -8.25E-03 |
| age\_3 | -2.76E-01 | 1.46E-04 | 1.65E-06 | -2.75E-04 | -6.10E-04 | 1.96E-03 | -8.25E-03 | 9.39E-03 |
| Hispanic HET Men | intercept | 2.08E+03 | -1.04E+00 | -3.48E-02 | 2.62E+00 | 1.48E-01 | -2.42E-01 | 5.07E-01 | -4.22E-01 |
| year | -1.04E+00 | 5.16E-04 | 1.68E-05 | -1.31E-03 | -8.75E-05 | 1.52E-04 | -3.03E-04 | 2.35E-04 |
| init\_sqrt\_cd4 | -3.48E-02 | 1.68E-05 | 5.89E-05 | -1.23E-04 | 8.37E-06 | -2.78E-05 | 3.76E-05 | -1.30E-05 |
| art\_period | 2.62E+00 | -1.31E-03 | -1.23E-04 | 2.20E-02 | 5.03E-04 | -4.75E-04 | -2.61E-04 | 1.28E-03 |
| age | 1.48E-01 | -8.75E-05 | 8.37E-06 | 5.03E-04 | 8.66E-04 | -2.04E-03 | 3.44E-03 | -1.75E-03 |
| age\_1 | -2.42E-01 | 1.52E-04 | -2.78E-05 | -4.75E-04 | -2.04E-03 | 5.58E-03 | -1.08E-02 | 6.81E-03 |
| age\_2 | 5.07E-01 | -3.03E-04 | 3.76E-05 | -2.61E-04 | 3.44E-03 | -1.08E-02 | 2.43E-02 | -1.92E-02 |
| age\_3 | -4.22E-01 | 2.35E-04 | -1.30E-05 | 1.28E-03 | -1.75E-03 | 6.81E-03 | -1.92E-02 | 1.98E-02 |
| White HET Women | intercept | 1.74E+03 | -8.67E-01 | 6.24E-03 | 2.45E+00 | -1.23E-03 | 1.09E-01 | -1.03E-01 | -1.99E-01 |
| year | -8.67E-01 | 4.31E-04 | -3.66E-06 | -1.22E-03 | -8.28E-06 | -3.66E-05 | 1.55E-05 | 1.22E-04 |
| init\_sqrt\_cd4 | 6.24E-03 | -3.66E-06 | 6.29E-05 | -1.03E-04 | -2.00E-06 | 3.65E-05 | -1.14E-04 | 7.65E-05 |
| art\_period | 2.45E+00 | -1.22E-03 | -1.03E-04 | 2.43E-02 | 2.77E-04 | 1.79E-04 | -1.14E-03 | 8.73E-04 |
| age | -1.23E-03 | -8.28E-06 | -2.00E-06 | 2.77E-04 | 5.95E-04 | -1.26E-03 | 2.68E-03 | -1.79E-03 |
| age\_1 | 1.09E-01 | -3.66E-05 | 3.65E-05 | 1.79E-04 | -1.26E-03 | 3.11E-03 | -7.80E-03 | 6.13E-03 |
| age\_2 | -1.03E-01 | 1.55E-05 | -1.14E-04 | -1.14E-03 | 2.68E-03 | -7.80E-03 | 2.42E-02 | -2.35E-02 |
| age\_3 | -1.99E-01 | 1.22E-04 | 7.65E-05 | 8.73E-04 | -1.79E-03 | 6.13E-03 | -2.35E-02 | 2.77E-02 |
| Black/AA HET Women | intercept | 5.47E+02 | -2.72E-01 | 3.40E-03 | 6.42E-01 | 1.02E-02 | 1.58E-02 | -4.12E-02 | 2.05E-02 |
| year | -2.72E-01 | 1.36E-04 | -1.92E-06 | -3.20E-04 | -8.38E-06 | -1.35E-06 | 8.36E-06 | -3.24E-06 |
| init\_sqrt\_cd4 | 3.40E-03 | -1.92E-06 | 1.80E-05 | -4.42E-05 | 5.62E-06 | -4.28E-06 | -7.00E-06 | 1.54E-05 |
| art\_period | 6.42E-01 | -3.20E-04 | -4.42E-05 | 5.81E-03 | 2.39E-05 | 7.95E-05 | -2.87E-04 | 2.77E-04 |
| age | 1.02E-02 | -8.38E-06 | 5.62E-06 | 2.39E-05 | 2.25E-04 | -4.65E-04 | 9.07E-04 | -5.50E-04 |
| age\_1 | 1.58E-02 | -1.35E-06 | -4.28E-06 | 7.95E-05 | -4.65E-04 | 1.11E-03 | -2.52E-03 | 1.83E-03 |
| age\_2 | -4.12E-02 | 8.36E-06 | -7.00E-06 | -2.87E-04 | 9.07E-04 | -2.52E-03 | 6.97E-03 | -6.26E-03 |
| age\_3 | 2.05E-02 | -3.24E-06 | 1.54E-05 | 2.77E-04 | -5.50E-04 | 1.83E-03 | -6.26E-03 | 6.89E-03 |
| Hispanic HET Women | intercept | 2.47E+03 | -1.23E+00 | -7.55E-03 | 2.56E+00 | 1.72E-01 | -3.21E-01 | 5.70E-01 | -2.51E-01 |
| year | -1.23E+00 | 6.14E-04 | 3.07E-06 | -1.27E-03 | -1.08E-04 | 2.09E-04 | -3.61E-04 | 1.60E-04 |
| init\_sqrt\_cd4 | -7.55E-03 | 3.07E-06 | 7.03E-05 | -1.48E-04 | 5.32E-06 | 7.19E-06 | -1.42E-05 | -5.64E-06 |
| art\_period | 2.56E+00 | -1.27E-03 | -1.48E-04 | 2.85E-02 | -1.22E-04 | 5.81E-04 | -1.40E-03 | 1.10E-03 |
| age | 1.72E-01 | -1.08E-04 | 5.32E-06 | -1.22E-04 | 1.51E-03 | -3.39E-03 | 5.47E-03 | -2.61E-03 |
| age\_1 | -3.21E-01 | 2.09E-04 | 7.19E-06 | 5.81E-04 | -3.39E-03 | 8.57E-03 | -1.56E-02 | 9.14E-03 |
| age\_2 | 5.70E-01 | -3.61E-04 | -1.42E-05 | -1.40E-03 | 5.47E-03 | -1.56E-02 | 3.24E-02 | -2.38E-02 |
| age\_3 | -2.51E-01 | 1.60E-04 | -5.64E-06 | 1.10E-03 | -2.61E-03 | 9.14E-03 | -2.38E-02 | 2.36E-02 |

### Re-engagement in HIV care

To model re-engagement in care, we aggregated patients that disengaged from care (≥2 years between consecutive CD4 or viral load measurements) across all sub-groups in order to achieve a reasonable sample size. Among those who re-engaged in HIV care, those with an increased or stable CD4 count upon re-engagement were excluded as these patients were assumed to have been in care elsewhere. We assessed the number of years spent out of care (min=1 year, max=7 years). The probability of spending a certain number of years out of care was fit to a truncated, normalized Poisson distribution such that the probability of staying disengaged for more than 7 years was zero (Figure S10). The *curve\_fit* and *poisson* functions of the *scipy* package for Python were used for the fit of the model. Upon disengagement, this distribution is applied to generate the number of years that a simulated agent will be assigned as disengaged from HIV care and ART use before re-engaging with care and treatment.

A close up of a map

Description automatically generated

Figure S 10: Predicting the number of years spent out of HIV care and off of ART. Green dots represent the proportion of NA-ACCORD population who were disengaged from HIV care and ART and remained disengaged for the given number of years (x axis). The blue line shows a normalized Poisson distribution fit to this data.

### Mortality on ART

The mortality model for those in HIV care and using ART was constructed using the NA-ACCORD study population. Each participant contributed data to the year(s) they were alive and under observation. In order to reach a minimum of 100 deaths within each sub-group, the white and Hispanic race and ethnicity groups were collapsed together for the HET men, HET women, and IDU women groups. A logistic regression with a logit link was used to estimate the probability of mortality as a linear function of calendar year (year), restricted cubic splines for age, count at ART initiation (sqrt\_init\_cd4), and a categorical variable for year of ART initiation (art\_init\_year) as follows:

The full logistic regression equation is

where

is the logit function and is the probability of a given subject dying while in HIV care and on ART. These coefficients were estimated using a GEE with a logit link and an exchangeable correlation structure using the *geeglm* function of the *geepack* software package for R. The estimated regression coefficients are shown in Table S13, the knots are shown in Tables S14 and S15, and the covariance matrices are shown in Table S16.

**Mortality Threshold:** To avoid rare situations in which the estimated decline in future mortality among PWH on ART would fall below the reported mortality among the general population of HIV-negative individuals, we applied a “minimum threshold” for restricting the projected mortality in each subgroup. This threshold was implemented such that for a given race, sex, and 5-year age category the overall probability of mortality must be greater than or equal to the annual mortality rate of the general population with the same characteristics as reported by the CDC (15). If the average probability was lower than this threshold, then the difference was added to each agent so that the distribution would be shifted to one with the same mean as the general population. The threshold was taken to be twice as high for IDU populations.

Table S 13: Estimated regression coefficients for the probability of mortality in HIV care and on ART

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Population | intercept | year | age | age\_1 | age\_2 | sqrt\_init\_cd4 | sqrt\_init\_cd4\_1 | sqrt\_init\_cd4\_2 | art\_init\_year\_1 | art\_init\_year\_2 |
| White MSM | 128.045 | -0.067 | 0.037 | 0.029 | -0.173 | -0.006 | -0.163 | 1.009 | -0.014 | -0.126 |
| Black/AA MSM | 89.813 | -0.047 | 0.023 | -0.007 | 0.051 | -0.054 | -0.036 | 0.353 | -0.539 | -0.437 |
| Hispanic MSM | 50.136 | -0.028 | -0.009 | 0.194 | -0.666 | 0.019 | -0.157 | 0.768 | 0.007 | -0.472 |
| White IDU Men | 146.911 | -0.075 | 0.006 | 0.121 | -0.792 | 0.007 | -0.137 | 0.843 | -0.340 | -0.048 |
| Black/AA IDU Men | 239.650 | -0.122 | 0.027 | 0.105 | -0.651 | -0.026 | -0.015 | 0.178 | -0.118 | -0.649 |
| Hispanic IDU Men | 160.735 | -0.082 | 0.009 | 0.093 | -0.601 | 0.006 | -0.037 | 0.170 | -0.333 | 0.216 |
| White IDU Women | -120.688 | 0.060 | -0.079 | 0.246 | -1.066 | 0.055 | -0.305 | 1.728 | -0.085 | -0.559 |
| Black/AA IDU Women | 60.397 | -0.035 | 0.105 | -0.122 | 0.680 | 0.218 | -0.513 | 2.709 | -0.012 | -0.964 |
| Hispanic IDU Women | -120.688 | 0.060 | -0.079 | 0.246 | -1.066 | 0.055 | -0.305 | 1.728 | -0.085 | -0.559 |
| White HET Men | 136.583 | -0.071 | 0.025 | 0.017 | 0.068 | -0.038 | 0.094 | -0.508 | -0.283 | 0.194 |
| Black/AA HET Men | 38.522 | -0.022 | 0.011 | 0.023 | 0.006 | 0.045 | -0.326 | 1.238 | -0.118 | -0.858 |
| Hispanic HET Men | 136.583 | -0.071 | 0.025 | 0.017 | 0.068 | -0.038 | 0.094 | -0.508 | -0.283 | 0.194 |
| White HET Women | 103.993 | -0.056 | 0.152 | -0.250 | 0.853 | -0.073 | -0.005 | 0.387 | 0.566 | -0.495 |
| Black/AA HET Women | 151.146 | -0.077 | 0.007 | -0.004 | 0.136 | -0.061 | -0.049 | 0.493 | -0.241 | -0.064 |
| Hispanic HET Women | 103.993 | -0.056 | 0.152 | -0.250 | 0.853 | -0.073 | -0.005 | 0.387 | 0.566 | -0.495 |

Table S 14: Cubic restricted spline model age knots for the probability of mortality in HIV care and on ART

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Population** | k1 | k2 | k3 | k4 |
| **White MSM** | 29 | 45 | 52 | 65 |
| **Black/AA MSM** | 23 | 34 | 46 | 60 |
| **Hispanic MSM** | 25 | 38 | 46 | 59 |
| **White IDU Men** | 32 | 48 | 55 | 65 |
| **Black/AA IDU Men** | 41 | 53 | 58 | 67 |
| **Hispanic IDU Men** | 33 | 49 | 56 | 66 |
| **White IDU Women** | 32 | 45 | 52 | 63 |
| **Black/AA IDU Women** | 38 | 50 | 55 | 64 |
| **Hispanic IDU Women** | 32 | 45 | 52 | 63 |
| **White HET Men** | 30 | 44 | 52 | 67 |
| **Black/AA HET Men** | 30 | 45 | 52 | 65 |
| **Hispanic HET Men** | 30 | 44 | 52 | 67 |
| **White HET Women** | 28 | 42 | 50 | 65 |
| **Black/AA HET Women** | 27 | 41 | 49 | 63 |
| **Hispanic HET Women** | 28 | 42 | 50 | 65 |

Table S 15: Cubic restricted spline model CD4 count knots for the probability of mortality in HIV care and on ART

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Population** | k1 | k2 | k3 | k4 |
| **White MSM** | 5.10 | 14.83 | 19.62 | 27.75 |
| **Black/AA MSM** | 3.32 | 13.71 | 19.05 | 26.85 |
| **Hispanic MSM** | 4.47 | 13.82 | 18.73 | 26.38 |
| **White IDU Men** | 4.47 | 14.25 | 18.97 | 26.80 |
| **Black/AA IDU Men** | 3.46 | 13.15 | 17.97 | 26.31 |
| **Hispanic IDU Men** | 4.58 | 13.64 | 18.38 | 25.61 |
| **White IDU Women** | 4.69 | 14.42 | 18.89 | 27.35 |
| **Black/AA IDU Women** | 3.00 | 13.56 | 17.97 | 26.40 |
| **Hispanic IDU Women** | 4.69 | 14.42 | 18.89 | 27.35 |
| **White HET Men** | 3.16 | 10.54 | 16.58 | 25.22 |
| **Black/AA HET Men** | 2.83 | 11.09 | 17.29 | 25.48 |
| **Hispanic HET Men** | 3.16 | 10.54 | 16.58 | 25.22 |
| **White HET Women** | 4.47 | 14.46 | 18.95 | 27.51 |
| **Black/AA HET Women** | 3.32 | 13.60 | 18.38 | 26.87 |
| **Hispanic HET Women** | 4.47 | 14.46 | 18.95 | 27.51 |

Table S 16: Covariance matrices for modeling the probability of mortality in HIV care and on ART

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | intercept | year | age | age\_1 | age\_2 | sqrt\_init\_cd4 | sqrt\_init\_cd4\_1 | sqrt\_init\_cd4\_2 | art\_init\_year\_1 | art\_init\_year\_2 |
| White MSM | intercept | 1.68E+03 | -8.33E-01 | -8.28E-02 | 2.43E-01 | -1.19E+00 | -8.03E-02 | 1.12E-01 | -3.07E-01 | 1.06E+00 | 2.54E+00 |
| year | -8.33E-01 | 4.13E-04 | 3.28E-05 | -1.07E-04 | 5.28E-04 | 3.77E-05 | -5.20E-05 | 1.38E-04 | -5.32E-04 | -1.28E-03 |
| age | -8.28E-02 | 3.28E-05 | 4.44E-04 | -8.12E-04 | 3.63E-03 | 8.78E-06 | 2.47E-05 | -1.71E-04 | 2.88E-04 | 8.15E-04 |
| age\_1 | 2.43E-01 | -1.07E-04 | -8.12E-04 | 1.79E-03 | -8.79E-03 | -6.38E-06 | -1.59E-05 | 1.18E-04 | -1.64E-04 | -9.11E-04 |
| age\_2 | -1.19E+00 | 5.28E-04 | 3.63E-03 | -8.79E-03 | 4.57E-02 | -1.22E-05 | 8.62E-05 | -5.61E-04 | 2.32E-04 | 3.28E-03 |
| sqrt\_init\_cd4 | -8.03E-02 | 3.77E-05 | 8.78E-06 | -6.38E-06 | -1.22E-05 | 4.87E-04 | -1.20E-03 | 5.56E-03 | -6.26E-05 | 8.22E-06 |
| sqrt\_init\_cd4\_1 | 1.12E-01 | -5.20E-05 | 2.47E-05 | -1.59E-05 | 8.62E-05 | -1.20E-03 | 3.68E-03 | -1.89E-02 | -4.07E-04 | 6.41E-05 |
| sqrt\_init\_cd4\_2 | -3.07E-01 | 1.38E-04 | -1.71E-04 | 1.18E-04 | -5.61E-04 | 5.56E-03 | -1.89E-02 | 1.04E-01 | 2.35E-03 | -2.62E-03 |
| art\_init\_year\_1 | 1.06E+00 | -5.32E-04 | 2.88E-04 | -1.64E-04 | 2.32E-04 | -6.26E-05 | -4.07E-04 | 2.35E-03 | 1.43E-02 | 6.54E-03 |
| art\_init\_year\_2 | 2.54E+00 | -1.28E-03 | 8.15E-04 | -9.11E-04 | 3.28E-03 | 8.22E-06 | 6.41E-05 | -2.62E-03 | 6.54E-03 | 4.66E-02 |
| Black/AA MSM | intercept | 3.72E+03 | -1.85E+00 | 1.90E-01 | -3.61E-01 | 9.52E-01 | -1.28E-01 | 5.77E-01 | -2.97E+00 | 1.75E+00 | 6.15E+00 |
| year | -1.85E+00 | 9.23E-04 | -1.14E-04 | 2.32E-04 | -5.91E-04 | 5.83E-05 | -2.78E-04 | 1.44E-03 | -8.81E-04 | -3.08E-03 |
| age | 1.90E-01 | -1.14E-04 | 1.32E-03 | -3.74E-03 | 8.51E-03 | 1.51E-04 | -1.66E-04 | 4.73E-04 | 3.05E-04 | 1.22E-03 |
| age\_1 | -3.61E-01 | 2.32E-04 | -3.74E-03 | 1.20E-02 | -2.84E-02 | -3.46E-04 | 6.01E-04 | -2.37E-03 | 1.73E-03 | -7.53E-04 |
| age\_2 | 9.52E-01 | -5.91E-04 | 8.51E-03 | -2.84E-02 | 6.80E-02 | 7.21E-04 | -1.32E-03 | 5.10E-03 | -4.94E-03 | 9.68E-04 |
| sqrt\_init\_cd4 | -1.28E-01 | 5.83E-05 | 1.51E-04 | -3.46E-04 | 7.21E-04 | 1.04E-03 | -2.50E-03 | 1.21E-02 | -2.84E-04 | -8.42E-04 |
| sqrt\_init\_cd4\_1 | 5.77E-01 | -2.78E-04 | -1.66E-04 | 6.01E-04 | -1.32E-03 | -2.50E-03 | 7.41E-03 | -3.94E-02 | 6.05E-04 | 1.66E-03 |
| sqrt\_init\_cd4\_2 | -2.97E+00 | 1.44E-03 | 4.73E-04 | -2.37E-03 | 5.10E-03 | 1.21E-02 | -3.94E-02 | 2.27E-01 | -5.19E-03 | -1.42E-02 |
| art\_init\_year\_1 | 1.75E+00 | -8.81E-04 | 3.05E-04 | 1.73E-03 | -4.94E-03 | -2.84E-04 | 6.05E-04 | -5.19E-03 | 3.49E-02 | 1.99E-02 |
| art\_init\_year\_2 | 6.15E+00 | -3.08E-03 | 1.22E-03 | -7.53E-04 | 9.68E-04 | -8.42E-04 | 1.66E-03 | -1.42E-02 | 1.99E-02 | 7.53E-02 |
| Hispanic MSM | intercept | 8.99E+03 | -4.48E+00 | 1.77E-01 | 1.24E+00 | -6.02E+00 | 2.00E-01 | -9.55E-01 | 4.03E+00 | 9.00E+00 | 1.52E+01 |
| year | -4.48E+00 | 2.23E-03 | -1.37E-04 | -5.22E-04 | 2.69E-03 | -1.09E-04 | 4.94E-04 | -2.07E-03 | -4.56E-03 | -7.74E-03 |
| age | 1.77E-01 | -1.37E-04 | 3.13E-03 | -6.79E-03 | 2.22E-02 | -1.94E-04 | 5.01E-04 | -2.48E-03 | 3.54E-03 | 6.55E-03 |
| age\_1 | 1.24E+00 | -5.22E-04 | -6.79E-03 | 1.75E-02 | -6.09E-02 | 1.17E-03 | -3.17E-03 | 1.43E-02 | -2.48E-03 | -3.63E-03 |
| age\_2 | -6.02E+00 | 2.69E-03 | 2.22E-02 | -6.09E-02 | 2.17E-01 | -4.71E-03 | 1.30E-02 | -5.74E-02 | 1.96E-03 | 2.46E-04 |
| sqrt\_init\_cd4 | 2.00E-01 | -1.09E-04 | -1.94E-04 | 1.17E-03 | -4.71E-03 | 2.58E-03 | -6.04E-03 | 2.59E-02 | 1.74E-03 | 5.29E-03 |
| sqrt\_init\_cd4\_1 | -9.55E-01 | 4.94E-04 | 5.01E-04 | -3.17E-03 | 1.30E-02 | -6.04E-03 | 1.80E-02 | -8.58E-02 | -7.27E-03 | -1.64E-02 |
| sqrt\_init\_cd4\_2 | 4.03E+00 | -2.07E-03 | -2.48E-03 | 1.43E-02 | -5.74E-02 | 2.59E-02 | -8.58E-02 | 4.44E-01 | 2.81E-02 | 6.19E-02 |
| art\_init\_year\_1 | 9.00E+00 | -4.56E-03 | 3.54E-03 | -2.48E-03 | 1.96E-03 | 1.74E-03 | -7.27E-03 | 2.81E-02 | 7.24E-02 | 5.71E-02 |
| art\_init\_year\_2 | 1.52E+01 | -7.74E-03 | 6.55E-03 | -3.63E-03 | 2.46E-04 | 5.29E-03 | -1.64E-02 | 6.19E-02 | 5.71E-02 | 2.86E-01 |
| White IDU Men | intercept | 2.80E+03 | -1.39E+00 | -1.34E-01 | 3.39E-01 | -1.70E+00 | -1.20E-01 | 1.92E-01 | -6.62E-01 | 7.06E-01 | 3.66E+00 |
| year | -1.39E+00 | 6.89E-04 | 5.67E-05 | -1.53E-04 | 7.73E-04 | 5.45E-05 | -8.53E-05 | 2.85E-04 | -3.64E-04 | -1.82E-03 |
| age | -1.34E-01 | 5.67E-05 | 4.98E-04 | -8.48E-04 | 4.19E-03 | 5.46E-05 | -1.34E-04 | 6.82E-04 | 6.52E-04 | -2.04E-04 |
| age\_1 | 3.39E-01 | -1.53E-04 | -8.48E-04 | 1.82E-03 | -1.02E-02 | -9.96E-05 | 2.73E-04 | -1.50E-03 | -1.00E-03 | 6.23E-04 |
| age\_2 | -1.70E+00 | 7.73E-04 | 4.19E-03 | -1.02E-02 | 6.19E-02 | 3.20E-04 | -9.18E-04 | 5.50E-03 | 4.29E-03 | -3.94E-03 |
| sqrt\_init\_cd4 | -1.20E-01 | 5.45E-05 | 5.46E-05 | -9.96E-05 | 3.20E-04 | 9.71E-04 | -2.15E-03 | 9.92E-03 | -1.92E-04 | -2.60E-04 |
| sqrt\_init\_cd4\_1 | 1.92E-01 | -8.53E-05 | -1.34E-04 | 2.73E-04 | -9.18E-04 | -2.15E-03 | 5.80E-03 | -2.93E-02 | 8.62E-05 | 1.50E-04 |
| sqrt\_init\_cd4\_2 | -6.62E-01 | 2.85E-04 | 6.82E-04 | -1.50E-03 | 5.50E-03 | 9.92E-03 | -2.93E-02 | 1.57E-01 | -2.12E-03 | -1.43E-03 |
| art\_init\_year\_1 | 7.06E-01 | -3.64E-04 | 6.52E-04 | -1.00E-03 | 4.29E-03 | -1.92E-04 | 8.62E-05 | -2.12E-03 | 2.58E-02 | 6.80E-03 |
| art\_init\_year\_2 | 3.66E+00 | -1.82E-03 | -2.04E-04 | 6.23E-04 | -3.94E-03 | -2.60E-04 | 1.50E-04 | -1.43E-03 | 6.80E-03 | 5.72E-02 |
| Black/AA IDU Men | intercept | 1.84E+03 | -9.13E-01 | 2.31E-02 | 1.02E-01 | -4.02E-01 | -4.38E-02 | 8.68E-02 | -4.86E-01 | 4.95E-01 | 2.88E+00 |
| year | -9.13E-01 | 4.55E-04 | -1.91E-05 | -3.72E-05 | 1.35E-04 | 1.98E-05 | -4.00E-05 | 2.32E-04 | -2.50E-04 | -1.46E-03 |
| age | 2.31E-02 | -1.91E-05 | 3.28E-04 | -6.14E-04 | 3.05E-03 | 7.35E-06 | 1.89E-05 | -1.88E-04 | 1.27E-04 | 9.99E-04 |
| age\_1 | 1.02E-01 | -3.72E-05 | -6.14E-04 | 1.57E-03 | -9.06E-03 | -3.40E-05 | 5.25E-05 | -1.42E-04 | -1.01E-04 | -1.83E-03 |
| age\_2 | -4.02E-01 | 1.35E-04 | 3.05E-03 | -9.06E-03 | 5.69E-02 | 2.02E-04 | -5.21E-04 | 2.39E-03 | 5.08E-04 | 9.46E-03 |
| sqrt\_init\_cd4 | -4.38E-02 | 1.98E-05 | 7.35E-06 | -3.40E-05 | 2.02E-04 | 5.37E-04 | -1.25E-03 | 5.47E-03 | -1.21E-04 | -1.28E-05 |
| sqrt\_init\_cd4\_1 | 8.68E-02 | -4.00E-05 | 1.89E-05 | 5.25E-05 | -5.21E-04 | -1.25E-03 | 3.44E-03 | -1.62E-02 | 8.42E-06 | -5.03E-04 |
| sqrt\_init\_cd4\_2 | -4.86E-01 | 2.32E-04 | -1.88E-04 | -1.42E-04 | 2.39E-03 | 5.47E-03 | -1.62E-02 | 8.01E-02 | -1.28E-04 | 1.39E-03 |
| art\_init\_year\_1 | 4.95E-01 | -2.50E-04 | 1.27E-04 | -1.01E-04 | 5.08E-04 | -1.21E-04 | 8.42E-06 | -1.28E-04 | 1.12E-02 | 4.04E-03 |
| art\_init\_year\_2 | 2.88E+00 | -1.46E-03 | 9.99E-04 | -1.83E-03 | 9.46E-03 | -1.28E-05 | -5.03E-04 | 1.39E-03 | 4.04E-03 | 1.24E-01 |
| Hispanic IDU Men | intercept | 1.13E+04 | -5.61E+00 | -6.35E-01 | 1.10E+00 | -3.80E+00 | -8.24E-01 | 2.14E+00 | -8.82E+00 | 6.22E+00 | 1.72E+01 |
| year | -5.61E+00 | 2.78E-03 | 2.76E-04 | -4.83E-04 | 1.59E-03 | 4.00E-04 | -1.04E-03 | 4.30E-03 | -3.12E-03 | -8.60E-03 |
| age | -6.35E-01 | 2.76E-04 | 2.06E-03 | -3.45E-03 | 1.69E-02 | -2.10E-04 | 2.14E-04 | -1.14E-03 | 1.22E-03 | 1.68E-03 |
| age\_1 | 1.10E+00 | -4.83E-04 | -3.45E-03 | 6.88E-03 | -3.72E-02 | 2.35E-04 | 9.79E-05 | -1.40E-04 | -1.02E-03 | -2.13E-03 |
| age\_2 | -3.80E+00 | 1.59E-03 | 1.69E-02 | -3.72E-02 | 2.19E-01 | -1.22E-03 | -4.57E-04 | 7.06E-04 | 4.51E-03 | 1.30E-02 |
| sqrt\_init\_cd4 | -8.24E-01 | 4.00E-04 | -2.10E-04 | 2.35E-04 | -1.22E-03 | 3.72E-03 | -8.56E-03 | 3.71E-02 | -1.24E-03 | 1.85E-03 |
| sqrt\_init\_cd4\_1 | 2.14E+00 | -1.04E-03 | 2.14E-04 | 9.79E-05 | -4.57E-04 | -8.56E-03 | 2.37E-02 | -1.12E-01 | -2.88E-04 | -3.68E-03 |
| sqrt\_init\_cd4\_2 | -8.82E+00 | 4.30E-03 | -1.14E-03 | -1.40E-04 | 7.06E-04 | 3.71E-02 | -1.12E-01 | 5.57E-01 | -1.65E-03 | 8.07E-04 |
| art\_init\_year\_1 | 6.22E+00 | -3.12E-03 | 1.22E-03 | -1.02E-03 | 4.51E-03 | -1.24E-03 | -2.88E-04 | -1.65E-03 | 9.30E-02 | 3.32E-02 |
| art\_init\_year\_2 | 1.72E+01 | -8.60E-03 | 1.68E-03 | -2.13E-03 | 1.30E-02 | 1.85E-03 | -3.68E-03 | 8.07E-04 | 3.32E-02 | 2.57E-01 |
| White IDU Women | intercept | 1.04E+04 | -5.17E+00 | 3.90E-01 | -1.12E+00 | 7.29E+00 | 1.97E-01 | -1.28E-01 | -6.32E-01 | 3.69E+00 | 1.77E+01 |
| year | -5.17E+00 | 2.57E-03 | -2.17E-04 | 6.14E-04 | -3.86E-03 | -1.18E-04 | 1.03E-04 | 1.57E-04 | -1.86E-03 | -8.96E-03 |
| age | 3.90E-01 | -2.17E-04 | 1.26E-03 | -3.20E-03 | 1.38E-02 | 2.63E-04 | -4.31E-04 | 1.09E-03 | 1.27E-03 | 6.92E-03 |
| age\_1 | -1.12E+00 | 6.14E-04 | -3.20E-03 | 1.06E-02 | -5.11E-02 | -7.23E-04 | 1.34E-03 | -4.41E-03 | -1.84E-03 | -1.57E-02 |
| age\_2 | 7.29E+00 | -3.86E-03 | 1.38E-02 | -5.11E-02 | 2.63E-01 | 3.36E-03 | -5.78E-03 | 1.96E-02 | 3.52E-03 | 6.42E-02 |
| sqrt\_init\_cd4 | 1.97E-01 | -1.18E-04 | 2.63E-04 | -7.23E-04 | 3.36E-03 | 3.84E-03 | -8.76E-03 | 4.01E-02 | -1.21E-03 | 3.90E-03 |
| sqrt\_init\_cd4\_1 | -1.28E-01 | 1.03E-04 | -4.31E-04 | 1.34E-03 | -5.78E-03 | -8.76E-03 | 2.41E-02 | -1.19E-01 | 9.07E-04 | -1.29E-02 |
| sqrt\_init\_cd4\_2 | -6.32E-01 | 1.57E-04 | 1.09E-03 | -4.41E-03 | 1.96E-02 | 4.01E-02 | -1.19E-01 | 6.22E-01 | -6.94E-03 | 6.55E-02 |
| art\_init\_year\_1 | 3.69E+00 | -1.86E-03 | 1.27E-03 | -1.84E-03 | 3.52E-03 | -1.21E-03 | 9.07E-04 | -6.94E-03 | 7.47E-02 | 3.40E-02 |
| art\_init\_year\_2 | 1.77E+01 | -8.96E-03 | 6.92E-03 | -1.57E-02 | 6.42E-02 | 3.90E-03 | -1.29E-02 | 6.55E-02 | 3.40E-02 | 2.77E-01 |
| Black/AA IDU Women | intercept | 1.15E+04 | -5.75E+00 | 1.50E+00 | -3.90E+00 | 2.68E+01 | 9.15E-02 | -4.80E-01 | 3.98E+00 | 2.82E+00 | 1.08E+01 |
| year | -5.75E+00 | 2.87E-03 | -8.84E-04 | 2.18E-03 | -1.45E-02 | -8.17E-05 | 2.82E-04 | -2.14E-03 | -1.44E-03 | -4.11E-03 |
| age | 1.50E+00 | -8.84E-04 | 6.10E-03 | -1.09E-02 | 5.42E-02 | 7.31E-04 | -5.34E-04 | 7.73E-04 | 1.22E-03 | -5.53E-02 |
| age\_1 | -3.90E+00 | 2.18E-03 | -1.09E-02 | 2.33E-02 | -1.28E-01 | -9.05E-04 | 8.10E-04 | -3.19E-03 | 2.70E-03 | 8.57E-02 |
| age\_2 | 2.68E+01 | -1.45E-02 | 5.42E-02 | -1.28E-01 | 7.52E-01 | 1.49E-03 | 3.93E-04 | 2.24E-03 | -2.91E-02 | -3.86E-01 |
| sqrt\_init\_cd4 | 9.15E-02 | -8.17E-05 | 7.31E-04 | -9.05E-04 | 1.49E-03 | 5.05E-03 | -9.79E-03 | 4.75E-02 | 9.88E-04 | -2.94E-03 |
| sqrt\_init\_cd4\_1 | -4.80E-01 | 2.82E-04 | -5.34E-04 | 8.10E-04 | 3.93E-04 | -9.79E-03 | 2.37E-02 | -1.27E-01 | -6.90E-03 | -1.36E-02 |
| sqrt\_init\_cd4\_2 | 3.98E+00 | -2.14E-03 | 7.73E-04 | -3.19E-03 | 2.24E-03 | 4.75E-02 | -1.27E-01 | 7.32E-01 | 3.52E-02 | 9.11E-02 |
| art\_init\_year\_1 | 2.82E+00 | -1.44E-03 | 1.22E-03 | 2.70E-03 | -2.91E-02 | 9.88E-04 | -6.90E-03 | 3.52E-02 | 9.57E-02 | 3.89E-02 |
| art\_init\_year\_2 | 1.08E+01 | -4.11E-03 | -5.53E-02 | 8.57E-02 | -3.86E-01 | -2.94E-03 | -1.36E-02 | 9.11E-02 | 3.89E-02 | 1.03E+00 |
| Hispanic IDU Women | intercept | 1.04E+04 | -5.17E+00 | 3.90E-01 | -1.12E+00 | 7.29E+00 | 1.97E-01 | -1.28E-01 | -6.32E-01 | 3.69E+00 | 1.77E+01 |
| year | -5.17E+00 | 2.57E-03 | -2.17E-04 | 6.14E-04 | -3.86E-03 | -1.18E-04 | 1.03E-04 | 1.57E-04 | -1.86E-03 | -8.96E-03 |
| age | 3.90E-01 | -2.17E-04 | 1.26E-03 | -3.20E-03 | 1.38E-02 | 2.63E-04 | -4.31E-04 | 1.09E-03 | 1.27E-03 | 6.92E-03 |
| age\_1 | -1.12E+00 | 6.14E-04 | -3.20E-03 | 1.06E-02 | -5.11E-02 | -7.23E-04 | 1.34E-03 | -4.41E-03 | -1.84E-03 | -1.57E-02 |
| age\_2 | 7.29E+00 | -3.86E-03 | 1.38E-02 | -5.11E-02 | 2.63E-01 | 3.36E-03 | -5.78E-03 | 1.96E-02 | 3.52E-03 | 6.42E-02 |
| sqrt\_init\_cd4 | 1.97E-01 | -1.18E-04 | 2.63E-04 | -7.23E-04 | 3.36E-03 | 3.84E-03 | -8.76E-03 | 4.01E-02 | -1.21E-03 | 3.90E-03 |
| sqrt\_init\_cd4\_1 | -1.28E-01 | 1.03E-04 | -4.31E-04 | 1.34E-03 | -5.78E-03 | -8.76E-03 | 2.41E-02 | -1.19E-01 | 9.07E-04 | -1.29E-02 |
| sqrt\_init\_cd4\_2 | -6.32E-01 | 1.57E-04 | 1.09E-03 | -4.41E-03 | 1.96E-02 | 4.01E-02 | -1.19E-01 | 6.22E-01 | -6.94E-03 | 6.55E-02 |
| art\_init\_year\_1 | 3.69E+00 | -1.86E-03 | 1.27E-03 | -1.84E-03 | 3.52E-03 | -1.21E-03 | 9.07E-04 | -6.94E-03 | 7.47E-02 | 3.40E-02 |
| art\_init\_year\_2 | 1.77E+01 | -8.96E-03 | 6.92E-03 | -1.57E-02 | 6.42E-02 | 3.90E-03 | -1.29E-02 | 6.55E-02 | 3.40E-02 | 2.77E-01 |
| White HET Men | intercept | 5.74E+03 | -2.86E+00 | 1.47E-01 | -3.08E-01 | 1.17E+00 | -3.37E-02 | -1.09E+00 | 4.48E+00 | 5.47E+00 | 1.04E+01 |
| year | -2.86E+00 | 1.42E-03 | -1.12E-04 | 2.41E-04 | -8.81E-04 | 5.40E-06 | 5.78E-04 | -2.33E-03 | -2.75E-03 | -5.13E-03 |
| age | 1.47E-01 | -1.12E-04 | 2.12E-03 | -4.90E-03 | 1.70E-02 | 1.67E-04 | -6.28E-04 | 2.26E-03 | 1.42E-03 | -1.78E-03 |
| age\_1 | -3.08E-01 | 2.41E-04 | -4.90E-03 | 1.26E-02 | -4.55E-02 | -3.64E-04 | 1.65E-03 | -5.85E-03 | -3.43E-03 | 4.38E-03 |
| age\_2 | 1.17E+00 | -8.81E-04 | 1.70E-02 | -4.55E-02 | 1.69E-01 | 9.45E-04 | -5.16E-03 | 1.88E-02 | 1.29E-02 | -1.41E-02 |
| sqrt\_init\_cd4 | -3.37E-02 | 5.40E-06 | 1.67E-04 | -3.64E-04 | 9.45E-04 | 2.89E-03 | -9.16E-03 | 2.83E-02 | -7.45E-04 | -1.15E-03 |
| sqrt\_init\_cd4\_1 | -1.09E+00 | 5.78E-04 | -6.28E-04 | 1.65E-03 | -5.16E-03 | -9.16E-03 | 3.46E-02 | -1.15E-01 | -5.76E-04 | 2.64E-03 |
| sqrt\_init\_cd4\_2 | 4.48E+00 | -2.33E-03 | 2.26E-03 | -5.85E-03 | 1.88E-02 | 2.83E-02 | -1.15E-01 | 4.02E-01 | 2.83E-03 | -8.22E-03 |
| art\_init\_year\_1 | 5.47E+00 | -2.75E-03 | 1.42E-03 | -3.43E-03 | 1.29E-02 | -7.45E-04 | -5.76E-04 | 2.83E-03 | 5.22E-02 | 1.90E-02 |
| art\_init\_year\_2 | 1.04E+01 | -5.13E-03 | -1.78E-03 | 4.38E-03 | -1.41E-02 | -1.15E-03 | 2.64E-03 | -8.22E-03 | 1.90E-02 | 9.57E-02 |
| Black/AA HET Men | intercept | 3.54E+03 | -1.76E+00 | 1.84E-01 | -2.82E-01 | 1.13E+00 | -1.68E-01 | 3.28E-01 | -1.02E+00 | 1.31E+00 | 6.13E+00 |
| year | -1.76E+00 | 8.78E-04 | -1.08E-04 | 1.69E-04 | -6.78E-04 | 8.05E-05 | -1.58E-04 | 4.92E-04 | -6.60E-04 | -3.09E-03 |
| age | 1.84E-01 | -1.08E-04 | 8.70E-04 | -1.69E-03 | 6.99E-03 | -8.63E-05 | 3.52E-04 | -1.22E-03 | 2.74E-04 | 2.22E-03 |
| age\_1 | -2.82E-01 | 1.69E-04 | -1.69E-03 | 3.88E-03 | -1.75E-02 | 1.97E-04 | -6.45E-04 | 2.11E-03 | 2.23E-04 | -3.84E-03 |
| age\_2 | 1.13E+00 | -6.78E-04 | 6.99E-03 | -1.75E-02 | 8.23E-02 | -8.64E-04 | 2.44E-03 | -7.71E-03 | -1.89E-03 | 1.59E-02 |
| sqrt\_init\_cd4 | -1.68E-01 | 8.05E-05 | -8.63E-05 | 1.97E-04 | -8.64E-04 | 1.67E-03 | -4.57E-03 | 1.45E-02 | -1.78E-04 | -1.82E-03 |
| sqrt\_init\_cd4\_1 | 3.28E-01 | -1.58E-04 | 3.52E-04 | -6.45E-04 | 2.44E-03 | -4.57E-03 | 1.46E-02 | -4.95E-02 | -8.50E-04 | 2.18E-03 |
| sqrt\_init\_cd4\_2 | -1.02E+00 | 4.92E-04 | -1.22E-03 | 2.11E-03 | -7.71E-03 | 1.45E-02 | -4.95E-02 | 1.73E-01 | 4.05E-03 | -6.10E-03 |
| art\_init\_year\_1 | 1.31E+00 | -6.60E-04 | 2.74E-04 | 2.23E-04 | -1.89E-03 | -1.78E-04 | -8.50E-04 | 4.05E-03 | 2.51E-02 | 1.27E-02 |
| art\_init\_year\_2 | 6.13E+00 | -3.09E-03 | 2.22E-03 | -3.84E-03 | 1.59E-02 | -1.82E-03 | 2.18E-03 | -6.10E-03 | 1.27E-02 | 1.09E-01 |
| Hispanic HET Men | intercept | 5.74E+03 | -2.86E+00 | 1.47E-01 | -3.08E-01 | 1.17E+00 | -3.37E-02 | -1.09E+00 | 4.48E+00 | 5.47E+00 | 1.04E+01 |
| year | -2.86E+00 | 1.42E-03 | -1.12E-04 | 2.41E-04 | -8.81E-04 | 5.40E-06 | 5.78E-04 | -2.33E-03 | -2.75E-03 | -5.13E-03 |
| age | 1.47E-01 | -1.12E-04 | 2.12E-03 | -4.90E-03 | 1.70E-02 | 1.67E-04 | -6.28E-04 | 2.26E-03 | 1.42E-03 | -1.78E-03 |
| age\_1 | -3.08E-01 | 2.41E-04 | -4.90E-03 | 1.26E-02 | -4.55E-02 | -3.64E-04 | 1.65E-03 | -5.85E-03 | -3.43E-03 | 4.38E-03 |
| age\_2 | 1.17E+00 | -8.81E-04 | 1.70E-02 | -4.55E-02 | 1.69E-01 | 9.45E-04 | -5.16E-03 | 1.88E-02 | 1.29E-02 | -1.41E-02 |
| sqrt\_init\_cd4 | -3.37E-02 | 5.40E-06 | 1.67E-04 | -3.64E-04 | 9.45E-04 | 2.89E-03 | -9.16E-03 | 2.83E-02 | -7.45E-04 | -1.15E-03 |
| sqrt\_init\_cd4\_1 | -1.09E+00 | 5.78E-04 | -6.28E-04 | 1.65E-03 | -5.16E-03 | -9.16E-03 | 3.46E-02 | -1.15E-01 | -5.76E-04 | 2.64E-03 |
| sqrt\_init\_cd4\_2 | 4.48E+00 | -2.33E-03 | 2.26E-03 | -5.85E-03 | 1.88E-02 | 2.83E-02 | -1.15E-01 | 4.02E-01 | 2.83E-03 | -8.22E-03 |
| art\_init\_year\_1 | 5.47E+00 | -2.75E-03 | 1.42E-03 | -3.43E-03 | 1.29E-02 | -7.45E-04 | -5.76E-04 | 2.83E-03 | 5.22E-02 | 1.90E-02 |
| art\_init\_year\_2 | 1.04E+01 | -5.13E-03 | -1.78E-03 | 4.38E-03 | -1.41E-02 | -1.15E-03 | 2.64E-03 | -8.22E-03 | 1.90E-02 | 9.57E-02 |
| White HET Women | intercept | 7.38E+03 | -3.66E+00 | -2.89E-01 | 6.17E-01 | -1.66E+00 | -4.84E-01 | 1.58E+00 | -8.41E+00 | 2.40E+00 | 1.35E+01 |
| year | -3.66E+00 | 1.82E-03 | 9.17E-05 | -1.98E-04 | 4.63E-04 | 2.38E-04 | -7.82E-04 | 4.18E-03 | -1.21E-03 | -6.66E-03 |
| age | -2.89E-01 | 9.17E-05 | 2.95E-03 | -6.37E-03 | 2.16E-02 | -2.24E-04 | 5.99E-04 | -3.67E-03 | 7.02E-04 | -3.25E-03 |
| age\_1 | 6.17E-01 | -1.98E-04 | -6.37E-03 | 1.55E-02 | -5.57E-02 | 3.77E-04 | -6.59E-04 | 3.62E-03 | -1.15E-03 | 6.54E-03 |
| age\_2 | -1.66E+00 | 4.63E-04 | 2.16E-02 | -5.57E-02 | 2.07E-01 | -1.38E-03 | 1.99E-03 | -8.67E-03 | 3.60E-03 | -2.06E-02 |
| sqrt\_init\_cd4 | -4.84E-01 | 2.38E-04 | -2.24E-04 | 3.77E-04 | -1.38E-03 | 2.04E-03 | -5.06E-03 | 2.41E-02 | -8.52E-04 | -6.17E-04 |
| sqrt\_init\_cd4\_1 | 1.58E+00 | -7.82E-04 | 5.99E-04 | -6.59E-04 | 1.99E-03 | -5.06E-03 | 1.49E-02 | -7.60E-02 | -8.01E-04 | 4.35E-04 |
| sqrt\_init\_cd4\_2 | -8.41E+00 | 4.18E-03 | -3.67E-03 | 3.62E-03 | -8.67E-03 | 2.41E-02 | -7.60E-02 | 4.07E-01 | 9.48E-03 | -1.78E-03 |
| art\_init\_year\_1 | 2.40E+00 | -1.21E-03 | 7.02E-04 | -1.15E-03 | 3.60E-03 | -8.52E-04 | -8.01E-04 | 9.48E-03 | 4.09E-02 | 1.78E-02 |
| art\_init\_year\_2 | 1.35E+01 | -6.66E-03 | -3.25E-03 | 6.54E-03 | -2.06E-02 | -6.17E-04 | 4.35E-04 | -1.78E-03 | 1.78E-02 | 2.88E-01 |
| Black/AA HET Women | intercept | 3.95E+03 | -1.96E+00 | 2.62E-03 | 3.40E-01 | -1.68E+00 | -5.83E-02 | 2.17E-01 | -1.17E+00 | 1.65E+00 | 6.30E+00 |
| year | -1.96E+00 | 9.76E-04 | -1.13E-05 | -1.48E-04 | 7.63E-04 | 2.51E-05 | -1.00E-04 | 5.45E-04 | -8.25E-04 | -3.15E-03 |
| age | 2.62E-03 | -1.13E-05 | 5.86E-04 | -1.35E-03 | 4.83E-03 | 5.35E-05 | -8.41E-05 | 6.40E-04 | 1.42E-04 | 7.86E-04 |
| age\_1 | 3.40E-01 | -1.48E-04 | -1.35E-03 | 3.90E-03 | -1.52E-02 | -8.64E-05 | 3.23E-04 | -2.18E-03 | 5.42E-04 | -2.63E-04 |
| age\_2 | -1.68E+00 | 7.63E-04 | 4.83E-03 | -1.52E-02 | 6.16E-02 | 2.16E-04 | -1.19E-03 | 7.85E-03 | -2.94E-03 | -1.10E-03 |
| sqrt\_init\_cd4 | -5.83E-02 | 2.51E-05 | 5.35E-05 | -8.64E-05 | 2.16E-04 | 9.15E-04 | -2.26E-03 | 1.10E-02 | -1.78E-04 | 4.68E-04 |
| sqrt\_init\_cd4\_1 | 2.17E-01 | -1.00E-04 | -8.41E-05 | 3.23E-04 | -1.19E-03 | -2.26E-03 | 6.78E-03 | -3.62E-02 | -2.06E-04 | -2.11E-03 |
| sqrt\_init\_cd4\_2 | -1.17E+00 | 5.45E-04 | 6.40E-04 | -2.18E-03 | 7.85E-03 | 1.10E-02 | -3.62E-02 | 2.07E-01 | 1.40E-03 | 1.35E-02 |
| art\_init\_year\_1 | 1.65E+00 | -8.25E-04 | 1.42E-04 | 5.42E-04 | -2.94E-03 | -1.78E-04 | -2.06E-04 | 1.40E-03 | 2.44E-02 | 1.07E-02 |
| art\_init\_year\_2 | 6.30E+00 | -3.15E-03 | 7.86E-04 | -2.63E-04 | -1.10E-03 | 4.68E-04 | -2.11E-03 | 1.35E-02 | 1.07E-02 | 6.52E-02 |
| Hispanic HET Women | intercept | 7.38E+03 | -3.66E+00 | -2.89E-01 | 6.17E-01 | -1.66E+00 | -4.84E-01 | 1.58E+00 | -8.41E+00 | 2.40E+00 | 1.35E+01 |
| year | -3.66E+00 | 1.82E-03 | 9.17E-05 | -1.98E-04 | 4.63E-04 | 2.38E-04 | -7.82E-04 | 4.18E-03 | -1.21E-03 | -6.66E-03 |
| age | -2.89E-01 | 9.17E-05 | 2.95E-03 | -6.37E-03 | 2.16E-02 | -2.24E-04 | 5.99E-04 | -3.67E-03 | 7.02E-04 | -3.25E-03 |
| age\_1 | 6.17E-01 | -1.98E-04 | -6.37E-03 | 1.55E-02 | -5.57E-02 | 3.77E-04 | -6.59E-04 | 3.62E-03 | -1.15E-03 | 6.54E-03 |
| age\_2 | -1.66E+00 | 4.63E-04 | 2.16E-02 | -5.57E-02 | 2.07E-01 | -1.38E-03 | 1.99E-03 | -8.67E-03 | 3.60E-03 | -2.06E-02 |
| sqrt\_init\_cd4 | -4.84E-01 | 2.38E-04 | -2.24E-04 | 3.77E-04 | -1.38E-03 | 2.04E-03 | -5.06E-03 | 2.41E-02 | -8.52E-04 | -6.17E-04 |
| sqrt\_init\_cd4\_1 | 1.58E+00 | -7.82E-04 | 5.99E-04 | -6.59E-04 | 1.99E-03 | -5.06E-03 | 1.49E-02 | -7.60E-02 | -8.01E-04 | 4.35E-04 |
| sqrt\_init\_cd4\_2 | -8.41E+00 | 4.18E-03 | -3.67E-03 | 3.62E-03 | -8.67E-03 | 2.41E-02 | -7.60E-02 | 4.07E-01 | 9.48E-03 | -1.78E-03 |
| art\_init\_year\_1 | 2.40E+00 | -1.21E-03 | 7.02E-04 | -1.15E-03 | 3.60E-03 | -8.52E-04 | -8.01E-04 | 9.48E-03 | 4.09E-02 | 1.78E-02 |
| art\_init\_year\_2 | 1.35E+01 | -6.66E-03 | -3.25E-03 | 6.54E-03 | -2.06E-02 | -6.17E-04 | 4.35E-04 | -1.78E-03 | 1.78E-02 | 2.88E-01 |

### Mortality off ART

Due to small sample size of those disengaged from care in NA-ACCORD, and challenges in ascertaining the event of death among those off ART, we used data from the NA-ACCORD study population on ART to estimate mortality as a function of “current CD4 count”. Coupling this mortality function with the CD4 dynamics out of care (see section 1.4.6), the model projects gradual reductions in CD4 count, as well as increase in risk of mortality, for those out of care. A logistic regression was applied to model the probability of dying out of care as a linear function of calendar year (year), restricted cubic splines for age (age), and time-varying count (sqrt\_cd4), as follows:

where

is the logit function and is the probability of dying out of HIV care and off ART. The coefficients were estimated using a GEE with a logit link and an exchangeable correlation structure using the *geeglm* function of the *geepack* software package for R. The estimated regression coefficients are shown in Table S17, the knots are shown in Tables S18 and S19, and the covariance matrices are shown in Table S20.

A mortality threshold was implemented such that for a given race, sex, and 5-year age category the overall probability of mortality must be greater than or equal to the annual mortality rate of the general population with the same characteristics as reported by the CDC (15). If the average probability was lower than this threshold, then the difference was added to each agent so that the distribution would be shifted to one with the same mean as the general population. The threshold was taken to be twice as high for IDU populations.

Table S 17: Estimated regression coefficients for the probability of mortality out of HIV care and off ART

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Population | intercept | year | age | age\_1 | age\_2 | sqrt\_cd4 | sqrt\_cd4\_1 | sqrt\_cd4\_2 |
| White MSM | 35.804 | -0.020 | 0.048 | 0.020 | -0.096 | -0.194 | 0.144 | -0.192 |
| Black/AA MSM | 32.361 | -0.018 | 0.048 | -0.016 | 0.081 | -0.174 | 0.025 | 0.541 |
| Hispanic MSM | -37.432 | 0.017 | 0.016 | 0.159 | -0.547 | -0.221 | 0.141 | -0.019 |
| White IDU Men | 138.654 | -0.071 | 0.044 | 0.056 | -0.377 | -0.145 | 0.101 | -0.132 |
| Black/AA IDU Men | 165.545 | -0.084 | 0.040 | 0.089 | -0.550 | -0.145 | 0.069 | 0.084 |
| Hispanic IDU Men | 83.741 | -0.044 | 0.057 | 0.022 | -0.166 | -0.130 | 0.026 | 0.209 |
| White IDU Women | -92.260 | 0.046 | -0.053 | 0.206 | -0.781 | -0.201 | 0.298 | -0.903 |
| Black/AA IDU Women | -5.085 | -0.001 | 0.117 | -0.112 | 0.389 | -0.110 | -0.073 | 0.667 |
| Hispanic IDU Women | -92.260 | 0.046 | -0.053 | 0.206 | -0.781 | -0.201 | 0.298 | -0.903 |
| White HET Men | 28.528 | -0.016 | 0.036 | 0.036 | -0.062 | -0.187 | 0.207 | -0.823 |
| Black/AA HET Men | 45.473 | -0.025 | 0.034 | 0.035 | -0.127 | -0.158 | 0.121 | -0.584 |
| Hispanic HET Men | 28.528 | -0.016 | 0.036 | 0.036 | -0.062 | -0.187 | 0.207 | -0.823 |
| White HET Women | 31.149 | -0.019 | 0.129 | -0.132 | 0.337 | -0.200 | 0.159 | -0.602 |
| Black/AA HET Women | 86.236 | -0.044 | 0.018 | 0.035 | -0.040 | -0.196 | 0.137 | -0.167 |
| Hispanic HET Women | 31.149 | -0.019 | 0.129 | -0.132 | 0.337 | -0.200 | 0.159 | -0.602 |

Table S 18: Cubic restricted spline model age knots for the probability of mortality out of HIV care and off ART

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Population | k1 | | k2 | k3 | k4 |
| White MSM | | 29 | 45 | 52 | 65 |
| Black/AA MSM | | 23 | 34 | 46 | 60 |
| Hispanic MSM | | 25 | 38 | 46 | 59 |
| White IDU Men | | 32 | 48 | 55 | 65 |
| Black/AA IDU Men | | 41 | 53 | 58 | 67 |
| Hispanic IDU Men | | 33 | 49 | 56 | 66 |
| White IDU Women | | 32 | 45 | 52 | 63 |
| Black/AA IDU Women | | 38 | 50 | 55 | 64 |
| Hispanic IDU Women | | 32 | 45 | 52 | 63 |
| White HET Men | | 30 | 44 | 52 | 67 |
| Black/AA HET Men | | 30 | 45 | 52 | 65 |
| Hispanic HET Men | | 30 | 44 | 52 | 67 |
| White HET Women | | 28 | 42 | 50 | 65 |
| Black/AA HET Women | | 27 | 41 | 49 | 63 |
| Hispanic HET Women | | 28 | 42 | 50 | 65 |

Table S 19: Cubic restricted spline model CD4 count knots for the probability of mortality out of HIV care and off ART

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Population | k1 | k2 | k3 | k4 |
| White MSM | 12.77 | 21.68 | 26.08 | 33.46 |
| Black/AA MSM | 8.97 | 19.65 | 24.62 | 32.25 |
| Hispanic MSM | 11.58 | 20.35 | 24.77 | 31.97 |
| White IDU Men | 10.56 | 19.71 | 24.82 | 33.06 |
| Black/AA IDU Men | 9.00 | 18.64 | 23.62 | 31.73 |
| Hispanic IDU Men | 9.38 | 18.38 | 23.37 | 31.22 |
| White IDU Women | 9.08 | 18.65 | 24.45 | 33.29 |
| Black/AA IDU Women | 9.43 | 19.92 | 25.92 | 35.16 |
| Hispanic IDU Women | 9.08 | 18.65 | 24.45 | 33.29 |
| White HET Men | 8.60 | 18.79 | 24.07 | 32.37 |
| Black/AA HET Men | 7.62 | 18.41 | 23.43 | 31.59 |
| Hispanic HET Men | 8.60 | 18.79 | 24.07 | 32.37 |
| White HET Women | 10.39 | 21.42 | 26.66 | 35.03 |
| Black/AA HET Women | 9.00 | 20.38 | 25.75 | 34.38 |
| Hispanic HET Women | 10.39 | 21.42 | 26.66 | 35.03 |

Table S 20: Covariance matrices for modeling the probability of mortality out of HIV care and off ART

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | intercept | year | age | age\_1 | age\_2 | sqrt\_cd4 | sqrt\_cd4\_1 | sqrt\_cd4\_2 |
| White MSM | intercept | 1.07E+03 | -5.31E-01 | -1.12E-01 | 2.38E-01 | -1.08E+00 | -1.21E-02 | 1.17E-01 | -5.53E-01 |
| year | -5.31E-01 | 2.63E-04 | 4.92E-05 | -1.07E-04 | 4.88E-04 | 5.38E-06 | -5.65E-05 | 2.68E-04 |
| age | -1.12E-01 | 4.92E-05 | 3.41E-04 | -6.26E-04 | 2.79E-03 | 3.51E-07 | 2.95E-06 | -4.84E-05 |
| age\_1 | 2.38E-01 | -1.07E-04 | -6.26E-04 | 1.36E-03 | -6.63E-03 | -1.47E-05 | 5.16E-05 | -2.33E-04 |
| age\_2 | -1.08E+00 | 4.88E-04 | 2.79E-03 | -6.63E-03 | 3.39E-02 | 6.50E-05 | -2.79E-04 | 1.42E-03 |
| sqrt\_cd4 | -1.21E-02 | 5.38E-06 | 3.51E-07 | -1.47E-05 | 6.50E-05 | 1.07E-04 | -3.45E-04 | 1.74E-03 |
| sqrt\_cd4\_1 | 1.17E-01 | -5.65E-05 | 2.95E-06 | 5.16E-05 | -2.79E-04 | -3.45E-04 | 1.72E-03 | -1.02E-02 |
| sqrt\_cd4\_2 | -5.53E-01 | 2.68E-04 | -4.84E-05 | -2.33E-04 | 1.42E-03 | 1.74E-03 | -1.02E-02 | 6.61E-02 |
| Black/AA MSM | intercept | 2.79E+03 | -1.39E+00 | 2.91E-02 | -1.89E-01 | 5.88E-01 | -1.44E-02 | 2.85E-01 | -7.36E-01 |
| year | -1.39E+00 | 6.91E-04 | -3.22E-05 | 1.42E-04 | -3.99E-04 | 4.86E-06 | -1.38E-04 | 3.49E-04 |
| age | 2.91E-02 | -3.22E-05 | 1.20E-03 | -3.36E-03 | 7.54E-03 | 7.31E-05 | -6.15E-05 | 7.83E-05 |
| age\_1 | -1.89E-01 | 1.42E-04 | -3.36E-03 | 1.02E-02 | -2.35E-02 | -1.67E-04 | 1.10E-04 | -7.58E-05 |
| age\_2 | 5.88E-01 | -3.99E-04 | 7.54E-03 | -2.35E-02 | 5.50E-02 | 3.01E-04 | -1.11E-04 | -3.22E-04 |
| sqrt\_cd4 | -1.44E-02 | 4.86E-06 | 7.31E-05 | -1.67E-04 | 3.01E-04 | 2.68E-04 | -7.65E-04 | 4.24E-03 |
| sqrt\_cd4\_1 | 2.85E-01 | -1.38E-04 | -6.15E-05 | 1.10E-04 | -1.11E-04 | -7.65E-04 | 3.22E-03 | -2.09E-02 |
| sqrt\_cd4\_2 | -7.36E-01 | 3.49E-04 | 7.83E-05 | -7.58E-05 | -3.22E-04 | 4.24E-03 | -2.09E-02 | 1.51E-01 |
| Hispanic MSM | intercept | 6.40E+03 | -3.18E+00 | -4.06E-01 | 1.19E+00 | -4.43E+00 | 4.83E-02 | 1.04E+00 | -6.21E+00 |
| year | -3.18E+00 | 1.58E-03 | 1.61E-04 | -5.04E-04 | 1.93E-03 | -2.72E-05 | -4.99E-04 | 2.98E-03 |
| age | -4.06E-01 | 1.61E-04 | 2.63E-03 | -5.74E-03 | 1.89E-02 | 1.58E-05 | -5.03E-04 | 4.36E-03 |
| age\_1 | 1.19E+00 | -5.04E-04 | -5.74E-03 | 1.43E-02 | -4.96E-02 | 2.12E-05 | 6.83E-04 | -7.52E-03 |
| age\_2 | -4.43E+00 | 1.93E-03 | 1.89E-02 | -4.96E-02 | 1.76E-01 | -2.85E-04 | -1.23E-03 | 1.96E-02 |
| sqrt\_cd4 | 4.83E-02 | -2.72E-05 | 1.58E-05 | 2.12E-05 | -2.85E-04 | 5.39E-04 | -1.81E-03 | 8.82E-03 |
| sqrt\_cd4\_1 | 1.04E+00 | -4.99E-04 | -5.03E-04 | 6.83E-04 | -1.23E-03 | -1.81E-03 | 9.29E-03 | -5.08E-02 |
| sqrt\_cd4\_2 | -6.21E+00 | 2.98E-03 | 4.36E-03 | -7.52E-03 | 1.96E-02 | 8.82E-03 | -5.08E-02 | 2.96E-01 |
| White IDU Men | intercept | 1.54E+03 | -7.66E-01 | -5.86E-02 | 1.48E-01 | -7.69E-01 | -3.46E-03 | 1.47E-01 | -7.16E-01 |
| year | -7.66E-01 | 3.80E-04 | 1.93E-05 | -5.89E-05 | 3.16E-04 | 7.79E-07 | -7.07E-05 | 3.46E-04 |
| age | -5.86E-02 | 1.93E-05 | 4.94E-04 | -7.72E-04 | 3.64E-03 | -7.53E-06 | 1.46E-05 | -1.05E-04 |
| age\_1 | 1.48E-01 | -5.89E-05 | -7.72E-04 | 1.43E-03 | -7.47E-03 | 6.00E-06 | -2.84E-05 | 2.50E-04 |
| age\_2 | -7.69E-01 | 3.16E-04 | 3.64E-03 | -7.47E-03 | 4.18E-02 | -5.34E-05 | 2.30E-04 | -1.76E-03 |
| sqrt\_cd4 | -3.46E-03 | 7.79E-07 | -7.53E-06 | 6.00E-06 | -5.34E-05 | 1.87E-04 | -5.57E-04 | 2.41E-03 |
| sqrt\_cd4\_1 | 1.47E-01 | -7.07E-05 | 1.46E-05 | -2.84E-05 | 2.30E-04 | -5.57E-04 | 2.41E-03 | -1.20E-02 |
| sqrt\_cd4\_2 | -7.16E-01 | 3.46E-04 | -1.05E-04 | 2.50E-04 | -1.76E-03 | 2.41E-03 | -1.20E-02 | 6.45E-02 |
| Black/AA IDU Men | intercept | 1.05E+03 | -5.20E-01 | -3.27E-02 | 1.35E-01 | -6.45E-01 | -1.79E-03 | 8.80E-02 | -4.21E-01 |
| year | -5.20E-01 | 2.58E-04 | 1.09E-05 | -5.79E-05 | 2.77E-04 | 1.39E-07 | -4.18E-05 | 2.00E-04 |
| age | -3.27E-02 | 1.09E-05 | 2.29E-04 | -4.17E-04 | 2.01E-03 | 7.00E-06 | -2.14E-05 | 8.43E-05 |
| age\_1 | 1.35E-01 | -5.79E-05 | -4.17E-04 | 9.98E-04 | -5.51E-03 | -1.80E-05 | 4.25E-05 | -2.03E-04 |
| age\_2 | -6.45E-01 | 2.77E-04 | 2.01E-03 | -5.51E-03 | 3.27E-02 | 7.31E-05 | -1.47E-04 | 8.74E-04 |
| sqrt\_cd4 | -1.79E-03 | 1.39E-07 | 7.00E-06 | -1.80E-05 | 7.31E-05 | 1.14E-04 | -3.30E-04 | 1.59E-03 |
| sqrt\_cd4\_1 | 8.80E-02 | -4.18E-05 | -2.14E-05 | 4.25E-05 | -1.47E-04 | -3.30E-04 | 1.35E-03 | -7.45E-03 |
| sqrt\_cd4\_2 | -4.21E-01 | 2.00E-04 | 8.43E-05 | -2.03E-04 | 8.74E-04 | 1.59E-03 | -7.45E-03 | 4.47E-02 |
| Hispanic IDU Men | intercept | 6.26E+03 | -3.11E+00 | -4.34E-01 | 7.50E-01 | -3.20E+00 | 3.07E-02 | 4.74E-01 | -1.85E+00 |
| year | -3.11E+00 | 1.54E-03 | 1.70E-04 | -3.05E-04 | 1.28E-03 | -1.82E-05 | -2.23E-04 | 8.52E-04 |
| age | -4.34E-01 | 1.70E-04 | 2.26E-03 | -3.47E-03 | 1.61E-02 | -7.89E-05 | -6.69E-05 | 8.76E-04 |
| age\_1 | 7.50E-01 | -3.05E-04 | -3.47E-03 | 6.00E-03 | -3.02E-02 | 6.29E-05 | 3.10E-04 | -2.52E-03 |
| age\_2 | -3.20E+00 | 1.28E-03 | 1.61E-02 | -3.02E-02 | 1.61E-01 | -3.04E-04 | -1.64E-03 | 1.34E-02 |
| sqrt\_cd4 | 3.07E-02 | -1.82E-05 | -7.89E-05 | 6.29E-05 | -3.04E-04 | 8.63E-04 | -2.56E-03 | 1.16E-02 |
| sqrt\_cd4\_1 | 4.74E-01 | -2.23E-04 | -6.69E-05 | 3.10E-04 | -1.64E-03 | -2.56E-03 | 1.05E-02 | -5.41E-02 |
| sqrt\_cd4\_2 | -1.85E+00 | 8.52E-04 | 8.76E-04 | -2.52E-03 | 1.34E-02 | 1.16E-02 | -5.41E-02 | 2.99E-01 |
| White IDU Women | intercept | 7.39E+03 | -3.67E+00 | -8.15E-02 | -6.96E-02 | 1.92E+00 | -8.45E-02 | 9.20E-01 | -3.73E+00 |
| year | -3.67E+00 | 1.82E-03 | 2.25E-05 | 7.57E-05 | -1.12E-03 | 3.69E-05 | -4.41E-04 | 1.79E-03 |
| age | -8.15E-02 | 2.25E-05 | 1.02E-03 | -2.47E-03 | 1.04E-02 | -5.27E-06 | -1.15E-04 | 6.25E-04 |
| age\_1 | -6.96E-02 | 7.57E-05 | -2.47E-03 | 7.86E-03 | -3.66E-02 | -9.86E-05 | 4.56E-04 | -2.69E-03 |
| age\_2 | 1.92E+00 | -1.12E-03 | 1.04E-02 | -3.66E-02 | 1.80E-01 | 1.26E-04 | -8.75E-04 | 8.31E-03 |
| sqrt\_cd4 | -8.45E-02 | 3.69E-05 | -5.27E-06 | -9.86E-05 | 1.26E-04 | 1.10E-03 | -3.30E-03 | 1.29E-02 |
| sqrt\_cd4\_1 | 9.20E-01 | -4.41E-04 | -1.15E-04 | 4.56E-04 | -8.75E-04 | -3.30E-03 | 1.30E-02 | -5.59E-02 |
| sqrt\_cd4\_2 | -3.73E+00 | 1.79E-03 | 6.25E-04 | -2.69E-03 | 8.31E-03 | 1.29E-02 | -5.59E-02 | 2.55E-01 |
| Black/AA IDU Women | intercept | 9.26E+03 | -4.64E+00 | 1.55E+00 | -2.76E+00 | 1.60E+01 | -1.84E-01 | 2.19E+00 | -9.87E+00 |
| year | -4.64E+00 | 2.33E-03 | -8.85E-04 | 1.57E-03 | -8.94E-03 | 8.43E-05 | -1.08E-03 | 4.91E-03 |
| age | 1.55E+00 | -8.85E-04 | 5.28E-03 | -9.33E-03 | 4.61E-02 | 1.12E-04 | 3.29E-04 | -2.35E-03 |
| age\_1 | -2.76E+00 | 1.57E-03 | -9.33E-03 | 1.89E-02 | -1.02E-01 | -4.19E-04 | -1.64E-04 | 3.08E-03 |
| age\_2 | 1.60E+01 | -8.94E-03 | 4.61E-02 | -1.02E-01 | 5.85E-01 | 2.70E-03 | -5.86E-04 | -1.08E-02 |
| sqrt\_cd4 | -1.84E-01 | 8.43E-05 | 1.12E-04 | -4.19E-04 | 2.70E-03 | 8.48E-04 | -2.39E-03 | 9.85E-03 |
| sqrt\_cd4\_1 | 2.19E+00 | -1.08E-03 | 3.29E-04 | -1.64E-04 | -5.86E-04 | -2.39E-03 | 1.02E-02 | -4.88E-02 |
| sqrt\_cd4\_2 | -9.87E+00 | 4.91E-03 | -2.35E-03 | 3.08E-03 | -1.08E-02 | 9.85E-03 | -4.88E-02 | 2.53E-01 |
| Hispanic IDU Women | intercept | 7.39E+03 | -3.67E+00 | -8.15E-02 | -6.96E-02 | 1.92E+00 | -8.45E-02 | 9.20E-01 | -3.73E+00 |
| year | -3.67E+00 | 1.82E-03 | 2.25E-05 | 7.57E-05 | -1.12E-03 | 3.69E-05 | -4.41E-04 | 1.79E-03 |
| age | -8.15E-02 | 2.25E-05 | 1.02E-03 | -2.47E-03 | 1.04E-02 | -5.27E-06 | -1.15E-04 | 6.25E-04 |
| age\_1 | -6.96E-02 | 7.57E-05 | -2.47E-03 | 7.86E-03 | -3.66E-02 | -9.86E-05 | 4.56E-04 | -2.69E-03 |
| age\_2 | 1.92E+00 | -1.12E-03 | 1.04E-02 | -3.66E-02 | 1.80E-01 | 1.26E-04 | -8.75E-04 | 8.31E-03 |
| sqrt\_cd4 | -8.45E-02 | 3.69E-05 | -5.27E-06 | -9.86E-05 | 1.26E-04 | 1.10E-03 | -3.30E-03 | 1.29E-02 |
| sqrt\_cd4\_1 | 9.20E-01 | -4.41E-04 | -1.15E-04 | 4.56E-04 | -8.75E-04 | -3.30E-03 | 1.30E-02 | -5.59E-02 |
| sqrt\_cd4\_2 | -3.73E+00 | 1.79E-03 | 6.25E-04 | -2.69E-03 | 8.31E-03 | 1.29E-02 | -5.59E-02 | 2.55E-01 |
| White HET Men | intercept | 3.98E+03 | -1.98E+00 | 1.54E-01 | -2.86E-01 | 8.05E-01 | -2.27E-02 | 2.62E-01 | -1.66E-01 |
| year | -1.98E+00 | 9.86E-04 | -1.08E-04 | 2.12E-04 | -6.36E-04 | 9.21E-06 | -1.25E-04 | 5.69E-05 |
| age | 1.54E-01 | -1.08E-04 | 1.72E-03 | -3.91E-03 | 1.35E-02 | -3.61E-05 | 7.80E-05 | -1.79E-04 |
| age\_1 | -2.86E-01 | 2.12E-04 | -3.91E-03 | 9.92E-03 | -3.60E-02 | 8.25E-05 | -1.08E-04 | -4.06E-04 |
| age\_2 | 8.05E-01 | -6.36E-04 | 1.35E-02 | -3.60E-02 | 1.34E-01 | -4.15E-04 | 3.86E-04 | 2.56E-03 |
| sqrt\_cd4 | -2.27E-02 | 9.21E-06 | -3.61E-05 | 8.25E-05 | -4.15E-04 | 5.57E-04 | -1.56E-03 | 7.52E-03 |
| sqrt\_cd4\_1 | 2.62E-01 | -1.25E-04 | 7.80E-05 | -1.08E-04 | 3.86E-04 | -1.56E-03 | 6.09E-03 | -3.38E-02 |
| sqrt\_cd4\_2 | -1.66E-01 | 5.69E-05 | -1.79E-04 | -4.06E-04 | 2.56E-03 | 7.52E-03 | -3.38E-02 | 2.10E-01 |
| Black/AA HET Men | intercept | 2.65E+03 | -1.32E+00 | 7.70E-03 | -2.15E-02 | 1.18E-01 | -3.86E-02 | 3.58E-01 | -1.86E+00 |
| year | -1.32E+00 | 6.54E-04 | -1.62E-05 | 3.42E-05 | -1.55E-04 | 1.68E-05 | -1.73E-04 | 8.94E-04 |
| age | 7.70E-03 | -1.62E-05 | 6.63E-04 | -1.32E-03 | 5.51E-03 | 4.51E-05 | -1.05E-04 | 6.14E-04 |
| age\_1 | -2.15E-02 | 3.42E-05 | -1.32E-03 | 3.11E-03 | -1.42E-02 | -1.16E-04 | 3.46E-04 | -2.22E-03 |
| age\_2 | 1.18E-01 | -1.55E-04 | 5.51E-03 | -1.42E-02 | 6.76E-02 | 4.74E-04 | -1.59E-03 | 1.04E-02 |
| sqrt\_cd4 | -3.86E-02 | 1.68E-05 | 4.51E-05 | -1.16E-04 | 4.74E-04 | 3.66E-04 | -1.06E-03 | 6.06E-03 |
| sqrt\_cd4\_1 | 3.58E-01 | -1.73E-04 | -1.05E-04 | 3.46E-04 | -1.59E-03 | -1.06E-03 | 4.16E-03 | -2.68E-02 |
| sqrt\_cd4\_2 | -1.86E+00 | 8.94E-04 | 6.14E-04 | -2.22E-03 | 1.04E-02 | 6.06E-03 | -2.68E-02 | 1.94E-01 |
| Hispanic HET Men | intercept | 3.98E+03 | -1.98E+00 | 1.54E-01 | -2.86E-01 | 8.05E-01 | -2.27E-02 | 2.62E-01 | -1.66E-01 |
| year | -1.98E+00 | 9.86E-04 | -1.08E-04 | 2.12E-04 | -6.36E-04 | 9.21E-06 | -1.25E-04 | 5.69E-05 |
| age | 1.54E-01 | -1.08E-04 | 1.72E-03 | -3.91E-03 | 1.35E-02 | -3.61E-05 | 7.80E-05 | -1.79E-04 |
| age\_1 | -2.86E-01 | 2.12E-04 | -3.91E-03 | 9.92E-03 | -3.60E-02 | 8.25E-05 | -1.08E-04 | -4.06E-04 |
| age\_2 | 8.05E-01 | -6.36E-04 | 1.35E-02 | -3.60E-02 | 1.34E-01 | -4.15E-04 | 3.86E-04 | 2.56E-03 |
| sqrt\_cd4 | -2.27E-02 | 9.21E-06 | -3.61E-05 | 8.25E-05 | -4.15E-04 | 5.57E-04 | -1.56E-03 | 7.52E-03 |
| sqrt\_cd4\_1 | 2.62E-01 | -1.25E-04 | 7.80E-05 | -1.08E-04 | 3.86E-04 | -1.56E-03 | 6.09E-03 | -3.38E-02 |
| sqrt\_cd4\_2 | -1.66E-01 | 5.69E-05 | -1.79E-04 | -4.06E-04 | 2.56E-03 | 7.52E-03 | -3.38E-02 | 2.10E-01 |
| White HET Women | intercept | 5.86E+03 | -2.91E+00 | -1.84E-01 | 1.45E-01 | 1.29E-01 | 3.14E-02 | 3.56E-01 | -3.34E-01 |
| year | -2.91E+00 | 1.44E-03 | 3.61E-05 | 4.10E-05 | -4.39E-04 | -1.38E-05 | -1.86E-04 | 2.40E-04 |
| age | -1.84E-01 | 3.61E-05 | 3.12E-03 | -6.53E-03 | 2.19E-02 | -2.19E-04 | 7.84E-04 | -5.70E-03 |
| age\_1 | 1.45E-01 | 4.10E-05 | -6.53E-03 | 1.52E-02 | -5.39E-02 | 3.27E-04 | -1.47E-03 | 1.03E-02 |
| age\_2 | 1.29E-01 | -4.39E-04 | 2.19E-02 | -5.39E-02 | 1.97E-01 | -8.97E-04 | 4.58E-03 | -3.13E-02 |
| sqrt\_cd4 | 3.14E-02 | -1.38E-05 | -2.19E-04 | 3.27E-04 | -8.97E-04 | 4.59E-04 | -1.44E-03 | 8.09E-03 |
| sqrt\_cd4\_1 | 3.56E-01 | -1.86E-04 | 7.84E-04 | -1.47E-03 | 4.58E-03 | -1.44E-03 | 6.80E-03 | -4.44E-02 |
| sqrt\_cd4\_2 | -3.34E-01 | 2.40E-04 | -5.70E-03 | 1.03E-02 | -3.13E-02 | 8.09E-03 | -4.44E-02 | 3.36E-01 |
| Black/AA HET Women | intercept | 2.86E+03 | -1.42E+00 | -2.20E-02 | 1.44E-01 | -6.15E-01 | 4.70E-04 | 3.25E-01 | -1.99E+00 |
| year | -1.42E+00 | 7.06E-04 | 1.06E-06 | -4.88E-05 | 2.25E-04 | -2.05E-06 | -1.57E-04 | 9.63E-04 |
| age | -2.20E-02 | 1.06E-06 | 5.88E-04 | -1.41E-03 | 5.12E-03 | 4.76E-05 | -1.27E-04 | 8.47E-04 |
| age\_1 | 1.44E-01 | -4.88E-05 | -1.41E-03 | 3.95E-03 | -1.53E-02 | -1.21E-04 | 3.36E-04 | -2.36E-03 |
| age\_2 | -6.15E-01 | 2.25E-04 | 5.12E-03 | -1.53E-02 | 6.07E-02 | 4.06E-04 | -1.21E-03 | 8.89E-03 |
| sqrt\_cd4 | 4.70E-04 | -2.05E-06 | 4.76E-05 | -1.21E-04 | 4.06E-04 | 2.35E-04 | -6.86E-04 | 3.57E-03 |
| sqrt\_cd4\_1 | 3.25E-01 | -1.57E-04 | -1.27E-04 | 3.36E-04 | -1.21E-03 | -6.86E-04 | 2.80E-03 | -1.67E-02 |
| sqrt\_cd4\_2 | -1.99E+00 | 9.63E-04 | 8.47E-04 | -2.36E-03 | 8.89E-03 | 3.57E-03 | -1.67E-02 | 1.10E-01 |
| Hispanic HET Women | intercept | 5.86E+03 | -2.91E+00 | -1.84E-01 | 1.45E-01 | 1.29E-01 | 3.14E-02 | 3.56E-01 | -3.34E-01 |
| year | -2.91E+00 | 1.44E-03 | 3.61E-05 | 4.10E-05 | -4.39E-04 | -1.38E-05 | -1.86E-04 | 2.40E-04 |
| age | -1.84E-01 | 3.61E-05 | 3.12E-03 | -6.53E-03 | 2.19E-02 | -2.19E-04 | 7.84E-04 | -5.70E-03 |
| age\_1 | 1.45E-01 | 4.10E-05 | -6.53E-03 | 1.52E-02 | -5.39E-02 | 3.27E-04 | -1.47E-03 | 1.03E-02 |
| age\_2 | 1.29E-01 | -4.39E-04 | 2.19E-02 | -5.39E-02 | 1.97E-01 | -8.97E-04 | 4.58E-03 | -3.13E-02 |
| sqrt\_cd4 | 3.14E-02 | -1.38E-05 | -2.19E-04 | 3.27E-04 | -8.97E-04 | 4.59E-04 | -1.44E-03 | 8.09E-03 |
| sqrt\_cd4\_1 | 3.56E-01 | -1.86E-04 | 7.84E-04 | -1.47E-03 | 4.58E-03 | -1.44E-03 | 6.80E-03 | -4.44E-02 |
| sqrt\_cd4\_2 | -3.34E-01 | 2.40E-04 | -5.70E-03 | 1.03E-02 | -3.13E-02 | 8.09E-03 | -4.44E-02 | 3.36E-01 |

### CD4 dynamics among those in HIV care and using ART

CD4 increase among those in HIV care and using ART was estimated using those who initiated ART during or after the year 2000 and did not disengage from care while under observation in the NA-ACCORD study population. The CD4 count for each patient in each year they were under observation was identified. The square root of the time-varying (by year) CD4 count (sqrt\_cd4n) was modeled as a linear function of 10-year age category (age\_cat), square root of CD4 count at ART initiation (sqrt\_init\_cd4), number of years since ART initiation (yrs\_art), and interaction terms between CD4 count at ART initiation and number of years since ART initiation. The square root of CD4 count at ART initiation is represented by three binary variables:

and

The number of years since ART initiation was modeled as a restricted quadratic spline with 4 knots:

and

The same knot locations were used for each population at , , and . The final regression equation resulting from this choice of regressors is as follows:

The coefficients were estimated using a generalized estimating equation GEE with an identity link function and an exchangeable correlation structure using the *geeglm* function of the *geepack* software package for R. The resulting coefficient estimates are shown in Table S21, and the covariance matrices are shown in Table S22.

Table S 21: Regression coefficients for CD4 changes among those in HIV care and using ART

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Population | intercept | age\_cat | cd4\_cat\_1 | cd4\_cat\_2 | cd4\_cat\_3 | yrs\_art | yrs\_art\_1 | yrs\_art\_2 | yrs\_art\_3 | cd4\_1\_yrs\_1 | cd4\_1\_yrs\_2 | cd4\_1\_yrs\_3 | cd4\_2\_yrs\_1 | cd4\_2\_yrs\_2 | cd4\_2\_yrs\_3 | cd4\_3\_yrs\_1 | cd4\_3\_yrs\_2 | cd4\_3\_yrs\_3 |
| White MSM | 14.341 | -0.080 | 5.304 | 8.160 | 12.267 | 1.247 | -0.657 | -0.386 | 0.873 | -0.778 | 1.549 | -0.803 | -1.163 | 2.383 | -1.424 | -1.743 | 3.341 | -1.549 |
| Black/AA MSM | 13.479 | -0.158 | 5.285 | 8.814 | 13.280 | 1.347 | -1.100 | 0.399 | 0.570 | -1.043 | 2.147 | -1.070 | -1.391 | 3.092 | -2.041 | -1.651 | 2.309 | -0.416 |
| Hispanic MSM | 14.941 | -0.229 | 4.827 | 8.103 | 11.719 | 1.248 | -0.758 | -0.452 | 1.285 | -0.798 | 1.713 | -1.120 | -1.252 | 3.070 | -2.156 | -1.721 | 2.977 | -1.039 |
| White IDU Men | 13.565 | -0.049 | 4.817 | 7.449 | 12.279 | 1.129 | -0.839 | 0.021 | 0.813 | -0.628 | 1.222 | -0.858 | -0.613 | 1.101 | -0.444 | -1.297 | 2.876 | -2.049 |
| Black/AA IDU Men | 12.802 | -0.149 | 5.069 | 8.325 | 12.290 | 1.162 | -0.899 | 0.107 | 0.782 | -0.498 | 1.077 | -0.600 | -1.202 | 2.399 | -1.509 | -1.582 | 2.894 | -1.561 |
| Hispanic IDU Men | 13.597 | -0.085 | 3.979 | 6.731 | 11.279 | 1.209 | -1.650 | 1.678 | 0.066 | -0.068 | 0.271 | -0.841 | 0.120 | -1.173 | 1.133 | -0.942 | 0.022 | 1.555 |
| White IDU Women | 11.818 | 0.657 | 3.841 | 7.666 | 9.598 | 0.913 | -0.681 | -0.153 | 0.787 | -0.576 | 1.783 | -1.948 | -0.915 | 1.946 | -1.214 | 0.681 | -0.730 | -0.310 |
| Black/AA IDU Women | 13.455 | -0.171 | 5.881 | 8.043 | 13.880 | 1.222 | -0.400 | -0.371 | 0.643 | -1.677 | 2.633 | -0.319 | -0.334 | -1.637 | 3.541 | -2.498 | 4.361 | -2.624 |
| Hispanic IDU Women | 15.707 | -0.642 | 6.984 | 8.756 | 10.571 | -0.015 | 2.817 | -5.169 | 1.628 | 0.768 | -3.859 | 5.459 | 2.175 | -7.574 | 14.822 | -2.048 | 4.966 | -0.628 |
| White HET Men | 13.648 | -0.071 | 5.174 | 8.561 | 12.823 | 1.514 | -1.509 | 0.803 | 0.648 | -0.517 | 1.138 | -0.774 | -0.915 | 2.198 | -1.548 | -1.746 | 3.502 | -1.536 |
| Black/AA HET Men | 12.785 | -0.066 | 5.475 | 8.816 | 12.330 | 1.359 | -0.989 | -0.220 | 1.259 | -0.883 | 1.867 | -1.460 | -1.070 | 1.638 | -0.361 | -2.128 | 4.420 | -2.575 |
| Hispanic HET Men | 13.149 | -0.122 | 4.648 | 7.981 | 11.047 | 1.454 | -1.631 | 1.084 | 0.363 | -0.804 | 1.821 | -0.564 | -1.121 | 1.808 | -0.303 | -0.798 | 1.231 | -0.966 |
| White HET Women | 14.299 | -0.143 | 5.683 | 8.476 | 11.655 | 1.636 | -1.227 | 0.800 | -0.241 | -1.452 | 2.221 | -0.731 | -0.914 | 1.738 | -0.815 | -1.800 | 2.554 | -0.265 |
| Black/AA HET Women | 11.620 | 0.364 | 5.110 | 8.165 | 12.893 | 1.673 | -1.417 | 0.601 | 0.437 | -1.219 | 2.202 | -0.668 | -1.327 | 2.075 | -0.209 | -2.545 | 4.836 | -2.016 |
| Hispanic HET Women | 12.543 | 0.194 | 4.813 | 7.986 | 12.024 | 1.489 | -1.716 | 1.521 | 0.192 | -0.420 | 0.319 | 0.371 | -0.482 | 1.104 | -0.881 | -1.410 | 2.858 | -1.683 |

Table S 22: Covariance matrices for modeling among those in HIV care and using ART

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Population | Covariate | intercept | age\_cat | cd4\_cat\_1 | cd4\_cat\_2 | cd4\_cat\_3 | yrs\_art | yrs\_art\_1 | yrs\_art\_2 | yrs\_art\_3 | cd4\_1\_yrs\_1 | cd4\_1\_yrs\_2 | cd4\_1\_yrs\_3 | cd4\_2\_yrs\_1 | cd4\_2\_yrs\_2 | cd4\_2\_yrs\_3 | cd4\_3\_yrs\_1 | cd4\_3\_yrs\_2 | cd4\_3\_yrs\_3 |
| White MSM | intercept | 4.65E-02 | -6.12E-03 | -1.93E-02 | -1.98E-02 | -2.09E-02 | -2.47E-03 | 1.74E-03 | 1.73E-03 | -3.11E-03 | 6.69E-03 | -1.24E-02 | 5.41E-03 | 7.14E-03 | -1.40E-02 | 7.20E-03 | 8.24E-03 | -1.60E-02 | 7.78E-03 |
| age\_cat | -6.12E-03 | 1.53E-03 | 4.39E-04 | 4.79E-04 | 6.65E-04 | -1.66E-04 | 1.60E-04 | -3.57E-04 | 2.57E-04 | -1.26E-04 | 1.75E-04 | -2.36E-06 | -1.66E-04 | 3.54E-04 | -2.11E-04 | -1.87E-04 | 2.42E-04 | 3.29E-05 |
| cd4\_cat\_1 | -1.93E-02 | 4.39E-04 | 2.97E-02 | 1.82E-02 | 1.82E-02 | -3.59E-04 | 7.13E-03 | -1.30E-02 | 5.61E-03 | -9.70E-03 | 1.89E-02 | -9.21E-03 | -6.24E-03 | 1.17E-02 | -5.20E-03 | -6.20E-03 | 1.16E-02 | -5.07E-03 |
| cd4\_cat\_2 | -1.98E-02 | 4.79E-04 | 1.82E-02 | 2.97E-02 | 1.83E-02 | -1.68E-04 | 6.60E-03 | -1.23E-02 | 5.43E-03 | -6.27E-03 | 1.18E-02 | -5.24E-03 | -8.88E-03 | 1.69E-02 | -7.94E-03 | -6.29E-03 | 1.18E-02 | -5.23E-03 |
| cd4\_cat\_3 | -2.09E-02 | 6.65E-04 | 1.82E-02 | 1.83E-02 | 3.11E-02 | 7.34E-05 | 5.89E-03 | -1.13E-02 | 5.18E-03 | -6.28E-03 | 1.18E-02 | -5.25E-03 | -6.30E-03 | 1.19E-02 | -5.38E-03 | -9.96E-03 | 1.95E-02 | -1.01E-02 |
| yrs\_art | -2.47E-03 | -1.66E-04 | -3.59E-04 | -1.68E-04 | 7.34E-05 | 2.35E-03 | -6.43E-03 | 8.55E-03 | -2.38E-03 | 4.17E-05 | 8.91E-07 | -1.24E-04 | -1.80E-04 | 6.42E-04 | -7.86E-04 | -8.51E-04 | 2.24E-03 | -1.83E-03 |
| yrs\_art\_1 | 1.74E-03 | 1.60E-04 | 7.13E-03 | 6.60E-03 | 5.89E-03 | -6.43E-03 | 2.96E-02 | -5.17E-02 | 2.58E-02 | -1.20E-02 | 2.83E-02 | -1.89E-02 | -1.14E-02 | 2.65E-02 | -1.71E-02 | -9.57E-03 | 2.22E-02 | -1.43E-02 |
| yrs\_art\_2 | 1.73E-03 | -3.57E-04 | -1.30E-02 | -1.23E-02 | -1.13E-02 | 8.55E-03 | -5.17E-02 | 1.06E-01 | -6.75E-02 | 2.85E-02 | -7.48E-02 | 5.85E-02 | 2.76E-02 | -7.24E-02 | 5.60E-02 | 2.52E-02 | -6.66E-02 | 5.22E-02 |
| yrs\_art\_3 | -3.11E-03 | 2.57E-04 | 5.61E-03 | 5.43E-03 | 5.18E-03 | -2.38E-03 | 2.58E-02 | -6.75E-02 | 5.79E-02 | -1.93E-02 | 5.89E-02 | -5.54E-02 | -1.91E-02 | 5.83E-02 | -5.47E-02 | -1.84E-02 | 5.66E-02 | -5.36E-02 |
| cd4\_1\_yrs\_1 | 6.69E-03 | -1.26E-04 | -9.70E-03 | -6.27E-03 | -6.28E-03 | 4.17E-05 | -1.20E-02 | 2.85E-02 | -1.93E-02 | 2.02E-02 | -4.83E-02 | 3.32E-02 | 1.20E-02 | -2.84E-02 | 1.93E-02 | 1.20E-02 | -2.83E-02 | 1.93E-02 |
| cd4\_1\_yrs\_2 | -1.24E-02 | 1.75E-04 | 1.89E-02 | 1.18E-02 | 1.18E-02 | 8.91E-07 | 2.83E-02 | -7.48E-02 | 5.89E-02 | -4.83E-02 | 1.28E-01 | -1.03E-01 | -2.84E-02 | 7.49E-02 | -5.90E-02 | -2.84E-02 | 7.49E-02 | -5.90E-02 |
| cd4\_1\_yrs\_3 | 5.41E-03 | -2.36E-06 | -9.21E-03 | -5.24E-03 | -5.25E-03 | -1.24E-04 | -1.89E-02 | 5.85E-02 | -5.54E-02 | 3.32E-02 | -1.03E-01 | 9.92E-02 | 1.93E-02 | -5.90E-02 | 5.55E-02 | 1.93E-02 | -5.91E-02 | 5.56E-02 |
| cd4\_2\_yrs\_1 | 7.14E-03 | -1.66E-04 | -6.24E-03 | -8.88E-03 | -6.30E-03 | -1.80E-04 | -1.14E-02 | 2.76E-02 | -1.91E-02 | 1.20E-02 | -2.84E-02 | 1.93E-02 | 2.27E-02 | -5.56E-02 | 4.05E-02 | 1.20E-02 | -2.86E-02 | 1.94E-02 |
| cd4\_2\_yrs\_2 | -1.40E-02 | 3.54E-04 | 1.17E-02 | 1.69E-02 | 1.19E-02 | 6.42E-04 | 2.65E-02 | -7.24E-02 | 5.83E-02 | -2.84E-02 | 7.49E-02 | -5.90E-02 | -5.56E-02 | 1.54E-01 | -1.33E-01 | -2.86E-02 | 7.55E-02 | -5.95E-02 |
| cd4\_2\_yrs\_3 | 7.20E-03 | -2.11E-04 | -5.20E-03 | -7.94E-03 | -5.38E-03 | -7.86E-04 | -1.71E-02 | 5.60E-02 | -5.47E-02 | 1.93E-02 | -5.90E-02 | 5.55E-02 | 4.05E-02 | -1.33E-01 | 1.41E-01 | 1.96E-02 | -5.97E-02 | 5.61E-02 |
| cd4\_3\_yrs\_1 | 8.24E-03 | -1.87E-04 | -6.20E-03 | -6.29E-03 | -9.96E-03 | -8.51E-04 | -9.57E-03 | 2.52E-02 | -1.84E-02 | 1.20E-02 | -2.84E-02 | 1.93E-02 | 1.20E-02 | -2.86E-02 | 1.96E-02 | 2.73E-02 | -6.82E-02 | 5.04E-02 |
| cd4\_3\_yrs\_2 | -1.60E-02 | 2.42E-04 | 1.16E-02 | 1.18E-02 | 1.95E-02 | 2.24E-03 | 2.22E-02 | -6.66E-02 | 5.66E-02 | -2.83E-02 | 7.49E-02 | -5.91E-02 | -2.86E-02 | 7.55E-02 | -5.97E-02 | -6.82E-02 | 2.02E-01 | -1.83E-01 |
| cd4\_3\_yrs\_3 | 7.78E-03 | 3.29E-05 | -5.07E-03 | -5.23E-03 | -1.01E-02 | -1.83E-03 | -1.43E-02 | 5.22E-02 | -5.36E-02 | 1.93E-02 | -5.90E-02 | 5.56E-02 | 1.94E-02 | -5.95E-02 | 5.61E-02 | 5.04E-02 | -1.83E-01 | 2.04E-01 |
| Black/AA MSM | intercept | 8.83E-02 | -1.42E-02 | -4.02E-02 | -4.17E-02 | -4.01E-02 | -4.77E-03 | 2.62E-03 | 7.31E-03 | -1.24E-02 | 1.53E-02 | -3.35E-02 | 2.27E-02 | 1.52E-02 | -3.17E-02 | 2.16E-02 | 2.09E-02 | -5.42E-02 | 4.56E-02 |
| age\_cat | -1.42E-02 | 4.28E-03 | 2.30E-03 | 2.97E-03 | 2.38E-03 | -6.28E-04 | 9.58E-04 | -2.10E-03 | 1.93E-03 | -3.84E-04 | 1.75E-03 | -2.40E-03 | -1.77E-04 | 4.03E-04 | -1.17E-03 | -7.32E-04 | 3.08E-03 | -3.65E-03 |
| cd4\_cat\_1 | -4.02E-02 | 2.30E-03 | 5.61E-02 | 3.38E-02 | 3.35E-02 | -9.55E-05 | 1.26E-02 | -2.46E-02 | 1.26E-02 | -1.90E-02 | 3.66E-02 | -1.84E-02 | -1.29E-02 | 2.49E-02 | -1.27E-02 | -1.32E-02 | 2.61E-02 | -1.38E-02 |
| cd4\_cat\_2 | -4.17E-02 | 2.97E-03 | 3.38E-02 | 5.37E-02 | 3.38E-02 | -6.46E-04 | 1.40E-02 | -2.67E-02 | 1.36E-02 | -1.30E-02 | 2.56E-02 | -1.34E-02 | -1.57E-02 | 2.88E-02 | -1.30E-02 | -1.33E-02 | 2.67E-02 | -1.47E-02 |
| cd4\_cat\_3 | -4.01E-02 | 2.38E-03 | 3.35E-02 | 3.38E-02 | 5.70E-02 | -3.12E-04 | 1.33E-02 | -2.57E-02 | 1.32E-02 | -1.31E-02 | 2.55E-02 | -1.33E-02 | -1.30E-02 | 2.51E-02 | -1.30E-02 | -2.09E-02 | 4.06E-02 | -2.22E-02 |
| yrs\_art | -4.77E-03 | -6.28E-04 | -9.55E-05 | -6.46E-04 | -3.12E-04 | 5.35E-03 | -1.45E-02 | 1.91E-02 | -5.14E-03 | -7.72E-04 | 2.06E-03 | -1.72E-03 | -1.30E-03 | 4.05E-03 | -3.80E-03 | -3.84E-03 | 1.29E-02 | -1.41E-02 |
| yrs\_art\_1 | 2.62E-03 | 9.58E-04 | 1.26E-02 | 1.40E-02 | 1.33E-02 | -1.45E-02 | 7.07E-02 | -1.25E-01 | 6.28E-02 | -2.93E-02 | 6.77E-02 | -4.39E-02 | -2.79E-02 | 6.26E-02 | -3.85E-02 | -2.07E-02 | 3.73E-02 | -9.13E-03 |
| yrs\_art\_2 | 7.31E-03 | -2.10E-03 | -2.46E-02 | -2.67E-02 | -2.57E-02 | 1.91E-02 | -1.25E-01 | 2.58E-01 | -1.65E-01 | 7.09E-02 | -1.83E-01 | 1.41E-01 | 6.91E-02 | -1.76E-01 | 1.33E-01 | 5.93E-02 | -1.42E-01 | 9.35E-02 |
| yrs\_art\_3 | -1.24E-02 | 1.93E-03 | 1.26E-02 | 1.36E-02 | 1.32E-02 | -5.14E-03 | 6.28E-02 | -1.65E-01 | 1.45E-01 | -4.85E-02 | 1.46E-01 | -1.39E-01 | -4.80E-02 | 1.44E-01 | -1.36E-01 | -4.51E-02 | 1.33E-01 | -1.24E-01 |
| cd4\_1\_yrs\_1 | 1.53E-02 | -3.84E-04 | -1.90E-02 | -1.30E-02 | -1.31E-02 | -7.72E-04 | -2.93E-02 | 7.09E-02 | -4.85E-02 | 5.77E-02 | -1.39E-01 | 9.83E-02 | 3.17E-02 | -7.44E-02 | 4.98E-02 | 3.20E-02 | -7.52E-02 | 5.07E-02 |
| cd4\_1\_yrs\_2 | -3.35E-02 | 1.75E-03 | 3.66E-02 | 2.56E-02 | 2.55E-02 | 2.06E-03 | 6.77E-02 | -1.83E-01 | 1.46E-01 | -1.39E-01 | 3.84E-01 | -3.22E-01 | -7.43E-02 | 1.93E-01 | -1.49E-01 | -7.51E-02 | 1.95E-01 | -1.52E-01 |
| cd4\_1\_yrs\_3 | 2.27E-02 | -2.40E-03 | -1.84E-02 | -1.34E-02 | -1.33E-02 | -1.72E-03 | -4.39E-02 | 1.41E-01 | -1.39E-01 | 9.83E-02 | -3.22E-01 | 3.35E-01 | 4.97E-02 | -1.49E-01 | 1.42E-01 | 5.05E-02 | -1.52E-01 | 1.45E-01 |
| cd4\_2\_yrs\_1 | 1.52E-02 | -1.77E-04 | -1.29E-02 | -1.57E-02 | -1.30E-02 | -1.30E-03 | -2.79E-02 | 6.91E-02 | -4.80E-02 | 3.17E-02 | -7.43E-02 | 4.97E-02 | 5.79E-02 | -1.46E-01 | 1.10E-01 | 3.23E-02 | -7.63E-02 | 5.19E-02 |
| cd4\_2\_yrs\_2 | -3.17E-02 | 4.03E-04 | 2.49E-02 | 2.88E-02 | 2.51E-02 | 4.05E-03 | 6.26E-02 | -1.76E-01 | 1.44E-01 | -7.44E-02 | 1.93E-01 | -1.49E-01 | -1.46E-01 | 4.37E-01 | -4.00E-01 | -7.61E-02 | 1.98E-01 | -1.55E-01 |
| cd4\_2\_yrs\_3 | 2.16E-02 | -1.17E-03 | -1.27E-02 | -1.30E-02 | -1.30E-02 | -3.80E-03 | -3.85E-02 | 1.33E-01 | -1.36E-01 | 4.98E-02 | -1.49E-01 | 1.42E-01 | 1.10E-01 | -4.00E-01 | 4.50E-01 | 5.14E-02 | -1.54E-01 | 1.47E-01 |
| cd4\_3\_yrs\_1 | 2.09E-02 | -7.32E-04 | -1.32E-02 | -1.33E-02 | -2.09E-02 | -3.84E-03 | -2.07E-02 | 5.93E-02 | -4.51E-02 | 3.20E-02 | -7.51E-02 | 5.05E-02 | 3.23E-02 | -7.61E-02 | 5.14E-02 | 1.02E-01 | -2.65E-01 | 2.17E-01 |
| cd4\_3\_yrs\_2 | -5.42E-02 | 3.08E-03 | 2.61E-02 | 2.67E-02 | 4.06E-02 | 1.29E-02 | 3.73E-02 | -1.42E-01 | 1.33E-01 | -7.52E-02 | 1.95E-01 | -1.52E-01 | -7.63E-02 | 1.98E-01 | -1.54E-01 | -2.65E-01 | 8.96E-01 | -9.68E-01 |
| cd4\_3\_yrs\_3 | 4.56E-02 | -3.65E-03 | -1.38E-02 | -1.47E-02 | -2.22E-02 | -1.41E-02 | -9.13E-03 | 9.35E-02 | -1.24E-01 | 5.07E-02 | -1.52E-01 | 1.45E-01 | 5.19E-02 | -1.55E-01 | 1.47E-01 | 2.17E-01 | -9.68E-01 | 1.36E+00 |
| Hispanic MSM | intercept | 1.02E-01 | -1.81E-02 | -3.40E-02 | -3.72E-02 | -3.50E-02 | -6.38E-03 | 1.41E-02 | -1.40E-02 | 1.27E-03 | 7.84E-03 | -1.46E-02 | 6.31E-03 | 8.45E-03 | -1.48E-02 | 6.14E-03 | 1.66E-02 | -4.01E-02 | 2.68E-02 |
| age\_cat | -1.81E-02 | 5.57E-03 | 7.16E-04 | 1.39E-03 | 8.36E-04 | -5.96E-04 | -5.44E-04 | 1.57E-03 | -1.73E-03 | 6.56E-04 | -2.02E-03 | 2.40E-03 | 9.60E-04 | -2.87E-03 | 2.77E-03 | -3.59E-04 | 1.49E-03 | -1.01E-03 |
| cd4\_cat\_1 | -3.40E-02 | 7.16E-04 | 5.98E-02 | 3.29E-02 | 3.27E-02 | -7.43E-04 | 1.24E-02 | -2.41E-02 | 1.43E-02 | -1.85E-02 | 3.84E-02 | -2.50E-02 | -1.04E-02 | 2.11E-02 | -1.31E-02 | -1.05E-02 | 2.17E-02 | -1.37E-02 |
| cd4\_cat\_2 | -3.72E-02 | 1.39E-03 | 3.29E-02 | 6.43E-02 | 3.29E-02 | -1.41E-04 | 1.05E-02 | -2.14E-02 | 1.34E-02 | -1.04E-02 | 2.12E-02 | -1.32E-02 | -1.82E-02 | 3.91E-02 | -2.73E-02 | -1.08E-02 | 2.25E-02 | -1.43E-02 |
| cd4\_cat\_3 | -3.50E-02 | 8.36E-04 | 3.27E-02 | 3.29E-02 | 7.13E-02 | -1.69E-04 | 1.07E-02 | -2.19E-02 | 1.36E-02 | -1.04E-02 | 2.12E-02 | -1.32E-02 | -1.04E-02 | 2.11E-02 | -1.31E-02 | -2.59E-02 | 5.27E-02 | -2.78E-02 |
| yrs\_art | -6.38E-03 | -5.96E-04 | -7.43E-04 | -1.41E-04 | -1.69E-04 | 6.49E-03 | -1.77E-02 | 2.37E-02 | -7.19E-03 | 3.02E-04 | -2.39E-05 | -6.02E-04 | -8.52E-04 | 2.23E-03 | -1.51E-03 | -3.31E-03 | 9.14E-03 | -6.69E-03 |
| yrs\_art\_1 | 1.41E-02 | -5.44E-04 | 1.24E-02 | 1.05E-02 | 1.07E-02 | -1.77E-02 | 7.50E-02 | -1.30E-01 | 6.88E-02 | -2.70E-02 | 6.52E-02 | -4.76E-02 | -2.39E-02 | 5.92E-02 | -4.52E-02 | -1.66E-02 | 3.85E-02 | -2.96E-02 |
| yrs\_art\_2 | -1.40E-02 | 1.57E-03 | -2.41E-02 | -2.14E-02 | -2.19E-02 | 2.37E-02 | -1.30E-01 | 2.74E-01 | -1.96E-01 | 6.59E-02 | -1.86E-01 | 1.68E-01 | 6.17E-02 | -1.78E-01 | 1.65E-01 | 5.18E-02 | -1.50E-01 | 1.43E-01 |
| yrs\_art\_3 | 1.27E-03 | -1.73E-03 | 1.43E-02 | 1.34E-02 | 1.36E-02 | -7.19E-03 | 6.88E-02 | -1.96E-01 | 2.02E-01 | -4.89E-02 | 1.69E-01 | -1.93E-01 | -4.77E-02 | 1.67E-01 | -1.92E-01 | -4.45E-02 | 1.58E-01 | -1.85E-01 |
| cd4\_1\_yrs\_1 | 7.84E-03 | 6.56E-04 | -1.85E-02 | -1.04E-02 | -1.04E-02 | 3.02E-04 | -2.70E-02 | 6.59E-02 | -4.89E-02 | 5.56E-02 | -1.43E-01 | 1.11E-01 | 2.60E-02 | -6.44E-02 | 4.84E-02 | 2.59E-02 | -6.43E-02 | 4.83E-02 |
| cd4\_1\_yrs\_2 | -1.46E-02 | -2.02E-03 | 3.84E-02 | 2.12E-02 | 2.12E-02 | -2.39E-05 | 6.52E-02 | -1.86E-01 | 1.69E-01 | -1.43E-01 | 4.21E-01 | -3.88E-01 | -6.45E-02 | 1.85E-01 | -1.69E-01 | -6.45E-02 | 1.85E-01 | -1.69E-01 |
| cd4\_1\_yrs\_3 | 6.31E-03 | 2.40E-03 | -2.50E-02 | -1.32E-02 | -1.32E-02 | -6.02E-04 | -4.76E-02 | 1.68E-01 | -1.93E-01 | 1.11E-01 | -3.88E-01 | 4.33E-01 | 4.86E-02 | -1.69E-01 | 1.93E-01 | 4.87E-02 | -1.70E-01 | 1.94E-01 |
| cd4\_2\_yrs\_1 | 8.45E-03 | 9.60E-04 | -1.04E-02 | -1.82E-02 | -1.04E-02 | -8.52E-04 | -2.39E-02 | 6.17E-02 | -4.77E-02 | 2.60E-02 | -6.45E-02 | 4.86E-02 | 6.18E-02 | -1.56E-01 | 1.19E-01 | 2.63E-02 | -6.54E-02 | 4.92E-02 |
| cd4\_2\_yrs\_2 | -1.48E-02 | -2.87E-03 | 2.11E-02 | 3.91E-02 | 2.11E-02 | 2.23E-03 | 5.92E-02 | -1.78E-01 | 1.67E-01 | -6.44E-02 | 1.85E-01 | -1.69E-01 | -1.56E-01 | 4.65E-01 | -4.37E-01 | -6.54E-02 | 1.88E-01 | -1.71E-01 |
| cd4\_2\_yrs\_3 | 6.14E-03 | 2.77E-03 | -1.31E-02 | -2.73E-02 | -1.31E-02 | -1.51E-03 | -4.52E-02 | 1.65E-01 | -1.92E-01 | 4.84E-02 | -1.69E-01 | 1.93E-01 | 1.19E-01 | -4.37E-01 | 5.14E-01 | 4.92E-02 | -1.71E-01 | 1.95E-01 |
| cd4\_3\_yrs\_1 | 1.66E-02 | -3.59E-04 | -1.05E-02 | -1.08E-02 | -2.59E-02 | -3.31E-03 | -1.66E-02 | 5.18E-02 | -4.45E-02 | 2.59E-02 | -6.45E-02 | 4.87E-02 | 2.63E-02 | -6.54E-02 | 4.92E-02 | 1.05E-01 | -2.74E-01 | 2.08E-01 |
| cd4\_3\_yrs\_2 | -4.01E-02 | 1.49E-03 | 2.17E-02 | 2.25E-02 | 5.27E-02 | 9.14E-03 | 3.85E-02 | -1.50E-01 | 1.58E-01 | -6.43E-02 | 1.85E-01 | -1.70E-01 | -6.54E-02 | 1.88E-01 | -1.71E-01 | -2.74E-01 | 9.37E-01 | -9.22E-01 |
| cd4\_3\_yrs\_3 | 2.68E-02 | -1.01E-03 | -1.37E-02 | -1.43E-02 | -2.78E-02 | -6.69E-03 | -2.96E-02 | 1.43E-01 | -1.85E-01 | 4.83E-02 | -1.69E-01 | 1.94E-01 | 4.92E-02 | -1.71E-01 | 1.95E-01 | 2.08E-01 | -9.22E-01 | 1.08E+00 |
| White IDU Men | intercept | 2.17E-01 | -3.24E-02 | -6.13E-02 | -6.64E-02 | -6.52E-02 | -1.34E-02 | 2.10E-02 | -1.26E-02 | -5.12E-03 | 2.22E-02 | -4.25E-02 | 1.91E-02 | 3.04E-02 | -6.29E-02 | 3.93E-02 | 2.86E-02 | -5.72E-02 | 2.49E-02 |
| age\_cat | -3.24E-02 | 8.00E-03 | 1.02E-04 | 7.97E-04 | 1.10E-03 | -9.84E-04 | 1.19E-03 | -1.98E-03 | 4.92E-04 | -2.55E-04 | 2.58E-04 | 3.48E-04 | -1.29E-03 | 3.01E-03 | -3.10E-03 | -5.91E-04 | 8.88E-04 | 9.96E-04 |
| cd4\_cat\_1 | -6.13E-02 | 1.02E-04 | 1.04E-01 | 6.03E-02 | 6.02E-02 | 4.91E-04 | 1.87E-02 | -3.62E-02 | 1.59E-02 | -3.38E-02 | 6.74E-02 | -3.54E-02 | -2.02E-02 | 3.81E-02 | -1.65E-02 | -2.02E-02 | 3.83E-02 | -1.67E-02 |
| cd4\_cat\_2 | -6.64E-02 | 7.97E-04 | 6.03E-02 | 1.38E-01 | 6.05E-02 | 1.78E-03 | 1.52E-02 | -3.16E-02 | 1.48E-02 | -2.02E-02 | 3.82E-02 | -1.67E-02 | -4.89E-02 | 8.77E-02 | -3.17E-02 | -2.07E-02 | 3.95E-02 | -1.74E-02 |
| cd4\_cat\_3 | -6.52E-02 | 1.10E-03 | 6.02E-02 | 6.05E-02 | 1.36E-01 | 4.60E-04 | 1.87E-02 | -3.64E-02 | 1.63E-02 | -2.02E-02 | 3.82E-02 | -1.66E-02 | -2.07E-02 | 3.95E-02 | -1.78E-02 | -4.78E-02 | 9.08E-02 | -4.13E-02 |
| yrs\_art | -1.34E-02 | -9.84E-04 | 4.91E-04 | 1.78E-03 | 4.60E-04 | 1.17E-02 | -3.08E-02 | 3.95E-02 | -9.12E-03 | -6.87E-04 | 2.29E-03 | -2.68E-03 | -3.05E-03 | 7.68E-03 | -6.19E-03 | -3.92E-03 | 1.01E-02 | -8.21E-03 |
| yrs\_art\_1 | 2.10E-02 | 1.19E-03 | 1.87E-02 | 1.52E-02 | 1.87E-02 | -3.08E-02 | 1.16E-01 | -1.85E-01 | 7.83E-02 | -3.23E-02 | 7.46E-02 | -4.72E-02 | -2.58E-02 | 5.97E-02 | -3.71E-02 | -2.37E-02 | 5.38E-02 | -3.27E-02 |
| yrs\_art\_2 | -1.26E-02 | -1.98E-03 | -3.62E-02 | -3.16E-02 | -3.64E-02 | 3.95E-02 | -1.85E-01 | 3.44E-01 | -1.94E-01 | 7.83E-02 | -2.03E-01 | 1.55E-01 | 6.99E-02 | -1.84E-01 | 1.42E-01 | 6.73E-02 | -1.77E-01 | 1.36E-01 |
| yrs\_art\_3 | -5.12E-03 | 4.92E-04 | 1.59E-02 | 1.48E-02 | 1.63E-02 | -9.12E-03 | 7.83E-02 | -1.94E-01 | 1.59E-01 | -5.37E-02 | 1.62E-01 | -1.50E-01 | -5.14E-02 | 1.57E-01 | -1.46E-01 | -5.10E-02 | 1.55E-01 | -1.45E-01 |
| cd4\_1\_yrs\_1 | 2.22E-02 | -2.55E-04 | -3.38E-02 | -2.02E-02 | -2.02E-02 | -6.87E-04 | -3.23E-02 | 7.83E-02 | -5.37E-02 | 6.50E-02 | -1.57E-01 | 1.11E-01 | 3.44E-02 | -8.12E-02 | 5.47E-02 | 3.44E-02 | -8.13E-02 | 5.47E-02 |
| cd4\_1\_yrs\_2 | -4.25E-02 | 2.58E-04 | 6.74E-02 | 3.82E-02 | 3.82E-02 | 2.29E-03 | 7.46E-02 | -2.03E-01 | 1.62E-01 | -1.57E-01 | 4.21E-01 | -3.43E-01 | -8.12E-02 | 2.13E-01 | -1.65E-01 | -8.15E-02 | 2.13E-01 | -1.65E-01 |
| cd4\_1\_yrs\_3 | 1.91E-02 | 3.48E-04 | -3.54E-02 | -1.67E-02 | -1.66E-02 | -2.68E-03 | -4.72E-02 | 1.55E-01 | -1.50E-01 | 1.11E-01 | -3.43E-01 | 3.39E-01 | 5.46E-02 | -1.65E-01 | 1.53E-01 | 5.50E-02 | -1.66E-01 | 1.54E-01 |
| cd4\_2\_yrs\_1 | 3.04E-02 | -1.29E-03 | -2.02E-02 | -4.89E-02 | -2.07E-02 | -3.05E-03 | -2.58E-02 | 6.99E-02 | -5.14E-02 | 3.44E-02 | -8.12E-02 | 5.46E-02 | 1.05E-01 | -2.47E-01 | 1.66E-01 | 3.52E-02 | -8.32E-02 | 5.60E-02 |
| cd4\_2\_yrs\_2 | -6.29E-02 | 3.01E-03 | 3.81E-02 | 8.77E-02 | 3.95E-02 | 7.68E-03 | 5.97E-02 | -1.84E-01 | 1.57E-01 | -8.12E-02 | 2.13E-01 | -1.65E-01 | -2.47E-01 | 6.77E-01 | -5.70E-01 | -8.32E-02 | 2.17E-01 | -1.68E-01 |
| cd4\_2\_yrs\_3 | 3.93E-02 | -3.10E-03 | -1.65E-02 | -3.17E-02 | -1.78E-02 | -6.19E-03 | -3.71E-02 | 1.42E-01 | -1.46E-01 | 5.47E-02 | -1.65E-01 | 1.53E-01 | 1.66E-01 | -5.70E-01 | 6.17E-01 | 5.63E-02 | -1.69E-01 | 1.56E-01 |
| cd4\_3\_yrs\_1 | 2.86E-02 | -5.91E-04 | -2.02E-02 | -2.07E-02 | -4.78E-02 | -3.92E-03 | -2.37E-02 | 6.73E-02 | -5.10E-02 | 3.44E-02 | -8.15E-02 | 5.50E-02 | 3.52E-02 | -8.32E-02 | 5.63E-02 | 1.29E-01 | -3.09E-01 | 2.14E-01 |
| cd4\_3\_yrs\_2 | -5.72E-02 | 8.88E-04 | 3.83E-02 | 3.95E-02 | 9.08E-02 | 1.01E-02 | 5.38E-02 | -1.77E-01 | 1.55E-01 | -8.13E-02 | 2.13E-01 | -1.66E-01 | -8.32E-02 | 2.17E-01 | -1.69E-01 | -3.09E-01 | 8.45E-01 | -7.08E-01 |
| cd4\_3\_yrs\_3 | 2.49E-02 | 9.96E-04 | -1.67E-02 | -1.74E-02 | -4.13E-02 | -8.21E-03 | -3.27E-02 | 1.36E-01 | -1.45E-01 | 5.47E-02 | -1.65E-01 | 1.54E-01 | 5.60E-02 | -1.68E-01 | 1.56E-01 | 2.14E-01 | -7.08E-01 | 7.56E-01 |
| Black/AA IDU Men | intercept | 2.37E-01 | -3.43E-02 | -5.15E-02 | -5.66E-02 | -6.13E-02 | -1.34E-02 | 2.13E-02 | -1.75E-02 | -1.08E-03 | 2.49E-02 | -4.83E-02 | 2.50E-02 | 2.22E-02 | -4.32E-02 | 2.33E-02 | 2.34E-02 | -4.79E-02 | 2.77E-02 |
| age\_cat | -3.43E-02 | 7.27E-03 | 6.62E-04 | 1.28E-03 | 2.32E-03 | -7.27E-04 | 1.02E-03 | -1.72E-03 | 1.03E-03 | -1.15E-03 | 2.96E-03 | -2.70E-03 | 2.36E-04 | -1.32E-04 | -7.94E-04 | -6.80E-04 | 2.92E-03 | -3.72E-03 |
| cd4\_cat\_1 | -5.15E-02 | 6.62E-04 | 9.05E-02 | 4.94E-02 | 4.94E-02 | -5.81E-04 | 1.93E-02 | -3.23E-02 | 1.04E-02 | -3.37E-02 | 6.23E-02 | -2.63E-02 | -1.77E-02 | 3.01E-02 | -9.68E-03 | -1.78E-02 | 3.02E-02 | -9.74E-03 |
| cd4\_cat\_2 | -5.66E-02 | 1.28E-03 | 4.94E-02 | 1.06E-01 | 4.96E-02 | 8.04E-04 | 1.55E-02 | -2.76E-02 | 9.26E-03 | -1.81E-02 | 3.10E-02 | -1.02E-02 | -3.81E-02 | 7.00E-02 | -3.14E-02 | -1.80E-02 | 3.07E-02 | -9.99E-03 |
| cd4\_cat\_3 | -6.13E-02 | 2.32E-03 | 4.94E-02 | 4.96E-02 | 1.50E-01 | 6.83E-04 | 1.58E-02 | -2.80E-02 | 9.51E-03 | -1.83E-02 | 3.14E-02 | -1.06E-02 | -1.83E-02 | 3.15E-02 | -1.08E-02 | -5.93E-02 | 1.06E-01 | -4.10E-02 |
| yrs\_art | -1.34E-02 | -7.27E-04 | -5.81E-04 | 8.04E-04 | 6.83E-04 | 1.09E-02 | -2.83E-02 | 3.62E-02 | -8.93E-03 | -9.14E-04 | 2.31E-03 | -1.49E-03 | -3.38E-03 | 8.26E-03 | -5.94E-03 | -1.55E-03 | 2.58E-03 | -5.11E-04 |
| yrs\_art\_1 | 2.13E-02 | 1.02E-03 | 1.93E-02 | 1.55E-02 | 1.58E-02 | -2.83E-02 | 1.07E-01 | -1.73E-01 | 7.93E-02 | -3.00E-02 | 7.22E-02 | -5.18E-02 | -2.38E-02 | 5.70E-02 | -4.04E-02 | -2.85E-02 | 7.17E-02 | -5.43E-02 |
| yrs\_art\_2 | -1.75E-02 | -1.72E-03 | -3.23E-02 | -2.76E-02 | -2.80E-02 | 3.62E-02 | -1.73E-01 | 3.34E-01 | -2.07E-01 | 7.55E-02 | -2.05E-01 | 1.72E-01 | 6.73E-02 | -1.85E-01 | 1.57E-01 | 7.37E-02 | -2.05E-01 | 1.76E-01 |
| yrs\_art\_3 | -1.08E-03 | 1.03E-03 | 1.04E-02 | 9.26E-03 | 9.51E-03 | -8.93E-03 | 7.93E-02 | -2.07E-01 | 1.88E-01 | -5.54E-02 | 1.76E-01 | -1.80E-01 | -5.32E-02 | 1.70E-01 | -1.76E-01 | -5.50E-02 | 1.76E-01 | -1.81E-01 |
| cd4\_1\_yrs\_1 | 2.49E-02 | -1.15E-03 | -3.37E-02 | -1.81E-02 | -1.83E-02 | -9.14E-04 | -3.00E-02 | 7.55E-02 | -5.54E-02 | 6.32E-02 | -1.52E-01 | 1.08E-01 | 3.28E-02 | -7.93E-02 | 5.66E-02 | 3.29E-02 | -7.95E-02 | 5.68E-02 |
| cd4\_1\_yrs\_2 | -4.83E-02 | 2.96E-03 | 6.23E-02 | 3.10E-02 | 3.14E-02 | 2.31E-03 | 7.22E-02 | -2.05E-01 | 1.76E-01 | -1.52E-01 | 4.11E-01 | -3.39E-01 | -7.93E-02 | 2.15E-01 | -1.79E-01 | -7.95E-02 | 2.15E-01 | -1.79E-01 |
| cd4\_1\_yrs\_3 | 2.50E-02 | -2.70E-03 | -2.63E-02 | -1.02E-02 | -1.06E-02 | -1.49E-03 | -5.18E-02 | 1.72E-01 | -1.80E-01 | 1.08E-01 | -3.39E-01 | 3.41E-01 | 5.66E-02 | -1.79E-01 | 1.82E-01 | 5.66E-02 | -1.79E-01 | 1.82E-01 |
| cd4\_2\_yrs\_1 | 2.22E-02 | 2.36E-04 | -1.77E-02 | -3.81E-02 | -1.83E-02 | -3.38E-03 | -2.38E-02 | 6.73E-02 | -5.32E-02 | 3.28E-02 | -7.93E-02 | 5.66E-02 | 9.26E-02 | -2.24E-01 | 1.59E-01 | 3.32E-02 | -8.00E-02 | 5.68E-02 |
| cd4\_2\_yrs\_2 | -4.32E-02 | -1.32E-04 | 3.01E-02 | 7.00E-02 | 3.15E-02 | 8.26E-03 | 5.70E-02 | -1.85E-01 | 1.70E-01 | -7.93E-02 | 2.15E-01 | -1.79E-01 | -2.24E-01 | 6.10E-01 | -5.11E-01 | -8.02E-02 | 2.16E-01 | -1.79E-01 |
| cd4\_2\_yrs\_3 | 2.33E-02 | -7.94E-04 | -9.68E-03 | -3.14E-02 | -1.08E-02 | -5.94E-03 | -4.04E-02 | 1.57E-01 | -1.76E-01 | 5.66E-02 | -1.79E-01 | 1.82E-01 | 1.59E-01 | -5.11E-01 | 5.34E-01 | 5.73E-02 | -1.80E-01 | 1.82E-01 |
| cd4\_3\_yrs\_1 | 2.34E-02 | -6.80E-04 | -1.78E-02 | -1.80E-02 | -5.93E-02 | -1.55E-03 | -2.85E-02 | 7.37E-02 | -5.50E-02 | 3.29E-02 | -7.95E-02 | 5.66E-02 | 3.32E-02 | -8.02E-02 | 5.73E-02 | 1.43E-01 | -3.48E-01 | 2.47E-01 |
| cd4\_3\_yrs\_2 | -4.79E-02 | 2.92E-03 | 3.02E-02 | 3.07E-02 | 1.06E-01 | 2.58E-03 | 7.17E-02 | -2.05E-01 | 1.76E-01 | -7.95E-02 | 2.15E-01 | -1.79E-01 | -8.00E-02 | 2.16E-01 | -1.80E-01 | -3.48E-01 | 9.55E-01 | -7.99E-01 |
| cd4\_3\_yrs\_3 | 2.77E-02 | -3.72E-03 | -9.74E-03 | -9.99E-03 | -4.10E-02 | -5.11E-04 | -5.43E-02 | 1.76E-01 | -1.81E-01 | 5.68E-02 | -1.79E-01 | 1.82E-01 | 5.68E-02 | -1.79E-01 | 1.82E-01 | 2.47E-01 | -7.99E-01 | 8.07E-01 |
| Hispanic IDU Men | intercept | 6.30E-01 | -8.66E-02 | -1.81E-01 | -1.92E-01 | -2.40E-01 | -4.50E-02 | 5.88E-02 | -5.19E-03 | -6.37E-02 | 7.66E-02 | -1.50E-01 | 7.39E-02 | 8.40E-02 | -1.93E-01 | 1.31E-01 | 1.23E-01 | -2.36E-01 | 1.09E-01 |
| age\_cat | -8.66E-02 | 2.20E-02 | -1.87E-03 | 6.77E-04 | 1.81E-03 | -4.13E-03 | 4.01E-04 | 6.24E-03 | -8.21E-03 | 2.03E-03 | -9.93E-03 | 1.26E-02 | 5.89E-03 | -1.51E-02 | 1.17E-02 | 7.24E-03 | -3.21E-02 | 3.68E-02 |
| cd4\_cat\_1 | -1.81E-01 | -1.87E-03 | 4.05E-01 | 2.09E-01 | 2.07E-01 | -1.29E-02 | 1.44E-01 | -2.90E-01 | 1.71E-01 | -1.88E-01 | 4.12E-01 | -2.62E-01 | -1.08E-01 | 2.41E-01 | -1.55E-01 | -1.06E-01 | 2.36E-01 | -1.53E-01 |
| cd4\_cat\_2 | -1.92E-01 | 6.77E-04 | 2.09E-01 | 4.24E-01 | 2.08E-01 | -1.21E-02 | 1.40E-01 | -2.84E-01 | 1.68E-01 | -1.07E-01 | 2.38E-01 | -1.52E-01 | -1.44E-01 | 3.30E-01 | -2.37E-01 | -1.06E-01 | 2.34E-01 | -1.49E-01 |
| cd4\_cat\_3 | -2.40E-01 | 1.81E-03 | 2.07E-01 | 2.08E-01 | 5.11E-01 | 1.50E-02 | 6.68E-02 | -1.87E-01 | 1.41E-01 | -1.06E-01 | 2.36E-01 | -1.52E-01 | -1.09E-01 | 2.45E-01 | -1.60E-01 | -2.44E-01 | 6.01E-01 | -4.68E-01 |
| yrs\_art | -4.50E-02 | -4.13E-03 | -1.29E-02 | -1.21E-02 | 1.50E-02 | 4.60E-02 | -1.25E-01 | 1.64E-01 | -4.37E-02 | 1.39E-02 | -2.99E-02 | 1.73E-02 | -8.66E-04 | 1.06E-02 | -1.65E-02 | -2.91E-02 | 8.28E-02 | -6.87E-02 |
| yrs\_art\_1 | 5.88E-02 | 4.01E-04 | 1.44E-01 | 1.40E-01 | 6.68E-02 | -1.25E-01 | 5.13E-01 | -8.59E-01 | 4.08E-01 | -2.09E-01 | 4.92E-01 | -3.36E-01 | -1.71E-01 | 3.85E-01 | -2.45E-01 | -9.43E-02 | 1.94E-01 | -1.11E-01 |
| yrs\_art\_2 | -5.19E-03 | 6.24E-03 | -2.90E-01 | -2.84E-01 | -1.87E-01 | 1.64E-01 | -8.59E-01 | 1.63E+00 | -9.53E-01 | 4.58E-01 | -1.14E+00 | 8.59E-01 | 4.08E-01 | -1.00E+00 | 7.39E-01 | 3.07E-01 | -7.54E-01 | 5.66E-01 |
| yrs\_art\_3 | -6.37E-02 | -8.21E-03 | 1.71E-01 | 1.68E-01 | 1.41E-01 | -4.37E-02 | 4.08E-01 | -9.53E-01 | 7.42E-01 | -2.99E-01 | 8.22E-01 | -7.18E-01 | -2.86E-01 | 7.85E-01 | -6.85E-01 | -2.57E-01 | 7.16E-01 | -6.39E-01 |
| cd4\_1\_yrs\_1 | 7.66E-02 | 2.03E-03 | -1.88E-01 | -1.07E-01 | -1.06E-01 | 1.39E-02 | -2.09E-01 | 4.58E-01 | -2.99E-01 | 3.50E-01 | -8.36E-01 | 5.82E-01 | 1.70E-01 | -4.04E-01 | 2.82E-01 | 1.68E-01 | -4.03E-01 | 2.83E-01 |
| cd4\_1\_yrs\_2 | -1.50E-01 | -9.93E-03 | 4.12E-01 | 2.38E-01 | 2.36E-01 | -2.99E-02 | 4.92E-01 | -1.14E+00 | 8.22E-01 | -8.36E-01 | 2.15E+00 | -1.67E+00 | -4.06E-01 | 1.03E+00 | -7.86E-01 | -4.03E-01 | 1.03E+00 | -7.90E-01 |
| cd4\_1\_yrs\_3 | 7.39E-02 | 1.26E-02 | -2.62E-01 | -1.52E-01 | -1.52E-01 | 1.73E-02 | -3.36E-01 | 8.59E-01 | -7.18E-01 | 5.82E-01 | -1.67E+00 | 1.52E+00 | 2.84E-01 | -7.90E-01 | 6.97E-01 | 2.83E-01 | -7.90E-01 | 7.02E-01 |
| cd4\_2\_yrs\_1 | 8.40E-02 | 5.89E-03 | -1.08E-01 | -1.44E-01 | -1.09E-01 | -8.66E-04 | -1.71E-01 | 4.08E-01 | -2.86E-01 | 1.70E-01 | -4.06E-01 | 2.84E-01 | 3.55E-01 | -9.26E-01 | 7.26E-01 | 1.73E-01 | -4.16E-01 | 2.93E-01 |
| cd4\_2\_yrs\_2 | -1.93E-01 | -1.51E-02 | 2.41E-01 | 3.30E-01 | 2.45E-01 | 1.06E-02 | 3.85E-01 | -1.00E+00 | 7.85E-01 | -4.04E-01 | 1.03E+00 | -7.90E-01 | -9.26E-01 | 2.64E+00 | -2.31E+00 | -4.17E-01 | 1.06E+00 | -8.22E-01 |
| cd4\_2\_yrs\_3 | 1.31E-01 | 1.17E-02 | -1.55E-01 | -2.37E-01 | -1.60E-01 | -1.65E-02 | -2.45E-01 | 7.39E-01 | -6.85E-01 | 2.82E-01 | -7.86E-01 | 6.97E-01 | 7.26E-01 | -2.31E+00 | 2.33E+00 | 2.95E-01 | -8.24E-01 | 7.29E-01 |
| cd4\_3\_yrs\_1 | 1.23E-01 | 7.24E-03 | -1.06E-01 | -1.06E-01 | -2.44E-01 | -2.91E-02 | -9.43E-02 | 3.07E-01 | -2.57E-01 | 1.68E-01 | -4.03E-01 | 2.83E-01 | 1.73E-01 | -4.17E-01 | 2.95E-01 | 5.84E-01 | -1.52E+00 | 1.15E+00 |
| cd4\_3\_yrs\_2 | -2.36E-01 | -3.21E-02 | 2.36E-01 | 2.34E-01 | 6.01E-01 | 8.28E-02 | 1.94E-01 | -7.54E-01 | 7.16E-01 | -4.03E-01 | 1.03E+00 | -7.90E-01 | -4.16E-01 | 1.06E+00 | -8.24E-01 | -1.52E+00 | 4.82E+00 | -4.45E+00 |
| cd4\_3\_yrs\_3 | 1.09E-01 | 3.68E-02 | -1.53E-01 | -1.49E-01 | -4.68E-01 | -6.87E-02 | -1.11E-01 | 5.66E-01 | -6.39E-01 | 2.83E-01 | -7.90E-01 | 7.02E-01 | 2.93E-01 | -8.22E-01 | 7.29E-01 | 1.15E+00 | -4.45E+00 | 4.86E+00 |
| White IDU Women | intercept | 1.27E+00 | -1.94E-01 | -2.83E-01 | -3.08E-01 | -2.88E-01 | -1.31E-01 | 2.73E-01 | -2.88E-01 | 5.80E-02 | 7.09E-02 | -8.97E-02 | -3.90E-02 | 1.85E-01 | -4.40E-01 | 2.31E-01 | 8.01E-02 | 1.01E-02 | -2.02E-01 |
| age\_cat | -1.94E-01 | 4.87E-02 | 4.52E-03 | 9.37E-03 | -2.24E-02 | -3.20E-03 | 7.13E-03 | -1.38E-02 | 8.47E-04 | -7.97E-03 | 8.76E-03 | 7.36E-03 | -2.27E-02 | 5.85E-02 | -2.81E-02 | 3.35E-02 | -1.12E-01 | 1.08E-01 |
| cd4\_cat\_1 | -2.83E-01 | 4.52E-03 | 6.92E-01 | 3.34E-01 | 3.32E-01 | -4.29E-02 | 2.22E-01 | -3.43E-01 | 1.05E-01 | -2.31E-01 | 4.56E-01 | -2.14E-01 | -1.01E-01 | 1.74E-01 | -4.97E-02 | -1.03E-01 | 1.87E-01 | -6.44E-02 |
| cd4\_cat\_2 | -3.08E-01 | 9.37E-03 | 3.34E-01 | 7.28E-01 | 3.25E-01 | -3.80E-02 | 2.09E-01 | -3.27E-01 | 1.00E-01 | -1.06E-01 | 1.88E-01 | -5.66E-02 | -1.35E-01 | 1.32E-01 | 5.24E-02 | -9.95E-02 | 1.65E-01 | -3.57E-02 |
| cd4\_cat\_3 | -2.88E-01 | -2.24E-02 | 3.32E-01 | 3.25E-01 | 1.51E+00 | 2.73E-02 | 3.79E-02 | -9.66E-02 | 2.94E-02 | -1.00E-01 | 1.72E-01 | -4.43E-02 | -1.14E-01 | 2.10E-01 | -7.02E-02 | -6.57E-01 | 1.36E+00 | -8.04E-01 |
| yrs\_art | -1.31E-01 | -3.20E-03 | -4.29E-02 | -3.80E-02 | 2.73E-02 | 1.15E-01 | -3.21E-01 | 4.21E-01 | -1.02E-01 | 4.29E-02 | -8.73E-02 | 4.71E-02 | 3.19E-03 | 2.04E-02 | -4.22E-02 | -6.66E-02 | 1.50E-01 | -9.86E-02 |
| yrs\_art\_1 | 2.73E-01 | 7.13E-03 | 2.22E-01 | 2.09E-01 | 3.79E-02 | -3.21E-01 | 1.12E+00 | -1.69E+00 | 6.19E-01 | -3.37E-01 | 7.51E-01 | -4.63E-01 | -2.24E-01 | 4.42E-01 | -2.09E-01 | -4.58E-02 | 1.29E-01 | -8.62E-02 |
| yrs\_art\_2 | -2.88E-01 | -1.38E-02 | -3.43E-01 | -3.27E-01 | -9.66E-02 | 4.21E-01 | -1.69E+00 | 2.86E+00 | -1.36E+00 | 6.68E-01 | -1.63E+00 | 1.16E+00 | 5.19E-01 | -1.23E+00 | 8.27E-01 | 2.76E-01 | -7.94E-01 | 6.50E-01 |
| yrs\_art\_3 | 5.80E-02 | 8.47E-04 | 1.05E-01 | 1.00E-01 | 2.94E-02 | -1.02E-01 | 6.19E-01 | -1.36E+00 | 9.98E-01 | -3.74E-01 | 1.07E+00 | -9.56E-01 | -3.37E-01 | 9.72E-01 | -8.69E-01 | -2.59E-01 | 8.21E-01 | -7.98E-01 |
| cd4\_1\_yrs\_1 | 7.09E-02 | -7.97E-03 | -2.31E-01 | -1.06E-01 | -1.00E-01 | 4.29E-02 | -3.37E-01 | 6.68E-01 | -3.74E-01 | 4.89E-01 | -1.12E+00 | 7.09E-01 | 2.21E-01 | -5.12E-01 | 3.28E-01 | 2.13E-01 | -4.89E-01 | 3.09E-01 |
| cd4\_1\_yrs\_2 | -8.97E-02 | 8.76E-03 | 4.56E-01 | 1.88E-01 | 1.72E-01 | -8.73E-02 | 7.51E-01 | -1.63E+00 | 1.07E+00 | -1.12E+00 | 2.80E+00 | -1.99E+00 | -5.15E-01 | 1.32E+00 | -9.83E-01 | -4.94E-01 | 1.25E+00 | -9.27E-01 |
| cd4\_1\_yrs\_3 | -3.90E-02 | 7.36E-03 | -2.14E-01 | -5.66E-02 | -4.43E-02 | 4.71E-02 | -4.63E-01 | 1.16E+00 | -9.56E-01 | 7.09E-01 | -1.99E+00 | 1.71E+00 | 3.35E-01 | -9.96E-01 | 9.11E-01 | 3.16E-01 | -9.37E-01 | 8.59E-01 |
| cd4\_2\_yrs\_1 | 1.85E-01 | -2.27E-02 | -1.01E-01 | -1.35E-01 | -1.14E-01 | 3.19E-03 | -2.24E-01 | 5.19E-01 | -3.37E-01 | 2.21E-01 | -5.15E-01 | 3.35E-01 | 6.51E-01 | -1.71E+00 | 1.30E+00 | 2.26E-01 | -5.30E-01 | 3.48E-01 |
| cd4\_2\_yrs\_2 | -4.40E-01 | 5.85E-02 | 1.74E-01 | 1.32E-01 | 2.10E-01 | 2.04E-02 | 4.42E-01 | -1.23E+00 | 9.72E-01 | -5.12E-01 | 1.32E+00 | -9.96E-01 | -1.71E+00 | 5.03E+00 | -4.32E+00 | -5.26E-01 | 1.36E+00 | -1.03E+00 |
| cd4\_2\_yrs\_3 | 2.31E-01 | -2.81E-02 | -4.97E-02 | 5.24E-02 | -7.02E-02 | -4.22E-02 | -2.09E-01 | 8.27E-01 | -8.69E-01 | 3.28E-01 | -9.83E-01 | 9.11E-01 | 1.30E+00 | -4.32E+00 | 4.46E+00 | 3.38E-01 | -1.01E+00 | 9.27E-01 |
| cd4\_3\_yrs\_1 | 8.01E-02 | 3.35E-02 | -1.03E-01 | -9.95E-02 | -6.57E-01 | -6.66E-02 | -4.58E-02 | 2.76E-01 | -2.59E-01 | 2.13E-01 | -4.94E-01 | 3.16E-01 | 2.26E-01 | -5.26E-01 | 3.38E-01 | 1.41E+00 | -3.05E+00 | 1.77E+00 |
| cd4\_3\_yrs\_2 | 1.01E-02 | -1.12E-01 | 1.87E-01 | 1.65E-01 | 1.36E+00 | 1.50E-01 | 1.29E-01 | -7.94E-01 | 8.21E-01 | -4.89E-01 | 1.25E+00 | -9.37E-01 | -5.30E-01 | 1.36E+00 | -1.01E+00 | -3.05E+00 | 7.87E+00 | -6.14E+00 |
| cd4\_3\_yrs\_3 | -2.02E-01 | 1.08E-01 | -6.44E-02 | -3.57E-02 | -8.04E-01 | -9.86E-02 | -8.62E-02 | 6.50E-01 | -7.98E-01 | 3.09E-01 | -9.27E-01 | 8.59E-01 | 3.48E-01 | -1.03E+00 | 9.27E-01 | 1.77E+00 | -6.14E+00 | 6.76E+00 |
| Black/AA IDU Women | intercept | 2.03E+00 | -3.11E-01 | -3.53E-01 | -5.09E-01 | -4.65E-01 | -1.72E-01 | 4.38E-01 | -5.81E-01 | 2.07E-01 | 1.07E-02 | 9.80E-02 | -2.08E-01 | 2.43E-01 | -7.12E-01 | 6.38E-01 | 4.26E-02 | -9.57E-02 | 7.16E-02 |
| age\_cat | -3.11E-01 | 6.76E-02 | -1.31E-02 | 1.76E-02 | 2.14E-02 | 4.64E-03 | -3.54E-02 | 6.61E-02 | -4.18E-02 | 3.34E-02 | -9.58E-02 | 8.83E-02 | -1.81E-02 | 8.21E-02 | -9.70E-02 | 1.73E-02 | -3.23E-02 | 1.67E-02 |
| cd4\_cat\_1 | -3.53E-01 | -1.31E-02 | 7.63E-01 | 3.62E-01 | 3.60E-01 | 3.19E-02 | 3.13E-02 | -1.03E-01 | 6.52E-02 | -3.48E-01 | 6.97E-01 | -3.60E-01 | -1.16E-01 | 2.12E-01 | -9.19E-02 | -1.20E-01 | 2.24E-01 | -1.04E-01 |
| cd4\_cat\_2 | -5.09E-01 | 1.76E-02 | 3.62E-01 | 7.10E-01 | 3.69E-01 | 4.46E-02 | -1.01E-02 | -4.53E-02 | 4.54E-02 | -1.16E-01 | 2.14E-01 | -9.39E-02 | -1.45E-01 | 2.62E-01 | -1.23E-01 | -1.20E-01 | 2.29E-01 | -1.13E-01 |
| cd4\_cat\_3 | -4.65E-01 | 2.14E-02 | 3.60E-01 | 3.69E-01 | 7.73E-01 | 9.76E-03 | 8.12E-02 | -1.64E-01 | 7.56E-02 | -1.12E-01 | 2.03E-01 | -8.51E-02 | -1.20E-01 | 2.34E-01 | -1.18E-01 | -2.47E-01 | 5.07E-01 | -2.60E-01 |
| yrs\_art | -1.72E-01 | 4.64E-03 | 3.19E-02 | 4.46E-02 | 9.76E-03 | 9.32E-02 | -2.41E-01 | 3.05E-01 | -7.01E-02 | -2.51E-02 | 6.42E-02 | -4.87E-02 | -3.08E-02 | 9.01E-02 | -7.71E-02 | -3.12E-03 | 1.72E-02 | -3.13E-02 |
| yrs\_art\_1 | 4.38E-01 | -3.54E-02 | 3.13E-02 | -1.01E-02 | 8.12E-02 | -2.41E-01 | 8.88E-01 | -1.44E+00 | 6.61E-01 | -1.97E-01 | 4.89E-01 | -3.60E-01 | -1.72E-01 | 3.87E-01 | -2.49E-01 | -2.51E-01 | 6.00E-01 | -3.91E-01 |
| yrs\_art\_2 | -5.81E-01 | 6.61E-02 | -1.03E-01 | -4.53E-02 | -1.64E-01 | 3.05E-01 | -1.44E+00 | 2.76E+00 | -1.67E+00 | 5.61E-01 | -1.54E+00 | 1.28E+00 | 5.30E-01 | -1.42E+00 | 1.15E+00 | 6.31E-01 | -1.68E+00 | 1.32E+00 |
| yrs\_art\_3 | 2.07E-01 | -4.18E-02 | 6.52E-02 | 4.54E-02 | 7.56E-02 | -7.01E-02 | 6.61E-01 | -1.67E+00 | 1.41E+00 | -4.50E-01 | 1.38E+00 | -1.31E+00 | -4.42E-01 | 1.35E+00 | -1.28E+00 | -4.66E-01 | 1.41E+00 | -1.32E+00 |
| cd4\_1\_yrs\_1 | 1.07E-02 | 3.34E-02 | -3.48E-01 | -1.16E-01 | -1.12E-01 | -2.51E-02 | -1.97E-01 | 5.61E-01 | -4.50E-01 | 6.24E-01 | -1.50E+00 | 1.04E+00 | 2.58E-01 | -6.49E-01 | 4.79E-01 | 2.52E-01 | -6.28E-01 | 4.62E-01 |
| cd4\_1\_yrs\_2 | 9.80E-02 | -9.58E-02 | 6.97E-01 | 2.14E-01 | 2.03E-01 | 6.42E-02 | 4.89E-01 | -1.54E+00 | 1.38E+00 | -1.50E+00 | 3.92E+00 | -3.08E+00 | -6.43E-01 | 1.76E+00 | -1.45E+00 | -6.25E-01 | 1.70E+00 | -1.40E+00 |
| cd4\_1\_yrs\_3 | -2.08E-01 | 8.83E-02 | -3.60E-01 | -9.39E-02 | -8.51E-02 | -4.87E-02 | -3.60E-01 | 1.28E+00 | -1.31E+00 | 1.04E+00 | -3.08E+00 | 2.81E+00 | 4.72E-01 | -1.44E+00 | 1.36E+00 | 4.56E-01 | -1.39E+00 | 1.32E+00 |
| cd4\_2\_yrs\_1 | 2.43E-01 | -1.81E-02 | -1.16E-01 | -1.45E-01 | -1.20E-01 | -3.08E-02 | -1.72E-01 | 5.30E-01 | -4.42E-01 | 2.58E-01 | -6.43E-01 | 4.72E-01 | 6.91E-01 | -1.96E+00 | 1.65E+00 | 2.59E-01 | -6.51E-01 | 4.86E-01 |
| cd4\_2\_yrs\_2 | -7.12E-01 | 8.21E-02 | 2.12E-01 | 2.62E-01 | 2.34E-01 | 9.01E-02 | 3.87E-01 | -1.42E+00 | 1.35E+00 | -6.49E-01 | 1.76E+00 | -1.44E+00 | -1.96E+00 | 6.75E+00 | -6.72E+00 | -6.56E-01 | 1.80E+00 | -1.49E+00 |
| cd4\_2\_yrs\_3 | 6.38E-01 | -9.70E-02 | -9.19E-02 | -1.23E-01 | -1.18E-01 | -7.71E-02 | -2.49E-01 | 1.15E+00 | -1.28E+00 | 4.79E-01 | -1.45E+00 | 1.36E+00 | 1.65E+00 | -6.72E+00 | 7.53E+00 | 4.88E-01 | -1.49E+00 | 1.42E+00 |
| cd4\_3\_yrs\_1 | 4.26E-02 | 1.73E-02 | -1.20E-01 | -1.20E-01 | -2.47E-01 | -3.12E-03 | -2.51E-01 | 6.31E-01 | -4.66E-01 | 2.52E-01 | -6.25E-01 | 4.56E-01 | 2.59E-01 | -6.56E-01 | 4.88E-01 | 1.58E+00 | -4.12E+00 | 3.33E+00 |
| cd4\_3\_yrs\_2 | -9.57E-02 | -3.23E-02 | 2.24E-01 | 2.29E-01 | 5.07E-01 | 1.72E-02 | 6.00E-01 | -1.68E+00 | 1.41E+00 | -6.28E-01 | 1.70E+00 | -1.39E+00 | -6.51E-01 | 1.80E+00 | -1.49E+00 | -4.12E+00 | 1.15E+01 | -1.02E+01 |
| cd4\_3\_yrs\_3 | 7.16E-02 | 1.67E-02 | -1.04E-01 | -1.13E-01 | -2.60E-01 | -3.13E-02 | -3.91E-01 | 1.32E+00 | -1.32E+00 | 4.62E-01 | -1.40E+00 | 1.32E+00 | 4.86E-01 | -1.49E+00 | 1.42E+00 | 3.33E+00 | -1.02E+01 | 1.03E+01 |
| Hispanic IDU Women | intercept | 8.50E+00 | -1.28E+00 | -1.57E+00 | -1.82E+00 | -1.62E+00 | -7.11E-01 | 2.70E+00 | -3.72E+00 | 1.33E+00 | 1.44E-01 | -7.42E-01 | 3.85E-01 | 1.18E-01 | -1.85E+00 | 4.44E+00 | -7.10E-01 | 1.41E+00 | -1.24E+00 |
| age\_cat | -1.28E+00 | 2.61E-01 | 2.14E-02 | 6.29E-02 | 3.87E-02 | 3.09E-02 | -2.90E-01 | 4.29E-01 | -1.40E-01 | 4.54E-02 | 1.13E-02 | -6.78E-02 | 8.17E-02 | 6.47E-02 | -4.55E-01 | 2.09E-01 | -3.98E-01 | 2.50E-01 |
| cd4\_cat\_1 | -1.57E+00 | 2.14E-02 | 2.20E+00 | 1.60E+00 | 1.67E+00 | -9.69E-02 | 3.12E-01 | -3.06E-01 | -2.68E-01 | -5.43E-01 | 9.71E-01 | -1.07E-01 | -1.81E-02 | -1.94E-01 | 7.19E-01 | -7.16E-02 | -8.34E-04 | 3.42E-01 |
| cd4\_cat\_2 | -1.82E+00 | 6.29E-02 | 1.60E+00 | 3.83E+00 | 1.68E+00 | -5.97E-02 | 1.79E-01 | -1.18E-01 | -3.34E-01 | -6.48E-03 | -1.31E-01 | 4.13E-01 | -6.43E-01 | 3.09E+00 | -6.99E+00 | -4.78E-02 | -4.86E-02 | 3.76E-01 |
| cd4\_cat\_3 | -1.62E+00 | 3.87E-02 | 1.67E+00 | 1.68E+00 | 3.52E+00 | -1.49E-01 | 3.89E-01 | -4.18E-01 | -2.06E-01 | -3.62E-02 | -1.96E-02 | 3.20E-01 | 1.66E-02 | -1.52E-01 | 4.92E-01 | -1.11E+00 | 2.23E+00 | -1.16E+00 |
| yrs\_art | -7.11E-01 | 3.09E-02 | -9.69E-02 | -5.97E-02 | -1.49E-01 | 4.76E-01 | -1.22E+00 | 1.52E+00 | -3.49E-01 | -2.03E-01 | 4.98E-01 | -3.00E-01 | -2.89E-01 | 1.09E+00 | -1.97E+00 | -1.05E-01 | 2.45E-01 | -1.49E-01 |
| yrs\_art\_1 | 2.70E+00 | -2.90E-01 | 3.12E-01 | 1.79E-01 | 3.89E-01 | -1.22E+00 | 4.20E+00 | -6.57E+00 | 3.21E+00 | -4.24E-01 | 1.17E+00 | -1.46E+00 | -1.80E-01 | -5.41E-01 | 3.32E+00 | -7.47E-01 | 2.01E+00 | -2.00E+00 |
| yrs\_art\_2 | -3.72E+00 | 4.29E-01 | -3.06E-01 | -1.18E-01 | -4.18E-01 | 1.52E+00 | -6.57E+00 | 1.30E+01 | -9.90E+00 | 1.81E+00 | -6.21E+00 | 7.70E+00 | 1.47E+00 | -3.88E+00 | 1.29E+00 | 2.25E+00 | -7.35E+00 | 8.43E+00 |
| yrs\_art\_3 | 1.33E+00 | -1.40E-01 | -2.68E-01 | -3.34E-01 | -2.06E-01 | -3.49E-01 | 3.21E+00 | -9.90E+00 | 1.18E+01 | -2.06E+00 | 8.24E+00 | -1.13E+01 | -1.95E+00 | 7.50E+00 | -9.37E+00 | -2.21E+00 | 8.60E+00 | -1.15E+01 |
| cd4\_1\_yrs\_1 | 1.44E-01 | 4.54E-02 | -5.43E-01 | -6.48E-03 | -3.62E-02 | -2.03E-01 | -4.24E-01 | 1.81E+00 | -2.06E+00 | 2.67E+00 | -6.76E+00 | 5.17E+00 | 9.69E-01 | -2.58E+00 | 2.50E+00 | 9.83E-01 | -2.58E+00 | 2.33E+00 |
| cd4\_1\_yrs\_2 | -7.42E-01 | 1.13E-02 | 9.71E-01 | -1.31E-01 | -1.96E-02 | 4.98E-01 | 1.17E+00 | -6.21E+00 | 8.24E+00 | -6.76E+00 | 1.95E+01 | -1.75E+01 | -2.58E+00 | 8.31E+00 | -9.58E+00 | -2.58E+00 | 8.13E+00 | -8.87E+00 |
| cd4\_1\_yrs\_3 | 3.85E-01 | -6.78E-02 | -1.07E-01 | 4.13E-01 | 3.20E-01 | -3.00E-01 | -1.46E+00 | 7.70E+00 | -1.13E+01 | 5.17E+00 | -1.75E+01 | 1.90E+01 | 2.34E+00 | -9.05E+00 | 1.22E+01 | 2.33E+00 | -8.88E+00 | 1.17E+01 |
| cd4\_2\_yrs\_1 | 1.18E-01 | 8.17E-02 | -1.81E-02 | -6.43E-01 | 1.66E-02 | -2.89E-01 | -1.80E-01 | 1.47E+00 | -1.95E+00 | 9.69E-01 | -2.58E+00 | 2.34E+00 | 1.67E+00 | -5.35E+00 | 7.92E+00 | 9.43E-01 | -2.51E+00 | 2.29E+00 |
| cd4\_2\_yrs\_2 | -1.85E+00 | 6.47E-02 | -1.94E-01 | 3.09E+00 | -1.52E-01 | 1.09E+00 | -5.41E-01 | -3.88E+00 | 7.50E+00 | -2.58E+00 | 8.31E+00 | -9.05E+00 | -5.35E+00 | 2.39E+01 | -4.72E+01 | -2.44E+00 | 7.87E+00 | -8.70E+00 |
| cd4\_2\_yrs\_3 | 4.44E+00 | -4.55E-01 | 7.19E-01 | -6.99E+00 | 4.92E-01 | -1.97E+00 | 3.32E+00 | 1.29E+00 | -9.37E+00 | 2.50E+00 | -9.58E+00 | 1.22E+01 | 7.92E+00 | -4.72E+01 | 1.12E+02 | 2.20E+00 | -8.68E+00 | 1.15E+01 |
| cd4\_3\_yrs\_1 | -7.10E-01 | 2.09E-01 | -7.16E-02 | -4.78E-02 | -1.11E+00 | -1.05E-01 | -7.47E-01 | 2.25E+00 | -2.21E+00 | 9.83E-01 | -2.58E+00 | 2.33E+00 | 9.43E-01 | -2.44E+00 | 2.20E+00 | 2.94E+00 | -7.38E+00 | 5.67E+00 |
| cd4\_3\_yrs\_2 | 1.41E+00 | -3.98E-01 | -8.34E-04 | -4.86E-02 | 2.23E+00 | 2.45E-01 | 2.01E+00 | -7.35E+00 | 8.60E+00 | -2.58E+00 | 8.13E+00 | -8.88E+00 | -2.51E+00 | 7.87E+00 | -8.68E+00 | -7.38E+00 | 2.10E+01 | -1.90E+01 |
| cd4\_3\_yrs\_3 | -1.24E+00 | 2.50E-01 | 3.42E-01 | 3.76E-01 | -1.16E+00 | -1.49E-01 | -2.00E+00 | 8.43E+00 | -1.15E+01 | 2.33E+00 | -8.87E+00 | 1.17E+01 | 2.29E+00 | -8.70E+00 | 1.15E+01 | 5.67E+00 | -1.90E+01 | 2.10E+01 |
| White HET Men | intercept | 4.26E-01 | -6.58E-02 | -1.06E-01 | -1.43E-01 | -1.42E-01 | -1.93E-02 | 4.59E-02 | -3.77E-02 | -8.34E-03 | 1.00E-02 | -1.85E-02 | 4.24E-03 | 1.90E-02 | -4.00E-02 | 2.18E-02 | 1.69E-02 | -3.95E-02 | 2.72E-02 |
| age\_cat | -6.58E-02 | 1.62E-02 | -4.42E-04 | 6.45E-03 | 6.47E-03 | -2.87E-03 | 2.73E-03 | -3.32E-03 | -1.03E-03 | 2.92E-03 | -8.12E-03 | 8.98E-03 | 6.10E-04 | -2.67E-03 | 4.93E-03 | 3.09E-03 | -7.61E-03 | 7.52E-03 |
| cd4\_cat\_1 | -1.06E-01 | -4.42E-04 | 2.54E-01 | 1.12E-01 | 1.12E-01 | -2.50E-03 | 2.72E-02 | -5.30E-02 | 3.53E-02 | -7.68E-02 | 1.82E-01 | -1.35E-01 | -2.04E-02 | 4.37E-02 | -3.23E-02 | -1.94E-02 | 4.10E-02 | -2.98E-02 |
| cd4\_cat\_2 | -1.43E-01 | 6.45E-03 | 1.12E-01 | 2.61E-01 | 1.15E-01 | 1.90E-03 | 1.36E-02 | -3.52E-02 | 3.03E-02 | -1.96E-02 | 4.20E-02 | -3.09E-02 | -4.24E-02 | 9.86E-02 | -7.85E-02 | -2.04E-02 | 4.45E-02 | -3.36E-02 |
| cd4\_cat\_3 | -1.42E-01 | 6.47E-03 | 1.12E-01 | 1.15E-01 | 3.56E-01 | 1.62E-03 | 1.47E-02 | -3.70E-02 | 3.11E-02 | -1.96E-02 | 4.22E-02 | -3.10E-02 | -2.02E-02 | 4.35E-02 | -3.21E-02 | -6.59E-02 | 1.45E-01 | -1.20E-01 |
| yrs\_art | -1.93E-02 | -2.87E-03 | -2.50E-03 | 1.90E-03 | 1.62E-03 | 2.11E-02 | -5.23E-02 | 6.47E-02 | -1.39E-02 | -1.47E-03 | 6.22E-03 | -6.60E-03 | -8.34E-04 | 5.01E-03 | -6.70E-03 | -6.48E-03 | 1.86E-02 | -1.75E-02 |
| yrs\_art\_1 | 4.59E-02 | 2.73E-03 | 2.72E-02 | 1.36E-02 | 1.47E-02 | -5.23E-02 | 1.93E-01 | -3.08E-01 | 1.35E-01 | -6.03E-02 | 1.35E-01 | -8.64E-02 | -6.21E-02 | 1.38E-01 | -8.63E-02 | -4.73E-02 | 1.02E-01 | -5.72E-02 |
| yrs\_art\_2 | -3.77E-02 | -3.32E-03 | -5.30E-02 | -3.52E-02 | -3.70E-02 | 6.47E-02 | -3.08E-01 | 5.85E-01 | -3.53E-01 | 1.45E-01 | -3.72E-01 | 2.94E-01 | 1.48E-01 | -3.78E-01 | 2.95E-01 | 1.28E-01 | -3.30E-01 | 2.56E-01 |
| yrs\_art\_3 | -8.34E-03 | -1.03E-03 | 3.53E-02 | 3.03E-02 | 3.11E-02 | -1.39E-02 | 1.35E-01 | -3.53E-01 | 3.20E-01 | -1.00E-01 | 3.08E-01 | -3.08E-01 | -1.02E-01 | 3.12E-01 | -3.10E-01 | -9.61E-02 | 2.97E-01 | -2.97E-01 |
| cd4\_1\_yrs\_1 | 1.00E-02 | 2.92E-03 | -7.68E-02 | -1.96E-02 | -1.96E-02 | -1.47E-03 | -6.03E-02 | 1.45E-01 | -1.00E-01 | 2.00E-01 | -4.83E-01 | 3.41E-01 | 6.40E-02 | -1.51E-01 | 1.03E-01 | 6.36E-02 | -1.49E-01 | 1.01E-01 |
| cd4\_1\_yrs\_2 | -1.85E-02 | -8.12E-03 | 1.82E-01 | 4.20E-02 | 4.22E-02 | 6.22E-03 | 1.35E-01 | -3.72E-01 | 3.08E-01 | -4.83E-01 | 1.25E+00 | -9.78E-01 | -1.51E-01 | 3.95E-01 | -3.17E-01 | -1.50E-01 | 3.91E-01 | -3.13E-01 |
| cd4\_1\_yrs\_3 | 4.24E-03 | 8.98E-03 | -1.35E-01 | -3.09E-02 | -3.10E-02 | -6.60E-03 | -8.64E-02 | 2.94E-01 | -3.08E-01 | 3.41E-01 | -9.78E-01 | 8.85E-01 | 1.03E-01 | -3.18E-01 | 3.17E-01 | 1.02E-01 | -3.14E-01 | 3.13E-01 |
| cd4\_2\_yrs\_1 | 1.90E-02 | 6.10E-04 | -2.04E-02 | -4.24E-02 | -2.02E-02 | -8.34E-04 | -6.21E-02 | 1.48E-01 | -1.02E-01 | 6.40E-02 | -1.51E-01 | 1.03E-01 | 1.66E-01 | -3.98E-01 | 2.82E-01 | 6.44E-02 | -1.52E-01 | 1.04E-01 |
| cd4\_2\_yrs\_2 | -4.00E-02 | -2.67E-03 | 4.37E-02 | 9.86E-02 | 4.35E-02 | 5.01E-03 | 1.38E-01 | -3.78E-01 | 3.12E-01 | -1.51E-01 | 3.95E-01 | -3.18E-01 | -3.98E-01 | 1.09E+00 | -9.20E-01 | -1.52E-01 | 3.99E-01 | -3.21E-01 |
| cd4\_2\_yrs\_3 | 2.18E-02 | 4.93E-03 | -3.23E-02 | -7.85E-02 | -3.21E-02 | -6.70E-03 | -8.63E-02 | 2.95E-01 | -3.10E-01 | 1.03E-01 | -3.17E-01 | 3.17E-01 | 2.82E-01 | -9.20E-01 | 9.57E-01 | 1.04E-01 | -3.20E-01 | 3.19E-01 |
| cd4\_3\_yrs\_1 | 1.69E-02 | 3.09E-03 | -1.94E-02 | -2.04E-02 | -6.59E-02 | -6.48E-03 | -4.73E-02 | 1.28E-01 | -9.61E-02 | 6.36E-02 | -1.50E-01 | 1.02E-01 | 6.44E-02 | -1.52E-01 | 1.04E-01 | 2.57E-01 | -6.78E-01 | 5.61E-01 |
| cd4\_3\_yrs\_2 | -3.95E-02 | -7.61E-03 | 4.10E-02 | 4.45E-02 | 1.45E-01 | 1.86E-02 | 1.02E-01 | -3.30E-01 | 2.97E-01 | -1.49E-01 | 3.91E-01 | -3.14E-01 | -1.52E-01 | 3.99E-01 | -3.20E-01 | -6.78E-01 | 2.00E+00 | -1.91E+00 |
| cd4\_3\_yrs\_3 | 2.72E-02 | 7.52E-03 | -2.98E-02 | -3.36E-02 | -1.20E-01 | -1.75E-02 | -5.72E-02 | 2.56E-01 | -2.97E-01 | 1.01E-01 | -3.13E-01 | 3.13E-01 | 1.04E-01 | -3.21E-01 | 3.19E-01 | 5.61E-01 | -1.91E+00 | 2.14E+00 |
| Black/AA HET Men | intercept | 1.50E-01 | -2.44E-02 | -3.64E-02 | -3.48E-02 | -3.84E-02 | -1.12E-02 | 2.97E-02 | -3.48E-02 | 6.03E-03 | 1.00E-02 | -1.85E-02 | 8.59E-03 | 6.79E-03 | -7.56E-03 | -5.81E-03 | 1.06E-02 | -2.58E-02 | 2.03E-02 |
| age\_cat | -2.44E-02 | 6.22E-03 | 6.95E-04 | -1.25E-04 | 2.98E-04 | -8.11E-04 | -3.27E-05 | 3.24E-04 | -3.70E-04 | -1.59E-04 | 2.74E-04 | -4.21E-05 | 1.62E-03 | -5.67E-03 | 7.65E-03 | 8.96E-04 | -1.15E-03 | 3.49E-05 |
| cd4\_cat\_1 | -3.64E-02 | 6.95E-04 | 7.44E-02 | 3.34E-02 | 3.34E-02 | 1.75E-04 | 7.86E-03 | -1.62E-02 | 9.83E-03 | -2.03E-02 | 4.28E-02 | -2.60E-02 | -8.56E-03 | 1.72E-02 | -1.02E-02 | -8.59E-03 | 1.73E-02 | -1.03E-02 |
| cd4\_cat\_2 | -3.48E-02 | -1.25E-04 | 3.34E-02 | 8.83E-02 | 3.36E-02 | 1.25E-03 | 5.15E-03 | -1.25E-02 | 8.69E-03 | -8.58E-03 | 1.72E-02 | -1.01E-02 | -1.84E-02 | 4.14E-02 | -3.63E-02 | -8.83E-03 | 1.78E-02 | -1.06E-02 |
| cd4\_cat\_3 | -3.84E-02 | 2.98E-04 | 3.34E-02 | 3.36E-02 | 1.31E-01 | 2.54E-03 | 1.55E-03 | -7.67E-03 | 7.24E-03 | -8.64E-03 | 1.72E-02 | -1.01E-02 | -9.15E-03 | 1.89E-02 | -1.21E-02 | -3.28E-02 | 6.84E-02 | -4.72E-02 |
| yrs\_art | -1.12E-02 | -8.11E-04 | 1.75E-04 | 1.25E-03 | 2.54E-03 | 9.95E-03 | -2.62E-02 | 3.48E-02 | -1.02E-02 | -5.79E-04 | 2.87E-04 | 9.68E-04 | -3.11E-03 | 8.68E-03 | -9.64E-03 | -3.73E-03 | 8.80E-03 | -6.77E-03 |
| yrs\_art\_1 | 2.97E-02 | -3.27E-05 | 7.86E-03 | 5.15E-03 | 1.55E-03 | -2.62E-02 | 9.50E-02 | -1.57E-01 | 7.59E-02 | -2.39E-02 | 6.41E-02 | -5.19E-02 | -1.75E-02 | 4.27E-02 | -2.48E-02 | -1.56E-02 | 4.12E-02 | -3.06E-02 |
| yrs\_art\_2 | -3.48E-02 | 3.24E-04 | -1.62E-02 | -1.25E-02 | -7.67E-03 | 3.48E-02 | -1.57E-01 | 3.04E-01 | -1.92E-01 | 6.27E-02 | -1.81E-01 | 1.60E-01 | 5.40E-02 | -1.52E-01 | 1.23E-01 | 5.14E-02 | -1.50E-01 | 1.31E-01 |
| yrs\_art\_3 | 6.03E-03 | -3.70E-04 | 9.83E-03 | 8.69E-03 | 7.24E-03 | -1.02E-02 | 7.59E-02 | -1.92E-01 | 1.73E-01 | -4.84E-02 | 1.56E-01 | -1.65E-01 | -4.57E-02 | 1.47E-01 | -1.53E-01 | -4.49E-02 | 1.46E-01 | -1.55E-01 |
| cd4\_1\_yrs\_1 | 1.00E-02 | -1.59E-04 | -2.03E-02 | -8.58E-03 | -8.64E-03 | -5.79E-04 | -2.39E-02 | 6.27E-02 | -4.84E-02 | 6.32E-02 | -1.55E-01 | 1.12E-01 | 2.57E-02 | -6.53E-02 | 4.96E-02 | 2.57E-02 | -6.53E-02 | 4.94E-02 |
| cd4\_1\_yrs\_2 | -1.85E-02 | 2.74E-04 | 4.28E-02 | 1.72E-02 | 1.72E-02 | 2.87E-04 | 6.41E-02 | -1.81E-01 | 1.56E-01 | -1.55E-01 | 4.30E-01 | -3.67E-01 | -6.51E-02 | 1.82E-01 | -1.57E-01 | -6.52E-02 | 1.82E-01 | -1.57E-01 |
| cd4\_1\_yrs\_3 | 8.59E-03 | -4.21E-05 | -2.60E-02 | -1.01E-02 | -1.01E-02 | 9.68E-04 | -5.19E-02 | 1.60E-01 | -1.65E-01 | 1.12E-01 | -3.67E-01 | 3.94E-01 | 4.92E-02 | -1.57E-01 | 1.64E-01 | 4.92E-02 | -1.56E-01 | 1.63E-01 |
| cd4\_2\_yrs\_1 | 6.79E-03 | 1.62E-03 | -8.56E-03 | -1.84E-02 | -9.15E-03 | -3.11E-03 | -1.75E-02 | 5.40E-02 | -4.57E-02 | 2.57E-02 | -6.51E-02 | 4.92E-02 | 6.91E-02 | -1.92E-01 | 1.76E-01 | 2.63E-02 | -6.66E-02 | 5.04E-02 |
| cd4\_2\_yrs\_2 | -7.56E-03 | -5.67E-03 | 1.72E-02 | 4.14E-02 | 1.89E-02 | 8.68E-03 | 4.27E-02 | -1.52E-01 | 1.47E-01 | -6.53E-02 | 1.82E-01 | -1.57E-01 | -1.92E-01 | 6.63E-01 | -7.54E-01 | -6.69E-02 | 1.87E-01 | -1.60E-01 |
| cd4\_2\_yrs\_3 | -5.81E-03 | 7.65E-03 | -1.02E-02 | -3.63E-02 | -1.21E-02 | -9.64E-03 | -2.48E-02 | 1.23E-01 | -1.53E-01 | 4.96E-02 | -1.57E-01 | 1.64E-01 | 1.76E-01 | -7.54E-01 | 1.05E+00 | 5.12E-02 | -1.61E-01 | 1.67E-01 |
| cd4\_3\_yrs\_1 | 1.06E-02 | 8.96E-04 | -8.59E-03 | -8.83E-03 | -3.28E-02 | -3.73E-03 | -1.56E-02 | 5.14E-02 | -4.49E-02 | 2.57E-02 | -6.52E-02 | 4.92E-02 | 2.63E-02 | -6.69E-02 | 5.12E-02 | 1.42E-01 | -3.67E-01 | 2.91E-01 |
| cd4\_3\_yrs\_2 | -2.58E-02 | -1.15E-03 | 1.73E-02 | 1.78E-02 | 6.84E-02 | 8.80E-03 | 4.12E-02 | -1.50E-01 | 1.46E-01 | -6.53E-02 | 1.82E-01 | -1.56E-01 | -6.66E-02 | 1.87E-01 | -1.61E-01 | -3.67E-01 | 1.11E+00 | -1.07E+00 |
| cd4\_3\_yrs\_3 | 2.03E-02 | 3.49E-05 | -1.03E-02 | -1.06E-02 | -4.72E-02 | -6.77E-03 | -3.06E-02 | 1.31E-01 | -1.55E-01 | 4.94E-02 | -1.57E-01 | 1.63E-01 | 5.04E-02 | -1.60E-01 | 1.67E-01 | 2.91E-01 | -1.07E+00 | 1.32E+00 |
| Hispanic HET Men | intercept | 3.37E-01 | -5.54E-02 | -6.06E-02 | -6.09E-02 | -6.20E-02 | -3.49E-02 | 8.55E-02 | -9.65E-02 | 1.36E-02 | 3.38E-02 | -8.14E-02 | 5.62E-02 | 5.14E-02 | -1.09E-01 | 6.36E-02 | 5.11E-02 | -1.26E-01 | 1.15E-01 |
| age\_cat | -5.54E-02 | 1.38E-02 | -2.50E-03 | -3.25E-03 | -2.33E-03 | 2.39E-04 | -3.46E-03 | 3.34E-03 | 7.80E-04 | -3.15E-04 | 3.59E-03 | -5.29E-03 | -4.43E-03 | 9.20E-03 | -5.31E-03 | -6.27E-03 | 1.80E-02 | -1.98E-02 |
| cd4\_cat\_1 | -6.06E-02 | -2.50E-03 | 1.83E-01 | 7.06E-02 | 7.05E-02 | 2.76E-04 | 2.17E-02 | -3.87E-02 | 1.35E-02 | -4.97E-02 | 9.98E-02 | -6.10E-02 | -2.15E-02 | 3.85E-02 | -1.36E-02 | -2.11E-02 | 3.66E-02 | -1.10E-02 |
| cd4\_cat\_2 | -6.09E-02 | -3.25E-03 | 7.06E-02 | 2.32E-01 | 7.07E-02 | 2.77E-03 | 1.49E-02 | -2.95E-02 | 1.06E-02 | -2.24E-02 | 3.96E-02 | -1.35E-02 | -8.61E-02 | 1.76E-01 | -9.23E-02 | -2.08E-02 | 3.61E-02 | -1.05E-02 |
| cd4\_cat\_3 | -6.20E-02 | -2.33E-03 | 7.05E-02 | 7.07E-02 | 4.44E-01 | 1.50E-03 | 1.83E-02 | -3.42E-02 | 1.23E-02 | -2.27E-02 | 4.05E-02 | -1.41E-02 | -2.15E-02 | 3.87E-02 | -1.39E-02 | -6.82E-02 | 1.32E-01 | -3.77E-02 |
| yrs\_art | -3.49E-02 | 2.39E-04 | 2.76E-04 | 2.77E-03 | 1.50E-03 | 2.46E-02 | -6.79E-02 | 8.91E-02 | -2.27E-02 | -6.77E-03 | 1.82E-02 | -1.42E-02 | -8.44E-03 | 2.35E-02 | -2.02E-02 | -3.67E-03 | 1.27E-02 | -1.73E-02 |
| yrs\_art\_1 | 8.55E-02 | -3.46E-03 | 2.17E-02 | 1.49E-02 | 1.83E-02 | -6.79E-02 | 2.38E-01 | -3.65E-01 | 1.44E-01 | -3.13E-02 | 6.81E-02 | -4.17E-02 | -2.58E-02 | 5.22E-02 | -2.51E-02 | -3.87E-02 | 8.05E-02 | -3.03E-02 |
| yrs\_art\_2 | -9.65E-02 | 3.34E-03 | -3.87E-02 | -2.95E-02 | -3.42E-02 | 8.91E-02 | -3.65E-01 | 6.45E-01 | -3.46E-01 | 9.36E-02 | -2.53E-01 | 2.10E-01 | 8.67E-02 | -2.33E-01 | 1.88E-01 | 1.05E-01 | -2.73E-01 | 1.97E-01 |
| yrs\_art\_3 | 1.36E-02 | 7.80E-04 | 1.35E-02 | 1.06E-02 | 1.23E-02 | -2.27E-02 | 1.44E-01 | -3.46E-01 | 2.86E-01 | -7.42E-02 | 2.44E-01 | -2.51E-01 | -7.26E-02 | 2.38E-01 | -2.44E-01 | -7.92E-02 | 2.54E-01 | -2.50E-01 |
| cd4\_1\_yrs\_1 | 3.38E-02 | -3.15E-04 | -4.97E-02 | -2.24E-02 | -2.27E-02 | -6.77E-03 | -3.13E-02 | 9.36E-02 | -7.42E-02 | 1.58E-01 | -3.81E-01 | 2.62E-01 | 5.10E-02 | -1.22E-01 | 8.42E-02 | 5.17E-02 | -1.23E-01 | 8.60E-02 |
| cd4\_1\_yrs\_2 | -8.14E-02 | 3.59E-03 | 9.98E-02 | 3.96E-02 | 4.05E-02 | 1.82E-02 | 6.81E-02 | -2.53E-01 | 2.44E-01 | -3.81E-01 | 1.03E+00 | -8.30E-01 | -1.22E-01 | 3.30E-01 | -2.71E-01 | -1.24E-01 | 3.36E-01 | -2.78E-01 |
| cd4\_1\_yrs\_3 | 5.62E-02 | -5.29E-03 | -6.10E-02 | -1.35E-02 | -1.41E-02 | -1.42E-02 | -4.17E-02 | 2.10E-01 | -2.51E-01 | 2.62E-01 | -8.30E-01 | 8.85E-01 | 8.50E-02 | -2.72E-01 | 2.73E-01 | 8.67E-02 | -2.78E-01 | 2.80E-01 |
| cd4\_2\_yrs\_1 | 5.14E-02 | -4.43E-03 | -2.15E-02 | -8.61E-02 | -2.15E-02 | -8.44E-03 | -2.58E-02 | 8.67E-02 | -7.26E-02 | 5.10E-02 | -1.22E-01 | 8.50E-02 | 2.58E-01 | -6.33E-01 | 4.56E-01 | 5.28E-02 | -1.27E-01 | 9.06E-02 |
| cd4\_2\_yrs\_2 | -1.09E-01 | 9.20E-03 | 3.85E-02 | 1.76E-01 | 3.87E-02 | 2.35E-02 | 5.22E-02 | -2.33E-01 | 2.38E-01 | -1.22E-01 | 3.30E-01 | -2.72E-01 | -6.33E-01 | 1.76E+00 | -1.50E+00 | -1.26E-01 | 3.41E-01 | -2.85E-01 |
| cd4\_2\_yrs\_3 | 6.36E-02 | -5.31E-03 | -1.36E-02 | -9.23E-02 | -1.39E-02 | -2.02E-02 | -2.51E-02 | 1.88E-01 | -2.44E-01 | 8.42E-02 | -2.71E-01 | 2.73E-01 | 4.56E-01 | -1.50E+00 | 1.54E+00 | 8.66E-02 | -2.78E-01 | 2.81E-01 |
| cd4\_3\_yrs\_1 | 5.11E-02 | -6.27E-03 | -2.11E-02 | -2.08E-02 | -6.82E-02 | -3.67E-03 | -3.87E-02 | 1.05E-01 | -7.92E-02 | 5.17E-02 | -1.24E-01 | 8.67E-02 | 5.28E-02 | -1.26E-01 | 8.66E-02 | 2.70E-01 | -6.80E-01 | 6.04E-01 |
| cd4\_3\_yrs\_2 | -1.26E-01 | 1.80E-02 | 3.66E-02 | 3.61E-02 | 1.32E-01 | 1.27E-02 | 8.05E-02 | -2.73E-01 | 2.54E-01 | -1.23E-01 | 3.36E-01 | -2.78E-01 | -1.27E-01 | 3.41E-01 | -2.78E-01 | -6.80E-01 | 1.99E+00 | -2.19E+00 |
| cd4\_3\_yrs\_3 | 1.15E-01 | -1.98E-02 | -1.10E-02 | -1.05E-02 | -3.77E-02 | -1.73E-02 | -3.03E-02 | 1.97E-01 | -2.50E-01 | 8.60E-02 | -2.78E-01 | 2.80E-01 | 9.06E-02 | -2.85E-01 | 2.81E-01 | 6.04E-01 | -2.19E+00 | 3.24E+00 |
| White HET Women | intercept | 5.76E-01 | -7.93E-02 | -1.87E-01 | -2.09E-01 | -2.49E-01 | -4.51E-02 | 7.51E-02 | -4.34E-02 | -5.13E-02 | 7.55E-02 | -1.61E-01 | 1.14E-01 | 7.81E-02 | -1.97E-01 | 1.77E-01 | 9.46E-02 | -2.40E-01 | 2.05E-01 |
| age\_cat | -7.93E-02 | 2.04E-02 | -2.55E-03 | 1.18E-03 | 1.18E-02 | -1.18E-03 | -3.46E-03 | 5.27E-03 | 1.01E-03 | 7.98E-04 | -2.13E-03 | -1.49E-03 | 6.91E-04 | 2.12E-03 | -1.00E-02 | -7.98E-04 | 9.30E-03 | -1.88E-02 |
| cd4\_cat\_1 | -1.87E-01 | -2.55E-03 | 3.39E-01 | 1.89E-01 | 1.90E-01 | 3.61E-03 | 4.93E-02 | -1.12E-01 | 7.72E-02 | -1.18E-01 | 2.50E-01 | -1.48E-01 | -5.89E-02 | 1.26E-01 | -8.13E-02 | -5.82E-02 | 1.24E-01 | -8.09E-02 |
| cd4\_cat\_2 | -2.09E-01 | 1.18E-03 | 1.89E-01 | 3.73E-01 | 1.94E-01 | 8.71E-03 | 3.47E-02 | -9.32E-02 | 7.26E-02 | -5.88E-02 | 1.25E-01 | -8.14E-02 | -1.03E-01 | 1.99E-01 | -1.20E-01 | -6.02E-02 | 1.31E-01 | -8.86E-02 |
| cd4\_cat\_3 | -2.49E-01 | 1.18E-02 | 1.90E-01 | 1.94E-01 | 4.18E-01 | 6.66E-03 | 3.87E-02 | -9.94E-02 | 7.51E-02 | -6.04E-02 | 1.29E-01 | -8.41E-02 | -6.12E-02 | 1.33E-01 | -8.98E-02 | -9.91E-02 | 2.16E-01 | -1.46E-01 |
| yrs\_art | -4.51E-02 | -1.18E-03 | 3.61E-03 | 8.71E-03 | 6.66E-03 | 3.25E-02 | -7.93E-02 | 9.82E-02 | -2.30E-02 | -1.21E-02 | 2.72E-02 | -1.69E-02 | -1.36E-02 | 3.93E-02 | -3.54E-02 | -2.04E-02 | 4.89E-02 | -3.11E-02 |
| yrs\_art\_1 | 7.51E-02 | -3.46E-03 | 4.93E-02 | 3.47E-02 | 3.87E-02 | -7.93E-02 | 3.73E-01 | -6.59E-01 | 3.36E-01 | -1.47E-01 | 3.48E-01 | -2.37E-01 | -1.44E-01 | 3.17E-01 | -1.87E-01 | -1.25E-01 | 2.88E-01 | -1.96E-01 |
| yrs\_art\_2 | -4.34E-02 | 5.27E-03 | -1.12E-01 | -9.32E-02 | -9.94E-02 | 9.82E-02 | -6.59E-01 | 1.33E+00 | -8.30E-01 | 3.77E-01 | -9.44E-01 | 7.04E-01 | 3.75E-01 | -9.06E-01 | 6.40E-01 | 3.49E-01 | -8.67E-01 | 6.52E-01 |
| yrs\_art\_3 | -5.13E-02 | 1.01E-03 | 7.72E-02 | 7.26E-02 | 7.51E-02 | -2.30E-02 | 3.36E-01 | -8.30E-01 | 6.66E-01 | -2.71E-01 | 7.38E-01 | -6.36E-01 | -2.71E-01 | 7.29E-01 | -6.18E-01 | -2.63E-01 | 7.19E-01 | -6.23E-01 |
| cd4\_1\_yrs\_1 | 7.55E-02 | 7.98E-04 | -1.18E-01 | -5.88E-02 | -6.04E-02 | -1.21E-02 | -1.47E-01 | 3.77E-01 | -2.71E-01 | 3.21E-01 | -7.43E-01 | 4.93E-01 | 1.81E-01 | -4.25E-01 | 2.87E-01 | 1.81E-01 | -4.25E-01 | 2.87E-01 |
| cd4\_1\_yrs\_2 | -1.61E-01 | -2.13E-03 | 2.50E-01 | 1.25E-01 | 1.29E-01 | 2.72E-02 | 3.48E-01 | -9.44E-01 | 7.38E-01 | -7.43E-01 | 1.85E+00 | -1.38E+00 | -4.25E-01 | 1.05E+00 | -7.75E-01 | -4.24E-01 | 1.05E+00 | -7.75E-01 |
| cd4\_1\_yrs\_3 | 1.14E-01 | -1.49E-03 | -1.48E-01 | -8.14E-02 | -8.41E-02 | -1.69E-02 | -2.37E-01 | 7.04E-01 | -6.36E-01 | 4.93E-01 | -1.38E+00 | 1.24E+00 | 2.85E-01 | -7.72E-01 | 6.59E-01 | 2.85E-01 | -7.73E-01 | 6.60E-01 |
| cd4\_2\_yrs\_1 | 7.81E-02 | 6.91E-04 | -5.89E-02 | -1.03E-01 | -6.12E-02 | -1.36E-02 | -1.44E-01 | 3.75E-01 | -2.71E-01 | 1.81E-01 | -4.25E-01 | 2.85E-01 | 3.47E-01 | -9.03E-01 | 7.09E-01 | 1.84E-01 | -4.31E-01 | 2.91E-01 |
| cd4\_2\_yrs\_2 | -1.97E-01 | 2.12E-03 | 1.26E-01 | 1.99E-01 | 1.33E-01 | 3.93E-02 | 3.17E-01 | -9.06E-01 | 7.29E-01 | -4.25E-01 | 1.05E+00 | -7.72E-01 | -9.03E-01 | 2.62E+00 | -2.33E+00 | -4.33E-01 | 1.07E+00 | -7.88E-01 |
| cd4\_2\_yrs\_3 | 1.77E-01 | -1.00E-02 | -8.13E-02 | -1.20E-01 | -8.98E-02 | -3.54E-02 | -1.87E-01 | 6.40E-01 | -6.18E-01 | 2.87E-01 | -7.75E-01 | 6.59E-01 | 7.09E-01 | -2.33E+00 | 2.45E+00 | 2.94E-01 | -7.94E-01 | 6.74E-01 |
| cd4\_3\_yrs\_1 | 9.46E-02 | -7.98E-04 | -5.82E-02 | -6.02E-02 | -9.91E-02 | -2.04E-02 | -1.25E-01 | 3.49E-01 | -2.63E-01 | 1.81E-01 | -4.24E-01 | 2.85E-01 | 1.84E-01 | -4.33E-01 | 2.94E-01 | 3.91E-01 | -9.70E-01 | 6.96E-01 |
| cd4\_3\_yrs\_2 | -2.40E-01 | 9.30E-03 | 1.24E-01 | 1.31E-01 | 2.16E-01 | 4.89E-02 | 2.88E-01 | -8.67E-01 | 7.19E-01 | -4.25E-01 | 1.05E+00 | -7.73E-01 | -4.31E-01 | 1.07E+00 | -7.94E-01 | -9.70E-01 | 2.68E+00 | -2.20E+00 |
| cd4\_3\_yrs\_3 | 2.05E-01 | -1.88E-02 | -8.09E-02 | -8.86E-02 | -1.46E-01 | -3.11E-02 | -1.96E-01 | 6.52E-01 | -6.23E-01 | 2.87E-01 | -7.75E-01 | 6.60E-01 | 2.91E-01 | -7.88E-01 | 6.74E-01 | 6.96E-01 | -2.20E+00 | 2.14E+00 |
| Black/AA HET Women | intercept | 1.42E-01 | -2.28E-02 | -4.48E-02 | -4.33E-02 | -4.91E-02 | -7.90E-03 | 1.19E-02 | -8.07E-03 | -4.30E-03 | 1.63E-02 | -2.96E-02 | 1.34E-02 | 1.49E-02 | -2.84E-02 | 1.63E-02 | 2.13E-02 | -3.71E-02 | 1.02E-02 |
| age\_cat | -2.28E-02 | 5.93E-03 | 1.23E-03 | 9.98E-04 | 1.70E-03 | -7.90E-04 | 4.82E-04 | -4.30E-04 | 4.17E-04 | -5.96E-05 | -1.83E-04 | 4.37E-04 | 7.59E-04 | -1.54E-03 | 3.47E-04 | -2.05E-04 | -2.13E-04 | 1.93E-03 |
| cd4\_cat\_1 | -4.48E-02 | 1.23E-03 | 7.55E-02 | 4.10E-02 | 4.10E-02 | -5.37E-04 | 1.64E-02 | -2.96E-02 | 1.34E-02 | -2.31E-02 | 4.24E-02 | -1.98E-02 | -1.52E-02 | 2.79E-02 | -1.28E-02 | -1.51E-02 | 2.77E-02 | -1.25E-02 |
| cd4\_cat\_2 | -4.33E-02 | 9.98E-04 | 4.10E-02 | 8.26E-02 | 4.10E-02 | -8.03E-04 | 1.73E-02 | -3.09E-02 | 1.39E-02 | -1.53E-02 | 2.82E-02 | -1.30E-02 | -2.21E-02 | 3.78E-02 | -1.48E-02 | -1.53E-02 | 2.78E-02 | -1.24E-02 |
| cd4\_cat\_3 | -4.91E-02 | 1.70E-03 | 4.10E-02 | 4.10E-02 | 9.47E-02 | 1.11E-03 | 1.19E-02 | -2.36E-02 | 1.17E-02 | -1.54E-02 | 2.83E-02 | -1.31E-02 | -1.54E-02 | 2.85E-02 | -1.34E-02 | -2.44E-02 | 2.92E-02 | 5.02E-03 |
| yrs\_art | -7.90E-03 | -7.90E-04 | -5.37E-04 | -8.03E-04 | 1.11E-03 | 8.26E-03 | -2.18E-02 | 2.87E-02 | -7.92E-03 | -5.14E-04 | 1.40E-03 | -1.42E-03 | -1.71E-03 | 4.26E-03 | -3.27E-03 | -3.60E-03 | 7.03E-03 | -3.72E-03 |
| yrs\_art\_1 | 1.19E-02 | 4.82E-04 | 1.64E-02 | 1.73E-02 | 1.19E-02 | -2.18E-02 | 9.71E-02 | -1.69E-01 | 8.47E-02 | -3.75E-02 | 8.90E-02 | -6.00E-02 | -3.45E-02 | 8.16E-02 | -5.50E-02 | -2.91E-02 | 7.38E-02 | -5.44E-02 |
| yrs\_art\_2 | -8.07E-03 | -4.30E-04 | -2.96E-02 | -3.09E-02 | -2.36E-02 | 2.87E-02 | -1.69E-01 | 3.49E-01 | -2.29E-01 | 9.08E-02 | -2.43E-01 | 1.97E-01 | 8.69E-02 | -2.34E-01 | 1.90E-01 | 7.96E-02 | -2.23E-01 | 1.90E-01 |
| yrs\_art\_3 | -4.30E-03 | 4.17E-04 | 1.34E-02 | 1.39E-02 | 1.17E-02 | -7.92E-03 | 8.47E-02 | -2.29E-01 | 2.12E-01 | -6.32E-02 | 2.00E-01 | -2.04E-01 | -6.21E-02 | 1.98E-01 | -2.02E-01 | -5.99E-02 | 1.95E-01 | -2.02E-01 |
| cd4\_1\_yrs\_1 | 1.63E-02 | -5.96E-05 | -2.31E-02 | -1.53E-02 | -1.54E-02 | -5.14E-04 | -3.75E-02 | 9.08E-02 | -6.32E-02 | 6.61E-02 | -1.61E-01 | 1.16E-01 | 3.90E-02 | -9.29E-02 | 6.39E-02 | 3.90E-02 | -9.30E-02 | 6.40E-02 |
| cd4\_1\_yrs\_2 | -2.96E-02 | -1.83E-04 | 4.24E-02 | 2.82E-02 | 2.83E-02 | 1.40E-03 | 8.90E-02 | -2.43E-01 | 2.00E-01 | -1.61E-01 | 4.47E-01 | -3.83E-01 | -9.30E-02 | 2.49E-01 | -2.02E-01 | -9.31E-02 | 2.49E-01 | -2.03E-01 |
| cd4\_1\_yrs\_3 | 1.34E-02 | 4.37E-04 | -1.98E-02 | -1.30E-02 | -1.31E-02 | -1.42E-03 | -6.00E-02 | 1.97E-01 | -2.04E-01 | 1.16E-01 | -3.83E-01 | 4.09E-01 | 6.40E-02 | -2.03E-01 | 2.06E-01 | 6.42E-02 | -2.03E-01 | 2.06E-01 |
| cd4\_2\_yrs\_1 | 1.49E-02 | 7.59E-04 | -1.52E-02 | -2.21E-02 | -1.54E-02 | -1.71E-03 | -3.45E-02 | 8.69E-02 | -6.21E-02 | 3.90E-02 | -9.30E-02 | 6.40E-02 | 7.80E-02 | -1.91E-01 | 1.38E-01 | 3.95E-02 | -9.40E-02 | 6.47E-02 |
| cd4\_2\_yrs\_2 | -2.84E-02 | -1.54E-03 | 2.79E-02 | 3.78E-02 | 2.85E-02 | 4.26E-03 | 8.16E-02 | -2.34E-01 | 1.98E-01 | -9.29E-02 | 2.49E-01 | -2.03E-01 | -1.91E-01 | 5.46E-01 | -4.86E-01 | -9.42E-02 | 2.52E-01 | -2.04E-01 |
| cd4\_2\_yrs\_3 | 1.63E-02 | 3.47E-04 | -1.28E-02 | -1.48E-02 | -1.34E-02 | -3.27E-03 | -5.50E-02 | 1.90E-01 | -2.02E-01 | 6.39E-02 | -2.02E-01 | 2.06E-01 | 1.38E-01 | -4.86E-01 | 5.62E-01 | 6.50E-02 | -2.05E-01 | 2.07E-01 |
| cd4\_3\_yrs\_1 | 2.13E-02 | -2.05E-04 | -1.51E-02 | -1.53E-02 | -2.44E-02 | -3.60E-03 | -2.91E-02 | 7.96E-02 | -5.99E-02 | 3.90E-02 | -9.31E-02 | 6.42E-02 | 3.95E-02 | -9.42E-02 | 6.50E-02 | 1.06E-01 | -2.69E-01 | 2.06E-01 |
| cd4\_3\_yrs\_2 | -3.71E-02 | -2.13E-04 | 2.77E-02 | 2.78E-02 | 2.92E-02 | 7.03E-03 | 7.38E-02 | -2.23E-01 | 1.95E-01 | -9.30E-02 | 2.49E-01 | -2.03E-01 | -9.40E-02 | 2.52E-01 | -2.05E-01 | -2.69E-01 | 8.96E-01 | -9.09E-01 |
| cd4\_3\_yrs\_3 | 1.02E-02 | 1.93E-03 | -1.25E-02 | -1.24E-02 | 5.02E-03 | -3.72E-03 | -5.44E-02 | 1.90E-01 | -2.02E-01 | 6.40E-02 | -2.03E-01 | 2.06E-01 | 6.47E-02 | -2.04E-01 | 2.07E-01 | 2.06E-01 | -9.09E-01 | 1.16E+00 |
| Hispanic HET Women | intercept | 6.65E-01 | -9.59E-02 | -2.32E-01 | -2.15E-01 | -2.71E-01 | -4.64E-02 | 7.65E-02 | -9.35E-02 | 4.74E-02 | 7.49E-02 | -1.09E-01 | 1.12E-02 | 3.66E-02 | -2.69E-02 | -3.73E-02 | 5.78E-02 | -6.83E-02 | -1.84E-02 |
| age\_cat | -9.59E-02 | 2.67E-02 | -1.42E-03 | -9.25E-04 | 3.84E-03 | -2.87E-03 | -6.31E-03 | 1.68E-02 | -1.36E-02 | 7.74E-03 | -1.83E-02 | 1.32E-02 | 1.28E-02 | -2.87E-02 | 1.92E-02 | 1.65E-02 | -3.78E-02 | 2.60E-02 |
| cd4\_cat\_1 | -2.32E-01 | -1.42E-03 | 4.13E-01 | 2.50E-01 | 2.51E-01 | -9.50E-03 | 1.31E-01 | -2.10E-01 | 6.06E-02 | -1.35E-01 | 2.30E-01 | -8.49E-02 | -1.04E-01 | 1.72E-01 | -4.83E-02 | -1.01E-01 | 1.66E-01 | -4.42E-02 |
| cd4\_cat\_2 | -2.15E-01 | -9.25E-04 | 2.50E-01 | 4.63E-01 | 2.49E-01 | -2.05E-02 | 1.58E-01 | -2.42E-01 | 6.66E-02 | -1.01E-01 | 1.66E-01 | -4.40E-02 | -1.91E-01 | 3.45E-01 | -1.37E-01 | -9.21E-02 | 1.45E-01 | -2.91E-02 |
| cd4\_cat\_3 | -2.71E-01 | 3.84E-03 | 2.51E-01 | 2.49E-01 | 4.92E-01 | 3.16E-03 | 9.41E-02 | -1.60E-01 | 4.58E-02 | -1.04E-01 | 1.73E-01 | -4.95E-02 | -1.01E-01 | 1.66E-01 | -4.57E-02 | -1.75E-01 | 2.89E-01 | -8.86E-02 |
| yrs\_art | -4.64E-02 | -2.87E-03 | -9.50E-03 | -2.05E-02 | 3.16E-03 | 4.48E-02 | -1.23E-01 | 1.62E-01 | -3.94E-02 | 5.28E-04 | 1.63E-03 | -6.70E-03 | 1.21E-02 | -2.35E-02 | 8.38E-03 | -1.19E-02 | 2.85E-02 | -2.29E-02 |
| yrs\_art\_1 | 7.65E-02 | -6.31E-03 | 1.31E-01 | 1.58E-01 | 9.41E-02 | -1.23E-01 | 5.94E-01 | -1.04E+00 | 4.96E-01 | -2.53E-01 | 5.82E-01 | -3.67E-01 | -2.85E-01 | 6.52E-01 | -4.10E-01 | -2.20E-01 | 5.11E-01 | -3.25E-01 |
| yrs\_art\_2 | -9.35E-02 | 1.68E-02 | -2.10E-01 | -2.42E-01 | -1.60E-01 | 1.62E-01 | -1.04E+00 | 2.09E+00 | -1.27E+00 | 5.86E-01 | -1.49E+00 | 1.10E+00 | 6.29E-01 | -1.59E+00 | 1.16E+00 | 5.43E-01 | -1.40E+00 | 1.05E+00 |
| yrs\_art\_3 | 4.74E-02 | -1.36E-02 | 6.06E-02 | 6.66E-02 | 4.58E-02 | -3.94E-02 | 4.96E-01 | -1.27E+00 | 1.04E+00 | -3.84E-01 | 1.12E+00 | -1.00E+00 | -3.96E-01 | 1.15E+00 | -1.02E+00 | -3.72E-01 | 1.10E+00 | -9.88E-01 |
| cd4\_1\_yrs\_1 | 7.49E-02 | 7.74E-03 | -1.35E-01 | -1.01E-01 | -1.04E-01 | 5.28E-04 | -2.53E-01 | 5.86E-01 | -3.84E-01 | 3.44E-01 | -8.07E-01 | 5.39E-01 | 2.49E-01 | -5.81E-01 | 3.82E-01 | 2.49E-01 | -5.81E-01 | 3.82E-01 |
| cd4\_1\_yrs\_2 | -1.09E-01 | -1.83E-02 | 2.30E-01 | 1.66E-01 | 1.73E-01 | 1.63E-03 | 5.82E-01 | -1.49E+00 | 1.12E+00 | -8.07E-01 | 2.10E+00 | -1.64E+00 | -5.80E-01 | 1.49E+00 | -1.12E+00 | -5.82E-01 | 1.49E+00 | -1.12E+00 |
| cd4\_1\_yrs\_3 | 1.12E-02 | 1.32E-02 | -8.49E-02 | -4.40E-02 | -4.95E-02 | -6.70E-03 | -3.67E-01 | 1.10E+00 | -1.00E+00 | 5.39E-01 | -1.64E+00 | 1.57E+00 | 3.81E-01 | -1.12E+00 | 1.01E+00 | 3.83E-01 | -1.13E+00 | 1.01E+00 |
| cd4\_2\_yrs\_1 | 3.66E-02 | 1.28E-02 | -1.04E-01 | -1.91E-01 | -1.01E-01 | 1.21E-02 | -2.85E-01 | 6.29E-01 | -3.96E-01 | 2.49E-01 | -5.80E-01 | 3.81E-01 | 4.88E-01 | -1.16E+00 | 7.95E-01 | 2.45E-01 | -5.72E-01 | 3.75E-01 |
| cd4\_2\_yrs\_2 | -2.69E-02 | -2.87E-02 | 1.72E-01 | 3.45E-01 | 1.66E-01 | -2.35E-02 | 6.52E-01 | -1.59E+00 | 1.15E+00 | -5.81E-01 | 1.49E+00 | -1.12E+00 | -1.16E+00 | 3.03E+00 | -2.40E+00 | -5.74E-01 | 1.47E+00 | -1.11E+00 |
| cd4\_2\_yrs\_3 | -3.73E-02 | 1.92E-02 | -4.83E-02 | -1.37E-01 | -4.57E-02 | 8.38E-03 | -4.10E-01 | 1.16E+00 | -1.02E+00 | 3.82E-01 | -1.12E+00 | 1.01E+00 | 7.95E-01 | -2.40E+00 | 2.30E+00 | 3.80E-01 | -1.12E+00 | 1.00E+00 |
| cd4\_3\_yrs\_1 | 5.78E-02 | 1.65E-02 | -1.01E-01 | -9.21E-02 | -1.75E-01 | -1.19E-02 | -2.20E-01 | 5.43E-01 | -3.72E-01 | 2.49E-01 | -5.82E-01 | 3.83E-01 | 2.45E-01 | -5.74E-01 | 3.80E-01 | 6.01E-01 | -1.42E+00 | 9.67E-01 |
| cd4\_3\_yrs\_2 | -6.83E-02 | -3.78E-02 | 1.66E-01 | 1.45E-01 | 2.89E-01 | 2.85E-02 | 5.11E-01 | -1.40E+00 | 1.10E+00 | -5.81E-01 | 1.49E+00 | -1.13E+00 | -5.72E-01 | 1.47E+00 | -1.12E+00 | -1.42E+00 | 3.78E+00 | -3.05E+00 |
| cd4\_3\_yrs\_3 | -1.84E-02 | 2.60E-02 | -4.42E-02 | -2.91E-02 | -8.86E-02 | -2.29E-02 | -3.25E-01 | 1.05E+00 | -9.88E-01 | 3.82E-01 | -1.12E+00 | 1.01E+00 | 3.75E-01 | -1.11E+00 | 1.00E+00 | 9.67E-01 | -3.05E+00 | 3.06E+00 |

### CD4 dynamics out of HIV care and off ART

CD4 decline during disengagement from HIV care and off ART was estimated using data from those disengaged from HIV care (≥2 years without a CD4 or viral load measurement) and contributed at least one CD4 count when they re-engaged in HIV care and resumed ART use in the NA-ACCORD study population. Patients without a valid CD4 measurement at exit and reentry and a detectable viral load at reentry were dropped. In order to have a reasonable sample size for modeling CD4 while out of HIV care and off ART, all sub-groups were combined. The decline in CD4 count while disengaged and off ART was modeled using a linear regression model. We assumed that the difference () of the log of the re-engagement CD4 count () from the log of CD4 count at disengagement from care () had a linear relationship with the number of years spent out of care () and square root of CD4 count at disengagement from care ():

where

The variable of interest is the time varying CD4 count at re-engagement (). Solving for:

where is the smearing retransformation term resulting from fitting a linear regression to a log-transformed variable. The fit was performed using the *glm* function of the *stats* package in base R. The estimated coefficients are shown in Table S23, and the covariance matrix is shown in Table S24.

Table S 23: Regression coefficients for decline in CD4 count while out of HIV care and off ART

|  |  |  |  |
| --- | --- | --- | --- |
| Population | intercept | years\_out | sqrt\_cd4\_exit |
| All | -1.496 | -0.037 | 0.025 |

Table S 24: Covariance matrix for modeling decline in CD4 count while out of HIV care and off ART

|  |  |  |  |
| --- | --- | --- | --- |
|  | intercept | years\_out | sqrt\_cd4\_exit |
| intercept | 1.44E-02 | -1.73E-03 | -5.01E-04 |
| years\_out | -1.73E-03 | 1.01E-03 | -1.11E-05 |
| sqrt\_cd4\_exit | -5.01E-04 | -1.11E-05 | 2.60E-05 |

# Characterizing the EHE75% scenario

In the EHE75% scenario, we modeled a 75% uniform linear decline in number of HIV diagnoses from 2020–2025, and assumed that the projected levels persist to 2030 (**Figure S11**).

Chart, line chart

Description automatically generated

Figure S 11: The projected range for number of new HIV diagnoses (y-axis) at the baseline scenario and in the scenario of achieving a 75% decline in new HIV diagnoses from 2020 to 2025 (EHE75%). The blue shaded area represents the projected uncertainty in number of ART-initiators at baseline (status quo) in PEARL. Red shaded area represents the projected uncertainty in number of ART-initiators at EHE75% scenario.

Footnotes:

The y axis maximum value is different for each subgroup plotted in this figure; we caution against comparison across subgroups.

# Simulation validation

To ensure the fidelity of estimated parameters and mathematical functions in PEARL, we compared individual fits between projected outcomes and corresponding data from NA-ACCORD (“in-sample” approach) among individual subgroups (Section 3.1).

Furthermore, to ensure the fidelity of model projections, we compared the projected age distribution of ART-users in PEARL to the observed data from NA-ACCORD from 2010-2017 that were not directly used for parameter estimation (“out-of-sample” approach) (Section 3.2). Using a threshold of >5% to detect clinically relevant differences, we detected 35 instances out of 720 comparisons made where PEARL projections differ with NAACCORD data. However, we detected no persistent pattern of bias over time and among various subgroups, and attribute the observed differences to the uncertainty in simulated results and potential issues involving the small sample size for some subgroups (e.g., Hispanic IDU men and women).

Finally, we compared the PEARL’s simulated population demographics with CDC’s reports of people living with diagnosed HIV in the US in 2010 and 2018 to ensure representativeness (Table 1 in the main manuscript). In all comparisons, we used a threshold of >5% to detect clinically relevant differences.29

## Internal validation

### Age distribution of ART-users in 2009

Shape, polygon

Description automatically generated

Figure S 12: Projected age distribution of ART-users in year 2009 compared to observed NA-ACCORD data

### CD4 distribution of ART-users in 2009

Diagram

Description automatically generated

Figure S 13: Projected CD4 distribution of initial population in year 2009 compared to observed NA-ACCORD data.

### Age distribution of new ART initiators from 2010 – 2030

Diagram

Description automatically generated with medium confidence

Figure S 14: Projected age distribution of people initiating ART from 2010 to 2030. The distribution of age at ART initiation (x-axis) in selected calendar years is shown. The distribution of age at ART initiation is modeled using a two-component mixed normal distribution with dynamic parameters (blue line) using NA-ACCORD data (green bars). The results suggest a temporal shift in the distribution of age at ART initiation toward younger ages over time in the Treat All era (as evident by an increase in size of left peak).

### CD4 distribution of new ART initiators from 2010 – 2030

A picture containing chart

Description automatically generated

Figure S 15: Projected CD4 distribution of people initiating ART from 2010 to 2030. The distribution of CD4 count at ART initiation (x-axis) in selected calendar years is shown. The CD4 distribution at ART initiation is modeled via a normal distribution with dynamic parameters (blue line), based on NA-ACCORD data (green bars). The results suggest a temporal shift toward higher CD4 counts at ART initiation over time in the Treat All era (as evident by a shift and flattening of the peak).

### Age distribution of people disengaging from care from 2010 – 2030

Diagram

Description automatically generated

Figure S 16: Projected age distribution of people disengaging from HIV care from 2010 to 2030. The distribution of age at ART disengagement (x-axis) in selected calendar years is shown, comparing simulated values (blue line) against NA-ACCORD data (green bars) when available. The probability of disengagement from ART is modeled via a logistic regression model. The simulated results provide a close fit between to NA-ACCORD data from 2010 to 2016 (loss to follow-up was defined as occurring at the last measurement of CD4 or HIV RNA prior to a gap of ≥2 years without such a measurement; by this definition, individuals cannot be loss to follow up in 2017, the final year of the observed data). Overall, the results suggest a temporal shift in the distribution of age at ART disengagement toward younger ages over time in the Treat All era (as evident by an increase in size of left peak).

### HIV Mortality among population on ART from 2010 – 2030

Chart, line chart

Description automatically generated

Figure S 17: Projected proportion of each subgroup dying in HIV care and on ART from 2010 to 2030. Each panel shows the projected proportion of that sub-group dying in HIV care and on ART (blue line), compared to NA-ACCORD data (green dots), over time (x-axis).

## External validation

Diagram

Description automatically generated

Figure S 18: Projected age distribution of all people receiving ART from 2010 to 2030. The distribution of age among population on ART (x-axis) in selected calendar years is shown, comparing simulated values (blue line) to NA-ACCORD data (green bars) when available. The simulated results provide a close fit to NA-ACCORD data from 2010 to 2017.

Table S 25: Comparing the age distributions of ART-users in PEARL to the observed data from NA-ACCORD, from 2010–2017 (Simulation validation “out-of-sample” approach). Values represent the difference in the age distribution in each subgroup [NA-ACCORD estimate - PEARL projection]. A threshold of 5 percentage points (>5% or <-5%) is used to detect significant differences (highlighted in blue).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** |
| **White MSM** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 0.7% | 0.8% | 0.6% | 0.8% | 0.9% | 0.6% | 0.7% | 0.8% |
| [4.9% vs. 4.2%] | [5.4% vs. 4.6%] | [5.7% vs. 5.1%] | [6.1% vs. 5.4%] | [6.4% vs. 5.5%] | [6.1% vs. 5.5%] | [6.1% vs. 5.4%] | [6.1% vs. 5.3%] |
| 30-39 years | -1.2% | -0.4% | 0.4% | 0.8% | 1.1% | 1.2% | 1.4% | 2.6% |
| [14.8% vs. 16.0%] | [14.2% vs. 14.7%] | [14.3% vs. 13.8%] | [14.1% vs. 13.3%] | [14.1% vs. 13.0%] | [14.0% vs. 12.8%] | [14.2% vs. 12.8%] | [15.5% vs. 13.0%] |
| 40-49 years | -0.9% | -0.7% | -1.5% | -1.8% | -2.5% | -2.4% | -2.1% | -1.4% |
| [41.0% vs. 41.9%] | [38.4% vs. 39.1%] | [34.7% vs. 36.2%] | [31.4% vs. 33.3%] | [28.0% vs. 30.5%] | [25.6% vs. 28.0%] | [23.4% vs. 25.6%] | [22.1% vs. 23.5%] |
| 50-59 years | 1.2% | 0.6% | 0.6% | 0.3% | 0.3% | 0.5% | -0.7% | -0.2% |
| [29.3% vs. 28.2%] | [31.1% vs. 30.6%] | [33.2% vs. 32.6%] | [34.7% vs. 34.4%] | [36.1% vs. 35.9%] | [37.5% vs. 37.0%] | [37.0% vs. 37.7%] | [37.7% vs. 37.9%] |
| 60-69 years | -0.1% | -0.5% | -0.3% | 0.0% | 0.3% | 0.2% | 0.7% | -1.1% |
| [8.4% vs. 8.5%] | [9.1% vs. 9.6%] | [10.2% vs. 10.5%] | [11.5% vs. 11.6%] | [12.9% vs. 12.6%] | [14.0% vs. 13.8%] | [15.8% vs. 15.1%] | [15.3% vs. 16.4%] |
| ≥70 years | 0.3% | 0.2% | 0.1% | 0.0% | 0.0% | -0.1% | 0.0% | -0.7% |
| [1.6% vs. 1.3%] | [1.7% vs. 1.5%] | [1.9% vs. 1.8%] | [2.2% vs. 2.1%] | [2.5% vs. 2.5%] | [2.8% vs. 2.9%] | [3.3% vs. 3.4%] | [3.2% vs. 3.9%] |
| **Black/AA MSM** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 0.8% | 1.8% | 1.9% | 2.6% | 3.7% | 3.7% | 4.0% | 4.4% |
| [19.4% vs. 18.6%] | [21.8% vs. 20.0%] | [23.3% vs. 21.3%] | [24.4% vs. 21.8%] | [25.4% vs. 21.8%] | [25.0% vs. 21.3%] | [24.7% vs. 20.6%] | [24.2% vs. 19.8%] |
| 30-39 years | -1.5% | -0.8% | 0.5% | 1.1% | 2.1% | 2.9% | 0.8% | 1.7% |
| [21.2% vs. 22.8%] | [20.7% vs. 21.5%] | [21.6% vs. 21.1%] | [22.4% vs. 21.2%] | [24.0% vs. 21.9%] | [26.0% vs. 23.0%] | [25.2% vs. 24.5%] | [27.8% vs. 26.1%] |
| 40-49 years | 1.9% | 0.5% | -0.6% | -2.1% | -4.2% | -4.9% | -4.9% | -4.7% |
| [36.7% vs. 34.8%] | [33.5% vs. 33.1%] | [30.6% vs. 31.2%] | [27.3% vs. 29.4%] | [23.3% vs. 27.6%] | [20.9% vs. 25.8%] | [19.2% vs. 24.0%] | [17.6% vs. 22.4%] |
| 50-59 years | -1.8% | -1.5% | -1.6% | -1.2% | -0.7% | -0.3% | 0.9% | 0.3% |
| [18.1% vs. 19.9%] | [19.2% vs. 20.8%] | [19.7% vs. 21.3%] | [20.6% vs. 21.8%] | [21.5% vs. 22.2%] | [22.2% vs. 22.5%] | [23.6% vs. 22.7%] | [23.0% vs. 22.7%] |
| 60-69 years | 0.3% | -0.2% | -0.6% | -0.8% | -1.2% | -1.6% | -1.0% | -1.7% |
| [4.0% vs. 3.7%] | [4.1% vs. 4.3%] | [4.2% vs. 4.8%] | [4.6% vs. 5.4%] | [4.8% vs. 6.0%] | [5.1% vs. 6.7%] | [6.4% vs. 7.4%] | [6.4% vs. 8.1%] |
| ≥70 years | 0.3% | 0.3% | 0.4% | 0.4% | 0.4% | 0.1% | 0.3% | 0.0% |
| [0.6% vs. 0.2%] | [0.6% vs. 0.3%] | [0.7% vs. 0.4%] | [0.8% vs. 0.4%] | [1.0% vs. 0.5%] | [0.8% vs. 0.7%] | [1.1% vs. 0.8%] | [0.9% vs. 1.0%] |
| **Hispanic MSM** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 1.5% | 1.4% | 1.1% | 1.6% | 1.0% | 0.3% | -0.4% | -0.3% |
| [11.5% vs. 10.0%] | [12.1% vs. 10.7%] | [12.7% vs. 11.6%] | [13.7% vs. 12.1%] | [13.4% vs. 12.4%] | [12.7% vs. 12.5%] | [12.1% vs. 12.5%] | [12.1% vs. 12.4%] |
| 30-39 years | -4.2% | -1.8% | -0.8% | -0.9% | 0.8% | 2.0% | 2.3% | 2.6% |
| [28.1% vs. 32.3%] | [27.9% vs. 29.6%] | [26.9% vs. 27.7%] | [25.4% vs. 26.3%] | [26.2% vs. 25.4%] | [26.9% vs. 24.9%] | [27.3% vs. 24.9%] | [27.9% vs. 25.4%] |
| 40-49 years | 3.4% | 1.7% | 0.9% | -0.3% | -2.4% | -3.3% | -4.0% | -2.5% |
| [42.3% vs. 38.9%] | [40.8% vs. 39.0%] | [39.5% vs. 38.6%] | [37.6% vs. 37.9%] | [34.5% vs. 36.9%] | [32.4% vs. 35.7%] | [30.2% vs. 34.2%] | [30.0% vs. 32.5%] |
| 50-59 years | -1.2% | -1.5% | -0.8% | -0.3% | 0.3% | 0.8% | 1.4% | 0.7% |
| [14.0% vs. 15.2%] | [15.3% vs. 16.8%] | [17.2% vs. 18.0%] | [19.0% vs. 19.3%] | [20.8% vs. 20.5%] | [22.4% vs. 21.6%] | [23.9% vs. 22.5%] | [24.0% vs. 23.3%] |
| 60-69 years | 0.6% | 0.4% | -0.3% | -0.1% | 0.4% | 0.4% | 0.5% | -0.6% |
| [3.3% vs. 2.7%] | [3.4% vs. 3.0%] | [2.9% vs. 3.3%] | [3.5% vs. 3.6%] | [4.4% vs. 4.0%] | [4.8% vs. 4.4%] | [5.4% vs. 4.9%] | [4.8% vs. 5.5%] |
| ≥70 years | -0.1% | -0.3% | -0.1% | -0.1% | -0.1% | -0.1% | 0.2% | 0.1% |
| [0.7% vs. 0.9%] | [0.6% vs. 0.9%] | [0.7% vs. 0.9%] | [0.7% vs. 0.9%] | [0.7% vs. 0.9%] | [0.8% vs. 0.9%] | [1.2% vs. 0.9%] | [1.1% vs. 1.0%] |
| **White IDU men** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 0.2% | 0.1% | 0.4% | 0.6% | 0.6% | 0.3% | -0.2% | -0.2% |
| [2.2% vs. 2.0%] | [2.1% vs. 2.0%] | [2.6% vs. 2.2%] | [2.9% vs. 2.3%] | [3.1% vs. 2.5%] | [3.1% vs. 2.7%] | [2.9% vs. 3.1%] | [3.3% vs. 3.5%] |
| 30-39 years | 0.0% | -0.4% | -0.4% | -0.2% | 0.0% | -0.4% | 3.2% | 1.3% |
| [10.6% vs. 10.6%] | [9.3% vs. 9.7%] | [8.9% vs. 9.3%] | [8.9% vs. 9.1%] | [9.2% vs. 9.2%] | [8.9% vs. 9.4%] | [12.9% vs. 9.7%] | [11.5% vs. 10.2%] |
| 40-49 years | -1.1% | -0.5% | -0.9% | -2.0% | -3.2% | -2.7% | 4.0% | 5.5% |
| [36.0% vs. 37.1%] | [34.1% vs. 34.6%] | [31.2% vs. 32.1%] | [27.6% vs. 29.6%] | [24.0% vs. 27.2%] | [22.0% vs. 24.7%] | [26.3% vs. 22.3%] | [25.6% vs. 20.1%] |
| 50-59 years | 0.1% | 0.7% | 0.5% | 0.4% | 1.1% | 0.5% | 0.2% | 1.4% |
| [38.5% vs. 38.4%] | [40.5% vs. 39.8%] | [41.0% vs. 40.5%] | [41.3% vs. 40.9%] | [42.2% vs. 41.1%] | [41.3% vs. 40.9%] | [40.5% vs. 40.3%] | [40.8% vs. 39.4%] |
| 60-69 years | 0.7% | 0.1% | 0.4% | 1.3% | 1.6% | 2.2% | -5.6% | -5.7% |
| [11.7% vs. 11.0%] | [12.9% vs. 12.8%] | [14.8% vs. 14.5%] | [17.4% vs. 16.1%] | [19.4% vs. 17.8%] | [21.7% vs. 19.5%] | [15.5% vs. 21.1%] | [17.0% vs. 22.7%] |
| ≥70 years | 0.1% | 0.0% | 0.0% | 0.0% | -0.1% | 0.1% | -1.6% | -2.3% |
| [0.9% vs. 0.9%] | [1.1% vs. 1.2%] | [1.5% vs. 1.5%] | [1.8% vs. 1.9%] | [2.2% vs. 2.3%] | [2.9% vs. 2.8%] | [1.8% vs. 3.4%] | [1.8% vs. 4.1%] |
| **Black/AA IDU men** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 0.1% | 0.1% | -0.1% | -0.3% | -0.4% | -0.5% | 4.5% | 7.2% |
| [0.6% vs. 0.5%] | [0.7% vs. 0.6%] | [0.7% vs. 0.8%] | [0.8% vs. 1.1%] | [1.1% vs. 1.5%] | [1.5% vs. 2.0%] | [7.1% vs. 2.6%] | [10.6% vs. 3.4%] |
| 30-39 years | 0.1% | 0.0% | -0.3% | -0.5% | -0.8% | -1.2% | 3.2% | 5.6% |
| [2.6% vs. 2.5%] | [2.6% vs. 2.5%] | [2.5% vs. 2.8%] | [2.7% vs. 3.1%] | [2.7% vs. 3.5%] | [2.6% vs. 3.8%] | [7.3% vs. 4.1%] | [9.9% vs. 4.3%] |
| 40-49 years | -1.3% | -1.1% | -1.0% | -1.2% | -1.2% | -0.8% | 3.4% | 3.2% |
| [20.4% vs. 21.7%] | [17.1% vs. 18.2%] | [14.3% vs. 15.3%] | [11.7% vs. 12.9%] | [9.7% vs. 10.9%] | [8.5% vs. 9.3%] | [11.5% vs. 8.1%] | [10.5% vs. 7.2%] |
| 50-59 years | 0.6% | 0.6% | 0.7% | 1.0% | 0.6% | -1.0% | -0.5% | -2.6% |
| [56.1% vs. 55.4%] | [55.8% vs. 55.2%] | [54.6% vs. 53.8%] | [52.7% vs. 51.6%] | [49.3% vs. 48.7%] | [44.2% vs. 45.3%] | [40.9% vs. 41.4%] | [34.6% vs. 37.3%] |
| 60-69 years | 0.0% | 0.0% | 0.6% | 0.9% | 1.9% | 3.8% | -9.1% | -10.1% |
| [19.1% vs. 19.1%] | [22.4% vs. 22.4%] | [26.3% vs. 25.7%] | [30.1% vs. 29.2%] | [34.5% vs. 32.6%] | [39.7% vs. 35.9%] | [29.8% vs. 38.9%] | [31.4% vs. 41.5%] |
| ≥70 years | 0.4% | 0.4% | 0.1% | 0.0% | -0.2% | -0.2% | -1.5% | -3.3% |
| [1.3% vs. 0.8%] | [1.5% vs. 1.1%] | [1.7% vs. 1.6%] | [2.1% vs. 2.1%] | [2.6% vs. 2.9%] | [3.6% vs. 3.8%] | [3.4% vs. 4.8%] | [2.9% vs. 6.2%] |
| **Hispanic IDU men** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 0.1% | -0.6% | -0.2% | 0.2% | -0.2% | -0.1% | 3.1% | 3.6% |
| [1.5% vs. 1.4%] | [1.0% vs. 1.6%] | [1.7% vs. 1.9%] | [2.3% vs. 2.1%] | [2.2% vs. 2.4%] | [2.5% vs. 2.6%] | [6.0% vs. 2.9%] | [6.8% vs. 3.2%] |
| 30-39 years | -1.2% | -0.2% | 0.6% | 0.3% | 0.5% | 0.8% | 10.7% | 12.3% |
| [9.8% vs. 11.0%] | [10.3% vs. 10.5%] | [10.8% vs. 10.1%] | [10.0% vs. 9.8%] | [10.1% vs. 9.5%] | [10.2% vs. 9.4%] | [20.1% vs. 9.4%] | [21.8% vs. 9.5%] |
| 40-49 years | 0.4% | -0.1% | -0.8% | -2.0% | -2.1% | -0.8% | 17.3% | 13.0% |
| [27.5% vs. 27.2%] | [24.9% vs. 25.0%] | [22.7% vs. 23.4%] | [20.2% vs. 22.2%] | [19.1% vs. 21.2%] | [19.6% vs. 20.4%] | [37.0% vs. 19.6%] | [32.0% vs. 19.0%] |
| 50-59 years | -0.1% | -0.8% | -1.0% | -0.7% | -0.4% | -5.8% | -10.4% | -5.6% |
| [45.9% vs. 46.0%] | [44.7% vs. 45.5%] | [43.3% vs. 44.3%] | [42.0% vs. 42.7%] | [40.5% vs. 40.9%] | [33.0% vs. 38.8%] | [26.1% vs. 36.5%] | [28.6% vs. 34.2%] |
| 60-69 years | 0.5% | 1.3% | 0.9% | 2.1% | 2.3% | 6.0% | -19.1% | -20.6% |
| [14.3% vs. 13.8%] | [17.8% vs. 16.5%] | [19.9% vs. 19.0%] | [23.5% vs. 21.4%] | [26.0% vs. 23.7%] | [31.8% vs. 25.8%] | [8.7% vs. 27.8%] | [8.8% vs. 29.4%] |
| ≥70 years | 0.3% | 0.3% | 0.5% | 0.3% | -0.1% | 0.0% | -1.6% | -2.7% |
| [0.9% vs. 0.6%] | [1.2% vs. 0.9%] | [1.7% vs. 1.2%] | [1.9% vs. 1.7%] | [2.2% vs. 2.3%] | [2.9% vs. 2.9%] | [2.2% vs. 3.8%] | [2.0% vs. 4.8%] |
| **White IDU women** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 0.6% | 1.6% | 0.7% | -0.4% | 0.3% | 0.8% | 2.1% | 0.6% |
| [3.9% vs. 3.3%] | [4.4% vs. 2.8%] | [3.3% vs. 2.6%] | [2.0% vs. 2.4%] | [2.5% vs. 2.2%] | [2.8% vs. 2.1%] | [4.0% vs. 2.0%] | [2.5% vs. 1.9%] |
| 30-39 years | -0.6% | 0.5% | 0.6% | 2.0% | 0.3% | -0.1% | -1.0% | 0.0% |
| [21.9% vs. 22.5%] | [20.7% vs. 20.2%] | [19.1% vs. 18.5%] | [19.2% vs. 17.2%] | [16.5% vs. 16.3%] | [15.4% vs. 15.4%] | [13.8% vs. 14.8%] | [14.2% vs. 14.2%] |
| 40-49 years | 0.6% | -1.8% | -2.3% | -2.0% | -2.6% | -2.0% | 2.3% | 3.0% |
| [41.9% vs. 41.2%] | [38.2% vs. 40.0%] | [36.0% vs. 38.3%] | [34.5% vs. 36.5%] | [31.9% vs. 34.5%] | [30.8% vs. 32.7%] | [33.3% vs. 31.0%] | [32.7% vs. 29.7%] |
| 50-59 years | 0.6% | 0.9% | 2.2% | 1.1% | 3.0% | 3.1% | -0.9% | -3.5% |
| [28.7% vs. 28.1%] | [31.7% vs. 30.9%] | [35.4% vs. 33.2%] | [36.0% vs. 34.9%] | [39.2% vs. 36.3%] | [40.3% vs. 37.2%] | [36.7% vs. 37.6%] | [34.2% vs. 37.6%] |
| 60-69 years | -1.6% | -1.1% | -0.9% | -0.3% | -0.2% | -0.9% | -1.6% | 0.9% |
| [3.1% vs. 4.7%] | [4.8% vs. 5.9%] | [6.3% vs. 7.2%] | [8.3% vs. 8.6%] | [9.9% vs. 10.1%] | [10.8% vs. 11.7%] | [11.8% vs. 13.4%] | [16.0% vs. 15.1%] |
| ≥70 years | 0.4% | -0.1% | -0.3% | -0.5% | -0.7% | -0.9% | -0.8% | -1.1% |
| [0.6% vs. 0.2%] | [0.2% vs. 0.3%] | [0.0% vs. 0.3%] | [0.0% vs. 0.5%] | [0.0% vs. 0.7%] | [0.0% vs. 0.9%] | [0.3% vs. 1.2%] | [0.4% vs. 1.5%] |
| **Black/AA IDU women** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 0.2% | 0.3% | 0.0% | -0.4% | -0.4% | -0.4% | 1.5% | 1.9% |
| [0.6% vs. 0.4%] | [0.8% vs. 0.5%] | [0.5% vs. 0.5%] | [0.2% vs. 0.6%] | [0.2% vs. 0.6%] | [0.2% vs. 0.6%] | [2.2% vs. 0.7%] | [2.7% vs. 0.7%] |
| 30-39 years | -0.7% | -0.3% | 0.4% | 1.1% | -0.3% | 0.2% | 1.6% | 1.2% |
| [7.1% vs. 7.9%] | [6.0% vs. 6.3%] | [5.7% vs. 5.3%] | [5.8% vs. 4.8%] | [4.1% vs. 4.4%] | [4.4% vs. 4.3%] | [5.7% vs. 4.1%] | [5.3% vs. 4.1%] |
| 40-49 years | 0.4% | -3.1% | -2.9% | -2.7% | -0.8% | -2.6% | 3.8% | 3.6% |
| [37.6% vs. 37.1%] | [30.4% vs. 33.5%] | [27.1% vs. 30.0%] | [24.0% vs. 26.8%] | [22.9% vs. 23.7%] | [18.2% vs. 20.8%] | [22.0% vs. 18.2%] | [19.6% vs. 16.0%] |
| 50-59 years | -1.6% | 0.1% | -0.7% | -1.2% | -1.2% | 0.9% | -5.7% | -3.0% |
| [47.1% vs. 48.6%] | [51.6% vs. 51.5%] | [52.2% vs. 53.0%] | [52.1% vs. 53.3%] | [51.4% vs. 52.6%] | [52.0% vs. 51.1%] | [43.2% vs. 48.9%] | [43.1% vs. 46.2%] |
| 60-69 years | 1.7% | 2.9% | 2.8% | 2.5% | 2.4% | 1.9% | -1.3% | -3.8% |
| [7.4% vs. 5.8%] | [10.9% vs. 8.0%] | [13.6% vs. 10.8%] | [16.7% vs. 14.2%] | [20.4% vs. 18.0%] | [24.2% vs. 22.3%] | [25.6% vs. 26.8%] | [27.6% vs. 31.3%] |
| ≥70 years | 0.0% | 0.1% | 0.6% | 0.8% | 0.4% | 0.0% | 0.1% | 0.0% |
| [0.2% vs. 0.1%] | [0.3% vs. 0.2%] | [0.8% vs. 0.3%] | [1.2% vs. 0.4%] | [1.0% vs. 0.6%] | [0.9% vs. 0.9%] | [1.3% vs. 1.2%] | [1.8% vs. 1.8%] |
| **Hispanic IDU women** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 1.2% | 0.3% | 0.1% | 0.6% | -0.3% | -0.3% | -0.2% | -0.2% |
| [3.5% vs. 2.3%] | [1.7% vs. 1.4%] | [1.0% vs. 0.9%] | [1.1% vs. 0.5%] | [0.0% vs. 0.3%] | [0.0% vs. 0.3%] | [0.0% vs. 0.2%] | [0.0% vs. 0.2%] |
| 30-39 years | -0.2% | 1.0% | 1.7% | 2.7% | -0.3% | -2.2% | -0.2% | 10.0% |
| [9.6% vs. 9.7%] | [10.4% vs. 9.4%] | [11.0% vs. 9.3%] | [12.0% vs. 9.2%] | [8.8% vs. 9.1%] | [6.7% vs. 8.9%] | [8.3% vs. 8.5%] | [18.2% vs. 8.1%] |
| 40-49 years | -2.6% | -1.7% | -6.0% | -7.2% | -4.1% | -1.3% | 5.9% | 0.6% |
| [35.7% vs. 38.3%] | [32.2% vs. 33.8%] | [24.0% vs. 30.0%] | [19.6% vs. 26.8%] | [19.8% vs. 23.8%] | [20.0% vs. 21.3%] | [25.0% vs. 19.1%] | [18.2% vs. 17.6%] |
| 50-59 years | 0.3% | -0.8% | -0.9% | 0.1% | -2.9% | 2.3% | -28.9% | -26.0% |
| [41.7% vs. 41.5%] | [43.5% vs. 44.3%] | [45.0% vs. 45.9%] | [46.7% vs. 46.7%] | [44.0% vs. 46.9%] | [48.9% vs. 46.6%] | [16.7% vs. 45.5%] | [18.2% vs. 44.1%] |
| 60-69 years | 0.7% | 0.6% | 4.7% | 2.6% | 6.7% | -1.3% | 9.3% | 0.5% |
| [8.7% vs. 8.0%] | [11.3% vs. 10.7%] | [18.0% vs. 13.3%] | [18.5% vs. 15.9%] | [25.3% vs. 18.6%] | [20.0% vs. 21.3%] | [33.3% vs. 24.0%] | [27.3% vs. 26.8%] |
| ≥70 years | 0.6% | 0.5% | 0.4% | 1.2% | 0.9% | 2.7% | 14.2% | 15.0% |
| [0.9% vs. 0.2%] | [0.9% vs. 0.4%] | [1.0% vs. 0.6%] | [2.2% vs. 0.9%] | [2.2% vs. 1.3%] | [4.4% vs. 1.8%] | [16.7% vs. 2.4%] | [18.2% vs. 3.2%] |
| **White heterosexual men** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 0.4% | 0.2% | 0.0% | 1.0% | 1.7% | 1.1% | 0.2% | 0.5% |
| [3.0% vs. 2.6%] | [2.7% vs. 2.5%] | [2.5% vs. 2.5%] | [3.6% vs. 2.6%] | [4.4% vs. 2.6%] | [3.8% vs. 2.7%] | [3.0% vs. 2.9%] | [3.5% vs. 3.1%] |
| 30-39 years | -1.0% | -2.7% | -2.3% | -2.7% | -2.8% | -1.7% | -1.0% | -0.3% |
| [12.5% vs. 13.5%] | [11.1% vs. 13.8%] | [11.6% vs. 14.0%] | [11.2% vs. 13.8%] | [10.7% vs. 13.5%] | [11.2% vs. 12.9%] | [11.3% vs. 12.4%] | [11.5% vs. 11.8%] |
| 40-49 years | 0.0% | 0.4% | -0.6% | -0.7% | -1.8% | -0.1% | -2.8% | -1.4% |
| [37.5% vs. 37.5%] | [35.2% vs. 34.8%] | [31.8% vs. 32.4%] | [29.4% vs. 30.1%] | [26.2% vs. 28.0%] | [26.1% vs. 26.2%] | [21.6% vs. 24.4%] | [21.3% vs. 22.7%] |
| 50-59 years | -0.8% | 0.8% | 2.3% | 1.6% | 2.6% | 0.9% | 0.5% | 1.0% |
| [31.0% vs. 31.8%] | [34.1% vs. 33.2%] | [36.7% vs. 34.4%] | [37.1% vs. 35.5%] | [39.1% vs. 36.5%] | [37.9% vs. 37.0%] | [37.6% vs. 37.1%] | [37.8% vs. 36.9%] |
| 60-69 years | 0.5% | 0.5% | -0.1% | -0.4% | -0.2% | -0.2% | 1.6% | -1.1% |
| [12.3% vs. 11.8%] | [13.1% vs. 12.7%] | [13.4% vs. 13.5%] | [14.1% vs. 14.5%] | [15.5% vs. 15.6%] | [16.6% vs. 16.9%] | [19.9% vs. 18.3%] | [18.9% vs. 20.0%] |
| ≥70 years | 1.0% | 0.8% | 0.8% | 1.2% | 0.4% | -0.1% | 1.6% | 1.4% |
| [3.7% vs. 2.6%] | [3.8% vs. 2.9%] | [3.9% vs. 3.2%] | [4.6% vs. 3.5%] | [4.2% vs. 3.9%] | [4.3% vs. 4.3%] | [6.5% vs. 4.9%] | [6.9% vs. 5.6%] |
| **Black/AA heterosexual men** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | -0.2% | -0.4% | 0.0% | -0.1% | 0.1% | 0.9% | 0.7% | 0.9% |
| [3.7% vs. 3.9%] | [3.9% vs. 4.3%] | [4.7% vs. 4.7%] | [4.7% vs. 4.8%] | [4.9% vs. 4.8%] | [5.6% vs. 4.7%] | [5.3% vs. 4.6%] | [5.3% vs. 4.4%] |
| 30-39 years | 1.0% | 1.3% | 1.6% | 1.7% | 1.9% | 2.2% | 1.2% | 1.3% |
| [17.1% vs. 16.1%] | [16.0% vs. 14.7%] | [15.3% vs. 13.8%] | [14.8% vs. 13.1%] | [14.5% vs. 12.6%] | [14.5% vs. 12.4%] | [13.4% vs. 12.3%] | [13.6% vs. 12.4%] |
| 40-49 years | -1.5% | -2.0% | -2.8% | -2.6% | -2.3% | -1.4% | 0.4% | 1.6% |
| [40.1% vs. 41.6%] | [37.5% vs. 39.5%] | [34.5% vs. 37.2%] | [32.4% vs. 35.0%] | [30.4% vs. 32.7%] | [28.9% vs. 30.4%] | [28.5% vs. 28.1%] | [27.5% vs. 25.9%] |
| 50-59 years | 1.0% | 0.9% | 1.3% | 1.1% | 0.5% | -1.1% | -0.5% | -1.2% |
| [30.0% vs. 28.9%] | [31.8% vs. 30.9%] | [33.9% vs. 32.6%] | [35.3% vs. 34.2%] | [36.0% vs. 35.5%] | [35.5% vs. 36.6%] | [36.8% vs. 37.4%] | [36.5% vs. 37.7%] |
| 60-69 years | -1.1% | -0.6% | -0.5% | -0.4% | -0.4% | -0.5% | -1.1% | -1.5% |
| [6.8% vs. 7.9%] | [8.2% vs. 8.8%] | [9.2% vs. 9.7%] | [10.4% vs. 10.8%] | [11.5% vs. 11.9%] | [12.8% vs. 13.3%] | [13.6% vs. 14.7%] | [14.8% vs. 16.2%] |
| ≥70 years | 0.7% | 0.8% | 0.5% | 0.3% | 0.2% | -0.1% | -0.7% | -1.1% |
| [2.3% vs. 1.6%] | [2.5% vs. 1.8%] | [2.4% vs. 1.9%] | [2.5% vs. 2.2%] | [2.6% vs. 2.4%] | [2.6% vs. 2.7%] | [2.3% vs. 3.0%] | [2.3% vs. 3.4%] |
| **Hispanic heterosexual men** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | -0.1% | -0.6% | -0.2% | -0.2% | 0.1% | 0.5% | -0.6% | -0.9% |
| [6.0% vs. 6.0%] | [4.9% vs. 5.5%] | [4.8% vs. 5.0%] | [4.2% vs. 4.4%] | [4.1% vs. 3.9%] | [3.9% vs. 3.4%] | [2.5% vs. 3.1%] | [1.8% vs. 2.8%] |
| 30-39 years | -1.9% | -0.6% | -0.3% | -0.1% | -0.2% | 1.6% | -0.5% | -0.4% |
| [24.6% vs. 26.6%] | [23.6% vs. 24.2%] | [22.2% vs. 22.4%] | [20.8% vs. 20.9%] | [19.5% vs. 19.7%] | [20.1% vs. 18.5%] | [17.0% vs. 17.5%] | [16.2% vs. 16.6%] |
| 40-49 years | 0.0% | -1.2% | -2.1% | -1.0% | -1.2% | 0.4% | -1.3% | 1.5% |
| [36.7% vs. 36.7%] | [35.7% vs. 36.9%] | [34.3% vs. 36.4%] | [34.5% vs. 35.5%] | [33.1% vs. 34.3%] | [33.4% vs. 33.0%] | [30.5% vs. 31.8%] | [32.4% vs. 30.8%] |
| 50-59 years | 2.3% | 2.7% | 1.9% | 1.2% | 0.3% | -0.3% | 3.3% | 1.0% |
| [23.0% vs. 20.7%] | [25.2% vs. 22.5%] | [26.3% vs. 24.3%] | [27.2% vs. 26.1%] | [27.9% vs. 27.6%] | [28.4% vs. 28.7%] | [32.7% vs. 29.4%] | [30.9% vs. 29.9%] |
| 60-69 years | -0.5% | -0.8% | 0.1% | -0.4% | 0.6% | -1.9% | -0.5% | -0.3% |
| [7.5% vs. 8.0%] | [7.9% vs. 8.7%] | [9.6% vs. 9.4%] | [10.0% vs. 10.4%] | [12.2% vs. 11.6%] | [11.0% vs. 12.9%] | [13.7% vs. 14.2%] | [15.1% vs. 15.4%] |
| ≥70 years | 0.2% | 0.5% | 0.6% | 0.6% | 0.3% | -0.2% | -0.4% | -0.9% |
| [2.2% vs. 2.0%] | [2.7% vs. 2.2%] | [2.9% vs. 2.4%] | [3.3% vs. 2.6%] | [3.3% vs. 3.0%] | [3.2% vs. 3.4%] | [3.6% vs. 3.9%] | [3.7% vs. 4.6%] |
| **White heterosexual women** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 0.8% | 1.5% | 1.0% | 1.3% | 1.3% | 1.0% | 1.3% | 1.9% |
| [6.4% vs. 5.6%] | [7.3% vs. 5.9%] | [7.2% vs. 6.2%] | [7.3% vs. 6.0%] | [6.8% vs. 5.6%] | [5.9% vs. 4.9%] | [5.5% vs. 4.2%] | [5.4% vs. 3.5%] |
| 30-39 years | -2.1% | -3.0% | -0.5% | 0.4% | -0.2% | 0.0% | -1.0% | -0.3% |
| [21.6% vs. 23.6%] | [17.7% vs. 20.7%] | [18.2% vs. 18.7%] | [17.9% vs. 17.5%] | [16.6% vs. 16.8%] | [16.3% vs. 16.3%] | [14.9% vs. 15.9%] | [15.2% vs. 15.5%] |
| 40-49 years | -1.3% | -0.2% | -1.2% | -3.0% | -2.4% | -3.1% | -5.2% | -1.6% |
| [37.6% vs. 38.9%] | [38.2% vs. 38.4%] | [36.0% vs. 37.2%] | [32.9% vs. 35.8%] | [31.8% vs. 34.2%] | [29.5% vs. 32.6%] | [25.8% vs. 31.0%] | [28.0% vs. 29.6%] |
| 50-59 years | 2.0% | 1.5% | 0.5% | 0.9% | 0.0% | 1.4% | 4.0% | 0.7% |
| [25.2% vs. 23.2%] | [26.8% vs. 25.3%] | [27.5% vs. 27.0%] | [29.4% vs. 28.6%] | [30.0% vs. 30.0%] | [32.6% vs. 31.2%] | [36.2% vs. 32.2%] | [33.6% vs. 32.9%] |
| 60-69 years | 0.6% | 0.4% | 0.4% | 0.3% | 0.8% | 0.2% | -0.3% | -1.4% |
| [7.6% vs. 7.1%] | [8.3% vs. 8.0%] | [9.2% vs. 8.8%] | [10.1% vs. 9.8%] | [11.6% vs. 10.8%] | [12.2% vs. 12.0%] | [12.9% vs. 13.2%] | [13.2% vs. 14.6%] |
| ≥70 years | 0.0% | -0.1% | -0.2% | 0.1% | 0.5% | 0.5% | 1.3% | 0.8% |
| [1.6% vs. 1.6%] | [1.7% vs. 1.9%] | [1.9% vs. 2.1%] | [2.4% vs. 2.3%] | [3.2% vs. 2.7%] | [3.5% vs. 3.0%] | [4.7% vs. 3.4%] | [4.6% vs. 3.8%] |
| **Black/AA heterosexual women** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 0.0% | -0.1% | 0.2% | 0.3% | 0.4% | 0.5% | 0.3% | 0.9% |
| [8.9% vs. 8.8%] | [8.1% vs. 8.2%] | [7.9% vs. 7.8%] | [7.5% vs. 7.2%] | [7.0% vs. 6.6%] | [6.5% vs. 5.9%] | [5.6% vs. 5.2%] | [5.5% vs. 4.6%] |
| 30-39 years | -1.7% | -1.5% | -0.6% | 0.2% | 0.4% | 1.5% | -0.3% | -0.9% |
| [25.5% vs. 27.2%] | [23.9% vs. 25.3%] | [23.2% vs. 23.7%] | [22.6% vs. 22.4%] | [21.6% vs. 21.2%] | [21.8% vs. 20.2%] | [19.1% vs. 19.3%] | [17.7% vs. 18.6%] |
| 40-49 years | 1.2% | 1.8% | 0.7% | 0.3% | -0.1% | 0.1% | 1.2% | 0.8% |
| [36.5% vs. 35.3%] | [36.9% vs. 35.1%] | [35.3% vs. 34.6%] | [34.4% vs. 34.1%] | [33.3% vs. 33.4%] | [32.8% vs. 32.6%] | [32.9% vs. 31.7%] | [31.6% vs. 30.7%] |
| 50-59 years | 0.3% | -0.5% | -0.7% | -0.6% | -0.4% | -1.8% | -0.9% | 0.2% |
| [22.7% vs. 22.4%] | [23.6% vs. 24.1%] | [24.9% vs. 25.6%] | [26.3% vs. 26.8%] | [27.6% vs. 28.0%] | [27.3% vs. 29.1%] | [29.1% vs. 30.0%] | [31.0% vs. 30.8%] |
| 60-69 years | -0.3% | 0.0% | 0.2% | -0.5% | -0.7% | -1.1% | -0.8% | -1.3% |
| [5.3% vs. 5.6%] | [6.5% vs. 6.5%] | [7.7% vs. 7.5%] | [8.0% vs. 8.5%] | [8.8% vs. 9.5%] | [9.5% vs. 10.6%] | [11.0% vs. 11.9%] | [11.8% vs. 13.1%] |
| ≥70 years | 0.5% | 0.4% | 0.2% | 0.3% | 0.5% | 0.6% | 0.5% | 0.3% |
| [1.1% vs. 0.5%] | [1.1% vs. 0.7%] | [1.0% vs. 0.8%] | [1.3% vs. 1.0%] | [1.7% vs. 1.3%] | [2.2% vs. 1.5%] | [2.3% vs. 1.8%] | [2.5% vs. 2.2%] |
| **Hispanic heterosexual women** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| <30 years | 0.5% | 0.7% | 0.9% | 0.8% | -0.2% | 0.5% | -1.2% | 1.0% |
| [8.7% vs. 8.2%] | [7.7% vs. 7.0%] | [7.0% vs. 6.1%] | [6.1% vs. 5.3%] | [4.6% vs. 4.7%] | [4.8% vs. 4.3%] | [2.9% vs. 4.0%] | [4.8% vs. 3.9%] |
| 30-39 years | -0.3% | -0.5% | -0.8% | -0.7% | 0.1% | 1.3% | 4.2% | 4.1% |
| [28.5% vs. 28.8%] | [27.4% vs. 27.9%] | [26.2% vs. 27.0%] | [25.2% vs. 25.9%] | [24.7% vs. 24.7%] | [24.7% vs. 23.4%] | [26.3% vs. 22.1%] | [25.0% vs. 20.9%] |
| 40-49 years | 1.1% | 0.8% | 0.5% | 0.9% | 1.0% | 1.2% | 2.2% | 5.0% |
| [34.6% vs. 33.5%] | [33.5% vs. 32.7%] | [32.4% vs. 32.0%] | [32.2% vs. 31.3%] | [31.7% vs. 30.7%] | [31.3% vs. 30.1%] | [31.7% vs. 29.5%] | [33.9% vs. 28.9%] |
| 50-59 years | -2.9% | -2.2% | -1.7% | -1.2% | -0.6% | -1.0% | -3.5% | -4.2% |
| [19.9% vs. 22.8%] | [22.1% vs. 24.3%] | [23.7% vs. 25.4%] | [25.1% vs. 26.3%] | [26.6% vs. 27.1%] | [26.6% vs. 27.6%] | [24.4% vs. 27.9%] | [23.8% vs. 28.0%] |
| 60-69 years | 1.4% | 0.4% | 0.6% | -0.2% | -0.8% | -2.1% | -1.9% | -5.8% |
| [7.5% vs. 6.1%] | [7.7% vs. 7.2%] | [9.1% vs. 8.5%] | [9.6% vs. 9.7%] | [10.2% vs. 11.0%] | [10.2% vs. 12.4%] | [11.7% vs. 13.7%] | [9.3% vs. 15.0%] |
| ≥70 years | 0.3% | 0.8% | 0.6% | 0.4% | 0.4% | 0.1% | 0.2% | 0.0% |
| [0.9% vs. 0.6%] | [1.6% vs. 0.8%] | [1.7% vs. 1.1%] | [1.8% vs. 1.3%] | [2.1% vs. 1.7%] | [2.3% vs. 2.2%] | [2.9% vs. 2.7%] | [3.2% vs. 3.3%] |

# Model projections

## Characteristics of the projected population of ART-users at baseline, in selected years

Table S 26: Characteristics of the PEARL’s projected population of people with HIV using ART in 2010, 2018 and 2030 in the United States. Values represent the median and 95% uncertainty range (UR) for each simulated outcome across 200 random simulation replications. The projected population (n and %) of people with HIV using ART are duplicated from Table 1 to accompany the uncertainty ranges.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2010** | | | | **2018** | | | | **2020** | | | | | **2030** | | | |
| **Characteristics** | **N =** | **395,033** |  |  | **N =** | **618,578** |  |  | **N =** | **670,770** |  |  | **N =** | | **909,638** |  |  |
|  | **n** | **95% UR** | **%** | **95% UR** | **n** | **95% UR** | **%** | **95% UR** | **n** | **95% UR** | **%** | **95% UR** | **n** | | **95% UR** | **%** | **95% UR** |
| **Age (in years)** |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |
| 15-19 | 696 | 645 - 747 | 0.2% | 0.2% - 0.2% | 648 | 595 - 696 | 0.1% | 0.1% - 0.1% | 696 | 626 - 773 | 0.1% | 0.1% - 0.1% | 1179 | | 685 - 2,213 | 0.1% | 0.1% - 0.2% |
| 20-24 | 8,447 | 8,280 - 8,618 | 2.1% | 2.1% - 2.2% | 11,223 | 10,946 - 11,490 | 1.8% | 1.8% - 1.8% | 11,438 | 11,069 - 11,848 | 1.7% | 1.7% - 1.7% | 12,001 | | 9,617 - 14,669 | 1.3% | 1.3% - 1.4% |
| 25-29 | 20,064 | 19,793 - 20,327 | 5.1% | 5.1% - 5.1% | 39,821 | 39,201 - 40,580 | 6.4% | 6.4% - 6.5% | 40,385 | 39,587 - 41,499 | 6.0% | 6.0% - 6.1% | 40,455 | | 35,524 - 45,923 | 4.4% | 4.3% - 4.6% |
| 30-34 | 30,866 | 30,531 - 31,191 | 7.8% | 7.8% - 7.8% | 58,915 | 58,302 - 59,894 | 9.5% | 9.5% - 9.6% | 66,879 | 65,832 - 68,316 | 10.0% | 9.9% - 10.0% | 78,078 | | 71,424 - 85,136 | 8.6% | 8.4% - 8.8% |
| 35-39 | 47,939 | 47,552 - 48,368 | 12.1% | 12.1% - 12.2% | 54,294 | 53,542 - 54,946 | 8.8% | 8.7% - 8.8% | 63,324 | 62,311 - 64,300 | 9.4% | 9.4% - 9.5% | 100,995 | | 94,939 - 108,668 | 11.1% | 11.0% - 11.2% |
| 40-44 | 67,560 | 67,068 - 67,973 | 17.1% | 17.1% - 17.1% | 62,629 | 61,987 - 63,399 | 10.1% | 10.1% - 10.1% | 61,786 | 60,898 - 62,616 | 9.2% | 9.2% - 9.2% | 102,485 | | 98,626 - 107,229 | 11.3% | 11.2% - 11.4% |
| 45-49 | 78,977 | 78,497 - 79,480 | 20.0% | 19.9% - 20.0% | 83,901 | 83,105 - 84,783 | 13.6% | 13.5% - 13.6% | 80,627 | 79,698 - 81,664 | 12.0% | 12.0% - 12.0% | 86,341 | | 82,972 - 90,299 | 9.5% | 9.4% - 9.6% |
| 50-54 | 66,251 | 65,847 - 66,681 | 16.8% | 16.7% - 16.8% | 99,404 | 98,699 - 100,294 | 16.1% | 16.0% - 16.1% | 98,786 | 97,899 - 99,762 | 14.7% | 14.7% - 14.8% | 82,619 | | 78,689 - 86,420 | 9.1% | 9.0% - 9.2% |
| 55-59 | 42,387 | 42,054 - 42,728 | 10.7% | 10.7% - 10.8% | 92,261 | 91,487 - 93,021 | 14.9% | 14.9% - 14.9% | 100,436 | 99,690 - 101,629 | 15.0% | 14.9% - 15.0% | 95,938 | | 92,903 - 99,109 | 10.5% | 10.4% - 10.6% |
| 60-64 | 20,630 | 20,381 - 20,944 | 5.2% | 5.2% - 5.2% | 63,134 | 62,709 - 63,662 | 10.2% | 10.2% - 10.2% | 75,456 | 74,847 - 76,177 | 11.2% | 11.2% - 11.3% | 103,721 | | 101,494 - 105,829 | 11.4% | 11.3% - 11.5% |
| ≥65 | 11,216 | 11,040 - 11,376 | 2.8% | 2.8% - 2.9% | 52,467 | 51,989 - 52,990 | 8.5% | 8.5% - 8.5% | 70,988 | 70,364 - 71,595 | 10.6% | 10.5% - 10.6% | 205,447 | | 203,065 - 208,392 | 22.6% | 22.3% - 22.8% |
| **Male sex** | 290,003 | 289,675 - 290,334 | 73.4% | 73.4% - 73.4% | 472,306 | 468,218 - 476,424 | 76.4% | 76.2% - 76.4% | 515,496 | 509,780 - 521,186 | 76.9% | 76.6% - 77.0% | 714,112 | | 682,584 - 745,897 | 78.5% | 77.8% - 79.0% |
| **Race** |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |
| White | 145,705 | 145,504 - 145,900 | 36.9% | 36.9% - 36.9% | 202,832 | 200,366 - 205,148 | 32.8% | 32.6% - 32.9% | 215,576 | 211,838 - 218,864 | 32.1% | 31.9% - 32.3% | 257,936 | | 240,475 - 273,377 | 28.4% | 27.6% - 28.8% |
| Black/AA | 167,444 | 167,258 - 167,681 | 42.4% | 42.4% - 42.4% | 275,564 | 273,161 - 278,720 | 44.5% | 44.4% - 44.7% | 298,888 | 295,442 - 303,384 | 44.6% | 44.4% - 44.7% | 398,817 | | 383,241 - 419,466 | 43.8% | 43.2% - 44.5% |
| Hispanic | 81,919 | 81,722 - 82,081 | 20.7% | 20.7% - 20.7% | 140,611 | 137,984 - 142,751 | 22.7% | 22.5% - 22.8% | 156,937 | 153,461 - 160,076 | 23.4% | 23.2% - 23.5% | 255,411 | | 234,921 - 274,021 | 28.1% | 27.0% - 28.7% |
| **Sub-groups** |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |
| MSM | 210,618 | 210,358 - 210,916 | 53.3% | 53.3% - 53.3% | 366,232 | 362,870 - 370,320 | 59.2% | 59.1% - 59.3% | 403,855 | 399,369 - 409,593 | 60.2% | 60.0% - 60.4% | 581,243 | | 554,876 - 610,942 | 63.9% | 63.3% - 64.6% |
| White MSM | 102,908 | 102,748 - 103,081 | 26.1% | 26.0% - 26.1% | 146,996 | 144,887 - 149,202 | 23.8% | 23.6% - 23.9% | 155,946 | 153,058 - 159,007 | 23.2% | 23.1% - 23.4% | 178,440 | | 164,452 - 193,405 | 19.6% | 19.0% - 20.4% |
| Black/AA MSM | 63,076 | 62,947 - 63,244 | 16.0% | 16.0% - 16.0% | 127,938 | 126,235 - 130,078 | 20.7% | 20.6% - 20.8% | 143,342 | 141,033 - 146,349 | 21.4% | 21.2% - 21.6% | 215,384 | | 203,679 - 230,450 | 23.7% | 23.1% - 24.4% |
| Hispanic MSM | 44,628 | 44,479 - 44,777 | 11.3% | 11.3% - 11.3% | 91,340 | 89,342 - 93,289 | 14.8% | 14.6% - 14.9% | 104,668 | 101,805 - 107,428 | 15.6% | 15.4% - 15.8% | 187,474 | | 169,188 - 205,669 | 20.6% | 19.7% - 21.4% |
| IDU menb | 49,864 | 49,767 - 49,962 | 12.6% | 12.6% - 12.6% | 56,363 | 55,175 - 57,467 | 9.1% | 9.0% - 9.2% | 57,752 | 56,209 - 59,200 | 8.6% | 8.5% - 8.7% | 64,336 | | 57,063 - 71,521 | 7.1% | 6.7% - 7.3% |
| White IDU men | 17,542 | 17,489 - 17,591 | 4.4% | 4.4% - 4.4% | 21,235 | 20,599 - 21,816 | 3.4% | 3.4% - 3.5% | 22,411 | 21,583 - 23,220 | 3.3% | 3.3% - 3.4% | 28,677 | | 25,141 - 31,948 | 3.2% | 2.9% - 3.3% |
| Black/AA IDU men | 20,538 | 20,496 - 20,587 | 5.2% | 5.2% - 5.2% | 21,312 | 20,735 - 21,904 | 3.4% | 3.4% - 3.5% | 20,834 | 20,010 - 21,641 | 3.1% | 3.0% - 3.2% | 17,618 | | 14,130 - 21,598 | 1.9% | 1.8% - 2.1% |
| Hispanic IDU men | 11,783 | 11,737 - 11,833 | 3.0% | 3.0% - 3.0% | 13,814 | 13,267 - 14,389 | 2.2% | 2.2% - 2.3% | 14,464 | 13,744 - 15,233 | 2.2% | 2.1% - 2.2% | 17,926 | | 14,777 - 21,300 | 2.0% | 1.8% - 2.1% |
| IDU women | 25,819 | 25,783 - 25,854 | 6.5% | 6.5% - 6.5% | 26,613 | 26,189 - 27,081 | 4.3% | 4.3% - 4.3% | 26,714 | 26,041 - 27,291 | 4.0% | 3.9% - 4.0% | 26,198 | | 23,673 - 28,663 | 2.9% | 2.8% - 3.0% |
| White IDU women | 7,464 | 7,453 - 7,475 | 1.9% | 1.9% - 1.9% | 8,248 | 8,066 - 8,433 | 1.3% | 1.3% - 1.3% | 8,462 | 8,224 - 8,664 | 1.3% | 1.2% - 1.3% | 9,288 | | 8,564 - 9,962 | 1.0% | 1.0% - 1.1% |
| Black/AA IDU women | 14,572 | 14,543 - 14,593 | 3.7% | 3.7% - 3.7% | 14,931 | 14,562 - 15,225 | 2.4% | 2.4% - 2.4% | 14,888 | 14,373 - 15,274 | 2.2% | 2.2% - 2.2% | 14,140 | | 11,946 - 15,768 | 1.6% | 1.4% - 1.6% |
| Hispanic IDU women | 3,786 | 3,769 - 3,803 | 1.0% | 1.0% - 1.0% | 3,458 | 3,292 - 3,641 | 0.6% | 0.5% - 0.6% | 3,385 | 3,138 - 3,614 | 0.5% | 0.5% - 0.5% | 2,952 | | 2,055 - 3,900 | 0.3% | 0.3% - 0.4% |
| Heterosexual men | 29,508 | 29,428 - 29,596 | 7.5% | 7.5% - 7.5% | 49,504 | 48,493 - 50,499 | 8.0% | 7.9% - 8.1% | 53,416 | 52,009 - 54,899 | 8.0% | 7.9% - 8.0% | 67,536 | | 61,165 - 74,536 | 7.4% | 7.1% - 7.7% |
| White heterosexual men | 3,487 | 3,471 - 3,506 | 0.9% | 0.9% - 0.9% | 6,336 | 6,103 - 6,578 | 1.0% | 1.0% - 1.0% | 7,032 | 6,698 - 7,358 | 1.0% | 1.0% - 1.1% | 10,342 | | 9,014 - 11,913 | 1.1% | 1.1% - 1.2% |
| Black/AA heterosexual men | 19,168 | 19,089 - 19,237 | 4.9% | 4.8% - 4.9% | 32,670 | 31,733 - 33,518 | 5.3% | 5.2% - 5.3% | 35,096 | 33,795 - 36,323 | 5.2% | 5.1% - 5.3% | 42,544 | | 36,318 - 48,027 | 4.7% | 4.4% - 5.0% |
| Hispanic heterosexual men | 6,853 | 6,823 - 6,880 | 1.7% | 1.7% - 1.7% | 10,520 | 10,154 - 10,855 | 1.7% | 1.7% - 1.7% | 11,317 | 10,781 - 11,750 | 1.7% | 1.6% - 1.7% | 14,644 | | 12,162 - 16,892 | 1.6% | 1.5% - 1.7% |
| Heterosexual women | 79,229 | 79,096 - 79,380 | 20.1% | 20.0% - 20.1% | 119,830 | 118,176 - 121,769 | 19.4% | 19.3% - 19.5% | 128,970 | 126,545 - 131,705 | 19.2% | 19.1% - 19.4% | 169,990 | | 159,043 - 182,229 | 18.7% | 18.2% - 19.2% |
| White heterosexual women | 14,290 | 14,256 - 14,330 | 3.6% | 3.6% - 3.6% | 19,874 | 19,392 - 20,450 | 3.2% | 3.2% - 3.3% | 21,454 | 20,803 - 22,248 | 3.2% | 3.2% - 3.3% | 29,712 | | 26,617 - 33,332 | 3.3% | 3.1% - 3.5% |
| Black/AA heterosexual women | 50,082 | 49,987 - 50,188 | 12.7% | 12.7% - 12.7% | 78,626 | 77,402 - 79,992 | 12.7% | 12.6% - 12.8% | 84,585 | 82,816 - 86,436 | 12.6% | 12.5% - 12.7% | 108,412 | | 100,915 - 116,887 | 11.9% | 11.5% - 12.3% |
| Hispanic heterosexual women | 14,856 | 14,812 - 14,908 | 3.8% | 3.8% - 3.8% | 21,296 | 20,708 - 22,022 | 3.4% | 3.4% - 3.5% | 23,012 | 22,151 - 23,993 | 3.4% | 3.4% - 3.5% | 31,766 | | 27,930 - 36,138 | 3.5% | 3.2% - 3.7% |

1. Values represent the median for each simulated outcome across 200 random simulation replications. PEARL estimates of PWH on ART do not include the 42,216 [95%UR: 41,108 - 43-529], 43,134 [95%: 42,605 - 43,596], 41,728 [95%: 41,267 - 42,241] and 32,988 [95%UR: 31,641 - 34,457] people who initiated ART but were not receiving ART treatment in 2010, 2018, 2020, and 2030 (respectively) and those who are other race/ethnicity.
2. MSM who also have IDU as an HIV acquisition risk group were include in the IDU HIV acquisition risk group.

## Projected number of ART-initiators at baseline and under the EHE75% scenario, in selected years

Table S 27: Projected median number of ART-initiators in each subgroup from 2010–2030, in the baseline scenario and after simulating 75% reduction in new HIV diagnoses from 2020–2025 (EHE75% scenario). Values represent the median and 95% uncertainty ranges (UR) for each simulated outcome across 200 random simulations. a

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2010** | | **2015** | | **2020** | | **2025** | | **2030** | |
| **Subgroup** | **Median** | **95% UR** | **Median** | **95% UR** | **Median** | **95% UR** | **Median** | **95% UR** | **Median** | **95% UR** |
| **Baseline scenario** |  |  |  |  |  |  |  |  |  |  |
| **Overall** | 25,087 | 24,761 - 25,469 | 33,801 | 33,439 - 34,218 | 32,934 | 31,890 - 34,141 | 32,785 | 30,343 - 35,701 | 33,044 | 28,696 - 38,085 |
| **White MSM** | 5,444 | 5,284 - 5,617 | 6,886 | 6,720 - 7,067 | 5,738 | 5,231 - 6,251 | 4,288 | 3,152 - 5,522 | 2,906 | 1,062 - 4,904 |
| **Black/AA MSM** | 5,972 | 5,843 - 6,140 | 8,919 | 8,759 - 9,097 | 8,824 | 8,417 - 9,359 | 8,727 | 7,801 - 9,916 | 8,518 | 7,048 - 10,420 |
| **Hispanic MSM** | 3,732 | 3,582 - 3,880 | 6,390 | 6,222 - 6,561 | 7,498 | 6,980 - 8,001 | 8,918 | 7,520 - 10,314 | 10,743 | 7,857 - 13,624 |
| **White IDU men** | 642 | 589 - 691 | 1,011 | 954 - 1,066 | 1,109 | 970 - 1,246 | 1,231 | 951 - 1,498 | 1,323 | 858 - 1,751 |
| **Black/AA IDU men** | 860 | 817 - 908 | 679 | 625 - 732 | 560 | 408 - 738 | 558 | 244 - 923 | 607 | 155 - 1,128 |
| **Hispanic IDU men** | 502 | 456 - 552 | 584 | 538 - 632 | 578 | 454 - 700 | 645 | 386 - 914 | 712 | 316 - 1,135 |
| **White IDU women** | 231 | 220 - 242 | 394 | 379 - 408 | 464 | 432 - 494 | 551 | 488 - 612 | 654 | 545 - 758 |
| **Black/AA IDU women** | 454 | 425 - 475 | 344 | 308 - 372 | 284 | 186 - 355 | 302 | 106 - 440 | 340 | 63 - 533 |
| **Hispanic IDU women** | 134 | 117 - 151 | 132 | 115 - 151 | 136 | 93 - 184 | 160 | 67 - 265 | 194 | 49 - 345 |
| **White heterosexual men** | 293 | 277 - 312 | 400 | 380 - 421 | 418 | 367 - 477 | 446 | 334 - 573 | 466 | 300 - 650 |
| **Black/AA heterosexual men** | 1,652 | 1,573 - 1,721 | 1,819 | 1,741 - 1,889 | 1,544 | 1,325 - 1,739 | 1,320 | 828 - 1,754 | 1,060 | 279 - 1,757 |
| **Hispanic heterosexual men** | 455 | 425 - 482 | 534 | 502 - 563 | 496 | 405 - 575 | 474 | 267 - 656 | 428 | 114 - 715 |
| **White heterosexual women** | 658 | 624 - 698 | 897 | 859 - 946 | 931 | 819 - 1,068 | 1,014 | 765 - 1,303 | 1,084 | 714 - 1,521 |
| **Black/AA heterosexual women** | 3,318 | 3,223 - 3,424 | 3,862 | 3,747 - 3,983 | 3,404 | 3,123 - 3,742 | 3,144 | 2,547 - 3,819 | 2,908 | 2,052 - 3,887 |
| **Hispanic heterosexual women** | 742 | 698 - 794 | 944 | 892 - 1,004 | 949 | 803 - 1,110 | 1,020 | 722 - 1,365 | 1,074 | 630 - 1,595 |
| **EHE75% scenario** |  |  |  |  |  |  |  |  |  |  |
| **Overall** | 25,130 | 24,813 - 25,500 | 33,834 | 33,468 - 34,260 | 33,058 | 32,082 - 34,268 | 8,911 | 7,847 - 10,194 | 8,580 | 7,503 - 9,849 |
| **White MSM** | 5,458 | 5,287 - 5,622 | 6,898 | 6,716 - 7,068 | 5,764 | 5,235 - 6,262 | 1,502 | 956 - 2,029 | 1,446 | 906 - 1,968 |
| **Black/AA MSM** | 5,984 | 5,847 - 6,127 | 8,926 | 8,769 - 9,088 | 8,861 | 8,426 - 9,330 | 2,376 | 1,908 - 2,859 | 2,295 | 1,819 - 2,783 |
| **Hispanic MSM** | 3,744 | 3,586 - 3,870 | 6,404 | 6,232 - 6,552 | 7,544 | 7,011 - 7,970 | 2,072 | 1,491 - 2,523 | 1,982 | 1,408 - 2,431 |
| **White IDU men** | 638 | 585 - 690 | 1,007 | 948 - 1,063 | 1,100 | 958 - 1,241 | 301 | 146 - 448 | 284 | 133 - 433 |
| **Black/AA IDU men** | 870 | 816 - 906 | 691 | 624 - 737 | 597 | 405 - 735 | 196 | 14 - 329 | 195 | 7 - 324 |
| **Hispanic IDU men** | 502 | 454 - 552 | 584 | 539 - 632 | 580 | 450 - 711 | 154 | 16 - 295 | 146 | 9 - 291 |
| **White IDU women** | 231 | 220 - 242 | 393 | 380 - 408 | 462 | 432 - 494 | 126 | 94 - 157 | 121 | 88 - 154 |
| **Black/AA IDU women** | 450 | 425 - 474 | 340 | 311 - 370 | 272 | 186 - 353 | 86 | 7 - 160 | 86 | 6 - 159 |
| **Hispanic IDU women** | 134 | 117 - 151 | 132 | 115 - 151 | 138 | 93 - 184 | 44 | Apr-86 | 44 | Mar-84 |
| **White heterosexual men** | 296 | 276 - 312 | 403 | 379 - 422 | 428 | 364 - 477 | 116 | 52 - 171 | 111 | 48 - 166 |
| **Black/AA heterosexual men** | 1,639 | 1,572 - 1,716 | 1,809 | 1,743 - 1,883 | 1,506 | 1,324 - 1,724 | 388 | 192 - 620 | 376 | 177 - 608 |
| **Hispanic heterosexual men** | 448 | 425 - 483 | 528 | 504 - 564 | 476 | 404 - 578 | 114 | 39 - 223 | 108 | 34 - 217 |
| **White heterosexual women** | 663 | 624 - 697 | 904 | 857 - 945 | 954 | 818 - 1,065 | 260 | 123 - 379 | 250 | 113 - 370 |
| **Black/AA heterosexual women** | 3,326 | 3,227 - 3,426 | 3,868 | 3,755 - 3,977 | 3,444 | 3,137 - 3,743 | 925 | 602 - 1,247 | 894 | 571 - 1,225 |
| **Hispanic heterosexual women** | 743 | 698 - 794 | 945 | 892 - 1,004 | 950 | 808 - 1,116 | 247 | 93 - 415 | 233 | 82 - 402 |

aSlight differences in the numbers of ART initiators in each subgroup in the baseline scenario and the EHE75% scenario in years prior to 2020 are due to model’s stochasticity (i.e., the estimates represent the median of 200 random simulations that were run for the baseline and EHE75% scenarios)

## Characteristics of the projected population of ART-users at baseline and under the EHE75% scenario, in 2030

Table S 28: Characteristics of the projected population of people with HIV using ART in the United States in year 2030, under the baseline scenario and after simulating 75% reduction in new HIV diagnoses from 2020–2025 (EHE75% scenario). Values represent the median and 95% uncertainty ranges (UR) for each simulated outcome across 200 random simulations (n represents the population size and % show the proportion of population in each category).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Baseline Scenario PEARL  (PWH using ARTa)** | | | | **EHE75% Scenario PEARL  (PWH using ARTb)** | | | |
|  | **N =** | **909,638** |  |  | **N =** | **718,347** |  |  |
| **Characteristics** | **n** | **95%UR** | **%** | **95%UR** | **n** | **95%UR** | **%** | **95%UR** |
| **Age (in years)** |  |  |  |  |  |  |  |  |
| 18-20 | 1179 | 685 - 2,213 | 0.1% | 0.1% - 0.2% | 332 | 161 - 670 | 0.0% | 0.0% - 0.1% |
| 20-24 | 12,001 | 9,617 - 14,669 | 1.3% | 1.3% - 1.4% | 3,278 | 2,463 - 4,136 | 0.5% | 0.4% - 0.5% |
| 25-29 | 40,455 | 35,524 - 45,923 | 4.4% | 4.3% - 4.6% | 12,647 | 11,091 - 14,326 | 1.8% | 1.7% - 1.8% |
| 30-34 | 78,078 | 71,424 - 85,136 | 8.6% | 8.4% - 8.8% | 34,256 | 31,605 - 37,117 | 4.8% | 4.7% - 4.9% |
| 35-39 | 100,995 | 94,939 - 108,668 | 11.1% | 11.0% - 11.2% | 64,312 | 61,285 - 67,393 | 9.0% | 8.9% - 9.0% |
| 40-44 | 102,485 | 98,626 - 107,229 | 11.3% | 11.2% - 11.4% | 82,243 | 80,211 - 84,945 | 11.4% | 11.4% - 11.5% |
| 45-49 | 86,341 | 82,972 - 90,299 | 9.5% | 9.4% - 9.6% | 72,557 | 71,013 - 74,593 | 10.1% | 10.1% - 10.2% |
| 50-54 | 82,619 | 78,689 - 86,420 | 9.1% | 9.0% - 9.2% | 69,182 | 67,743 - 70,936 | 9.6% | 9.6% - 9.7% |
| 55-59 | 95,938 | 92,903 - 99,109 | 10.5% | 10.4% - 10.6% | 84,894 | 83,519 - 86,817 | 11.8% | 11.8% - 11.9% |
| 60-64 | 103,721 | 101,494 - 105,829 | 11.4% | 11.3% - 11.5% | 96,364 | 94,796 - 97,866 | 13.4% | 13.4% - 13.5% |
| ≥65 | 205,447 | 203,065 - 208,392 | 22.6% | 22.3% - 22.8% | 197,838 | 195,846 - 200,053 | 27.5% | 27.4% - 27.7% |
| **Male sex** | 714,112 | 682,584 - 745,897 | 78.5% | 77.8% - 79.0% | 557,542 | 542,156 - 572,114 | 77.6% | 77.3% - 78.0% |
| **Race** |  |  |  |  |  |  |  |  |
| White | 257,936 | 240,475 - 273,377 | 28.4% | 27.6% - 28.8% | 218,759 | 208,471 - 227,160 | 30.5% | 30.0% - 30.8% |
| Black/AA | 398,817 | 383,241 - 419,466 | 43.8% | 43.2% - 44.5% | 318,804 | 308,745 - 330,061 | 44.4% | 44.0% - 44.9% |
| Hispanic | 255,411 | 234,921 - 274,021 | 28.1% | 27.0% - 28.7% | 181,179 | 171,889 - 189,406 | 25.2% | 24.8% - 25.6% |
| **Sub-groups** |  |  |  |  |  |  |  |  |
| MSM | 581,243 | 554,876 - 610,942 | 63.9% | 63.3% - 64.6% | 453,124 | 439,130 - 466,996 | 63.1% | 62.6% - 63.4% |
| White MSM | 178,440 | 164,452 - 193,405 | 19.6% | 19.0% - 20.4% | 159,940 | 151,954 - 167,447 | 22.3% | 21.7% - 22.8% |
| Black/AA MSM | 215,384 | 203,679 - 230,450 | 23.7% | 23.1% - 24.4% | 164,730 | 158,030 - 171,942 | 22.9% | 22.6% - 23.4% |
| Hispanic MSM | 187,474 | 169,188 - 205,669 | 20.6% | 19.7% - 21.4% | 128,283 | 119,670 - 134,617 | 17.9% | 17.3% - 18.2% |
| IDU menc | 64,336 | 57,063 - 71,521 | 7.1% | 6.7% - 7.3% | 49,704 | 45,479 - 54,169 | 6.9% | 6.7% - 7.2% |
| White IDU men | 28,677 | 25,141 - 31,948 | 3.2% | 2.9% - 3.3% | 21,228 | 19,040 - 23,255 | 3.0% | 2.8% - 3.1% |
| Black/AA IDU men | 17,618 | 14,130 - 21,598 | 1.9% | 1.8% - 2.1% | 14,923 | 12,640 - 16,661 | 2.1% | 1.9% - 2.2% |
| Hispanic IDU men | 17,926 | 14,777 - 21,300 | 2.0% | 1.8% - 2.1% | 13,814 | 11,930 - 15,838 | 1.9% | 1.8% - 2.1% |
| IDU women | 26,198 | 23,673 - 28,663 | 2.9% | 2.8% - 3.0% | 20,493 | 18,995 - 21,756 | 2.9% | 2.8% - 2.9% |
| White IDU women | 9,288 | 8,564 - 9,962 | 1.0% | 1.0% - 1.1% | 6,027 | 5,651 - 6,431 | 0.8% | 0.8% - 0.9% |
| Black/AA IDU women | 14,140 | 11,946 - 15,768 | 1.6% | 1.4% - 1.6% | 12,310 | 11,199 - 13,409 | 1.7% | 1.6% - 1.8% |
| Hispanic IDU women | 2,952 | 2,055 - 3,900 | 0.3% | 0.3% - 0.4% | 2,137 | 1,694 - 2,613 | 0.3% | 0.3% - 0.3% |
| Heterosexual men | 67,536 | 61,165 - 74,536 | 7.4% | 7.1% - 7.7% | 55,352 | 51,291 - 59,408 | 7.7% | 7.5% - 7.9% |
| White heterosexual men | 10,342 | 9,014 - 11,913 | 1.1% | 1.1% - 1.2% | 7,735 | 6,833 - 8,500 | 1.1% | 1.0% - 1.1% |
| Black/AA heterosexual men | 42,544 | 36,318 - 48,027 | 4.7% | 4.4% - 5.0% | 35,362 | 32,573 - 38,704 | 4.9% | 4.7% - 5.2% |
| Hispanic heterosexual men | 14,644 | 12,162 - 16,892 | 1.6% | 1.5% - 1.7% | 11,793 | 10,746 - 13,322 | 1.6% | 1.6% - 1.7% |
| Heterosexual women | 169,990 | 159,043 - 182,229 | 18.7% | 18.2% - 19.2% | 140,016 | 133,761 - 146,933 | 19.5% | 19.2% - 19.8% |
| White heterosexual women | 29,712 | 26,617 - 33,332 | 3.3% | 3.1% - 3.5% | 23,562 | 21,550 - 25,321 | 3.3% | 3.1% - 3.4% |
| Black/AA heterosexual women | 108,412 | 100,915 - 116,887 | 11.9% | 11.5% - 12.3% | 91,240 | 86,453 - 95,960 | 12.7% | 12.4% - 13.0% |
| Hispanic heterosexual women | 31,766 | 27,930 - 36,138 | 3.5% | 3.2% - 3.7% | 25,212 | 22,921 - 27,765 | 3.5% | 3.4% - 3.7% |

Footnotes:

a. PEARL projections of PWH on ART do not include the 32,988 [95%UR: 31,641 – 34,457] people who initiated ART but were not receiving ART treatment in 2030 at baseline

b. PEARL projections of PWH on ART do not include the 26,119 [95%UR: 25,348 – 26,842] people who initiated ART but were not receiving ART treatment in 2030, under the EHE75% scenario

c. MSM who also have IDU as an HIV acquisition risk group were include in the IDU HIV acquisition risk group.

## Projected differences in age distribution of ART-users at baseline and under the EHE75% scenario, in selected years

Table S 29: Projected differences in age distribution of people with HIV using ART in the United States in 2030, under the baseline scenario and after simulating 75% reduction in new HIV diagnoses from 2020–2025 (EHE75% scenario), by 15 subgroups. Values represent the difference in median proportion of PWH in each age-group within each of 15 subgroups, [EHE75% projection - baseline projection]. A threshold of 5% (>5% or <-5%) is used to detect clinically relevant differences, and significant differences are highlighted in blue.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **2010** | **2015** | **2020** | **2025** | **2030** |
| **White MSM** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -1.4% | -1.7% |
| [5.0% vs. 5.1%] | [6.7% vs. 6.6%] | [6.0% vs. 6.0%] | [3.3% vs. 4.7%] | [1.8% vs. 3.5%] |
| **30-39 years** | 0.0% | 0.0% | 0.0% | -0.9% | -2.6% |
| [17.9% vs. 17.9%] | [13.5% vs. 13.4%] | [13.9% vs. 13.9%] | [13.5% vs. 14.3%] | [10.0% vs. 12.6%] |
| **40-49 years** | 0.0% | 0.0% | 0.0% | -0.1% | 0.0% |
| [43.4% vs. 43.3%] | [30.4% vs. 30.4%] | [20.1% vs. 20.1%] | [15.7% vs. 15.7%] | [15.8% vs. 15.9%] |
| **50-59 years** | 0.0% | 0.0% | 0.0% | 0.7% | 0.4% |
| [25.4% vs. 25.4%] | [35.0% vs. 35.0%] | [36.2% vs. 36.2%] | [29.2% vs. 28.6%] | [21.3% vs. 20.9%] |
| **60-69 years** | 0.0% | 0.0% | 0.0% | 1.2% | 2.4% |
| [7.3% vs. 7.3%] | [12.2% vs. 12.2%] | [18.9% vs. 18.9%] | [28.7% vs. 27.5%] | [33.5% vs. 31.1%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 0.5% | 1.6% |
| [1.0% vs. 1.0%] | [2.3% vs. 2.3%] | [4.9% vs. 4.9%] | [9.6% vs. 9.1%] | [17.6% vs. 16.0%] |
| **Black/AA MSM** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -4.9% | -7.1% |
| [20.6% vs. 20.6%] | [24.6% vs. 24.6%] | [20.3% vs. 20.3%] | [10.7% vs. 15.6%] | [5.2% vs. 12.3%] |
| **30-39 years** | 0.0% | 0.0% | 0.0% | 0.2% | -4.8% |
| [24.0% vs. 24.0%] | [21.7% vs. 21.7%] | [29.2% vs. 29.2%] | [34.1% vs. 33.9%] | [27.3% vs. 32.1%] |
| **40-49 years** | 0.0% | 0.0% | 0.0% | 1.3% | 4.5% |
| [34.6% vs. 34.6%] | [26.6% vs. 26.6%] | [19.0% vs. 19.0%] | [18.9% vs. 17.6%] | [27.8% vs. 23.3%] |
| **50-59 years** | 0.0% | 0.0% | 0.0% | 1.7% | 2.8% |
| [17.7% vs. 17.7%] | [20.9% vs. 21.0%] | [21.3% vs. 21.3%] | [20.0% vs. 18.3%] | [17.0% vs. 14.2%] |
| **60-69 years** | 0.0% | 0.0% | 0.0% | 1.3% | 3.3% |
| [3.0% vs. 3.0%] | [5.6% vs. 5.6%] | [8.9% vs. 8.9%] | [13.2% vs. 11.8%] | [16.4% vs. 13.1%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 0.3% | 1.4% |
| [0.2% vs. 0.2%] | [0.5% vs. 0.5%] | [1.3% vs. 1.3%] | [3.1% vs. 2.7%] | [6.3% vs. 4.9%] |
| **Hispanic MSM** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.1% | -4.7% | -6.3% |
| [12.1% vs. 12.1%] | [14.9% vs. 14.9%] | [14.4% vs. 14.3%] | [7.7% vs. 12.4%] | [3.6% vs. 9.8%] |
| **30-39 years** | 0.0% | 0.0% | 0.0% | -2.5% | -9.4% |
| [34.6% vs. 34.6%] | [25.7% vs. 25.7%] | [27.7% vs. 27.7%] | [29.7% vs. 32.2%] | [22.5% vs. 31.9%] |
| **40-49 years** | 0.0% | 0.0% | 0.0% | 2.0% | 3.4% |
| [37.3% vs. 37.3%] | [35.8% vs. 35.8%] | [27.8% vs. 27.9%] | [23.8% vs. 21.9%] | [27.7% vs. 24.3%] |
| **50-59 years** | 0.0% | 0.0% | 0.0% | 3.2% | 5.3% |
| [13.1% vs. 13.1%] | [19.2% vs. 19.2%] | [23.0% vs. 23.0%] | [25.6% vs. 22.4%] | [24.1% vs. 18.8%] |
| **60-69 years** | 0.0% | 0.0% | 0.0% | 1.7% | 5.4% |
| [2.3% vs. 2.3%] | [3.6% vs. 3.6%] | [6.2% vs. 6.2%] | [11.2% vs. 9.5%] | [17.6% vs. 12.2%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 0.3% | 1.4% |
| [0.7% vs. 0.7%] | [0.8% vs. 0.8%] | [1.0% vs. 1.0%] | [2.0% vs. 1.7%] | [4.6% vs. 3.1%] |
| **White IDU men** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -3.3% | -6.0% |
| [2.5% vs. 2.5%] | [3.5% vs. 3.5%] | [5.9% vs. 5.9%] | [4.8% vs. 8.1%] | [3.6% vs. 9.6%] |
| **30-39 years** | 0.0% | 0.0% | 0.0% | -1.7% | -5.5% |
| [12.4% vs. 12.5%] | [9.9% vs. 9.9%] | [11.9% vs. 11.9%] | [12.7% vs. 14.5%] | [11.8% vs. 17.3%] |
| **40-49 years** | 0.0% | 0.0% | 0.1% | 0.2% | 0.5% |
| [39.4% vs. 39.4%] | [27.4% vs. 27.4%] | [16.6% vs. 16.5%] | [13.1% vs. 12.9%] | [15.0% vs. 14.4%] |
| **50-59 years** | 0.1% | -0.1% | 0.0% | 1.2% | 1.3% |
| [36.1% vs. 36.0%] | [40.0% vs. 40.1%] | [36.0% vs. 36.0%] | [27.7% vs. 26.5%] | [18.5% vs. 17.2%] |
| **60-69 years** | 0.0% | 0.0% | 0.0% | 2.5% | 5.6% |
| [9.0% vs. 9.0%] | [17.0% vs. 17.0%] | [24.5% vs. 24.5%] | [31.0% vs. 28.4%] | [32.5% vs. 26.8%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 1.1% | 4.4% |
| [0.6% vs. 0.6%] | [2.1% vs. 2.1%] | [5.1% vs. 5.1%] | [10.6% vs. 9.5%] | [18.6% vs. 14.3%] |
| **Black/AA IDU men** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.2% | -3.8% | -10.9% |
| [0.6% vs. 0.6%] | [2.4% vs. 2.3%] | [7.3% vs. 7.1%] | [9.7% vs. 13.6%] | [10.1% vs. 21.0%] |
| **30-39 years** | 0.0% | 0.1% | 0.0% | 0.3% | 0.9% |
| [3.0% vs. 3.0%] | [3.9% vs. 3.8%] | [5.0% vs. 5.0%] | [6.9% vs. 6.7%] | [10.8% vs. 9.9%] |
| **40-49 years** | 0.0% | 0.0% | 0.0% | 0.0% | 0.3% |
| [26.0% vs. 26.0%] | [11.4% vs. 11.4%] | [6.6% vs. 6.5%] | [6.1% vs. 6.1%] | [7.4% vs. 7.1%] |
| **50-59 years** | 0.0% | -0.1% | 0.0% | 0.4% | 0.4% |
| [54.5% vs. 54.6%] | [48.3% vs. 48.4%] | [29.1% vs. 29.1%] | [14.5% vs. 14.1%] | [9.0% vs. 8.6%] |
| **60-69 years** | 0.0% | 0.0% | -0.2% | 2.1% | 3.9% |
| [15.3% vs. 15.3%] | [31.4% vs. 31.4%] | [43.3% vs. 43.5%] | [41.9% vs. 39.8%] | [28.3% vs. 24.5%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 1.1% | 4.9% |
| [0.5% vs. 0.5%] | [2.6% vs. 2.6%] | [8.8% vs. 8.9%] | [20.8% vs. 19.7%] | [33.8% vs. 28.9%] |
| **Hispanic IDU men** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -3.1% | -5.8% |
| [2.0% vs. 2.0%] | [3.3% vs. 3.3%] | [5.0% vs. 5.0%] | [3.6% vs. 6.7%] | [2.6% vs. 8.4%] |
| **30-39 years** | 0.1% | 0.0% | 0.0% | -1.9% | -6.0% |
| [12.2% vs. 12.1%] | [10.2% vs. 10.2%] | [10.7% vs. 10.8%] | [11.5% vs. 13.3%] | [10.4% vs. 16.4%] |
| **40-49 years** | 0.0% | 0.0% | 0.0% | -0.8% | -1.5% |
| [30.1% vs. 30.1%] | [21.8% vs. 21.8%] | [18.1% vs. 18.1%] | [14.9% vs. 15.7%] | [14.1% vs. 15.7%] |
| **50-59 years** | 0.0% | 0.0% | 0.0% | 1.2% | 1.7% |
| [44.5% vs. 44.4%] | [39.9% vs. 40.0%] | [29.2% vs. 29.1%] | [23.2% vs. 22.0%] | [20.3% vs. 18.6%] |
| **60-69 years** | 0.0% | 0.0% | 0.2% | 3.0% | 5.7% |
| [11.0% vs. 11.0%] | [22.7% vs. 22.6%] | [30.4% vs. 30.2%] | [31.2% vs. 28.2%] | [26.9% vs. 21.2%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 1.4% | 6.0% |
| [0.4% vs. 0.4%] | [2.1% vs. 2.1%] | [6.7% vs. 6.7%] | [15.4% vs. 14.0%] | [25.8% vs. 19.8%] |
| **White IDU women** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -1.3% | -1.9% |
| [4.5% vs. 4.4%] | [2.8% vs. 2.8%] | [2.6% vs. 2.5%] | [1.5% vs. 2.8%] | [1.0% vs. 2.8%] |
| **30-39 years** | 0.1% | 0.0% | 0.0% | -2.8% | -5.6% |
| [24.8% vs. 24.7%] | [17.2% vs. 17.2%] | [14.5% vs. 14.5%] | [10.4% vs. 13.2%] | [6.8% vs. 12.3%] |
| **40-49 years** | -0.1% | 0.0% | 0.0% | -1.0% | -3.9% |
| [41.8% vs. 41.9%] | [34.5% vs. 34.5%] | [28.2% vs. 28.2%] | [26.2% vs. 27.3%] | [23.2% vs. 27.1%] |
| **50-59 years** | 0.0% | -0.1% | -0.1% | 1.7% | 1.7% |
| [25.1% vs. 25.1%] | [35.2% vs. 35.3%] | [35.0% vs. 35.1%] | [30.9% vs. 29.2%] | [28.5% vs. 26.7%] |
| **60-69 years** | 0.1% | 0.0% | 0.0% | 2.6% | 5.4% |
| [3.7% vs. 3.6%] | [9.7% vs. 9.6%] | [17.4% vs. 17.4%] | [24.3% vs. 21.7%] | [26.3% vs. 20.9%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 0.9% | 4.3% |
| [0.1% vs. 0.1%] | [0.6% vs. 0.6%] | [2.3% vs. 2.3%] | [6.6% vs. 5.7%] | [14.4% vs. 10.0%] |
| **Black/AA IDU women** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -0.6% | -1.1% |
| [0.6% vs. 0.6%] | [0.8% vs. 0.8%] | [1.1% vs. 1.1%] | [0.9% vs. 1.5%] | [0.6% vs. 1.7%] |
| **30-39 years** | 0.0% | 0.0% | 0.0% | -0.8% | -1.8% |
| [9.8% vs. 9.8%] | [4.8% vs. 4.9%] | [4.4% vs. 4.4%] | [3.3% vs. 4.2%] | [2.7% vs. 4.5%] |
| **40-49 years** | 0.0% | 0.0% | 0.0% | -0.9% | -1.9% |
| [40.7% vs. 40.7%] | [23.9% vs. 23.9%] | [12.7% vs. 12.8%] | [8.4% vs. 9.3%] | [7.3% vs. 9.2%] |
| **50-59 years** | 0.0% | 0.1% | 0.0% | 0.2% | -1.0% |
| [44.7% vs. 44.7%] | [52.2% vs. 52.1%] | [39.9% vs. 39.9%] | [26.0% vs. 25.9%] | [15.8% vs. 16.8%] |
| **60-69 years** | 0.0% | 0.0% | 0.1% | 1.8% | 2.9% |
| [4.1% vs. 4.1%] | [17.7% vs. 17.7%] | [38.6% vs. 38.5%] | [47.4% vs. 45.7%] | [40.3% vs. 37.5%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 0.4% | 3.2% |
| [0.1% vs. 0.1%] | [0.6% vs. 0.6%] | [3.3% vs. 3.3%] | [13.7% vs. 13.4%] | [33.4% vs. 30.2%] |
| **Hispanic IDU women** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -0.3% | -0.4% |
| [3.3% vs. 3.3%] | [0.5% vs. 0.5%] | [0.4% vs. 0.4%] | [0.2% vs. 0.4%] | [0.1% vs. 0.5%] |
| **30-39 years** | 0.0% | 0.1% | 0.2% | -2.0% | -4.6% |
| [10.7% vs. 10.7%] | [9.7% vs. 9.6%] | [7.9% vs. 7.7%] | [4.6% vs. 6.6%] | [3.4% vs. 7.9%] |
| **40-49 years** | -0.1% | 0.0% | 0.0% | -1.6% | -4.3% |
| [41.7% vs. 41.7%] | [24.4% vs. 24.4%] | [16.8% vs. 16.8%] | [15.8% vs. 17.4%] | [13.7% vs. 18.0%] |
| **50-59 years** | -0.1% | 0.0% | -0.2% | -0.6% | -3.6% |
| [38.0% vs. 38.1%] | [46.3% vs. 46.3%] | [39.6% vs. 39.7%] | [28.3% vs. 28.8%] | [21.7% vs. 25.3%] |
| **60-69 years** | 0.0% | 0.0% | 0.0% | 2.9% | 5.8% |
| [6.1% vs. 6.1%] | [18.0% vs. 18.0%] | [30.2% vs. 30.2%] | [36.7% vs. 33.9%] | [33.4% vs. 27.7%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 1.4% | 7.1% |
| [0.2% vs. 0.2%] | [1.3% vs. 1.3%] | [5.1% vs. 5.1%] | [14.2% vs. 12.8%] | [27.7% vs. 20.5%] |
| **White heterosexual men** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | -0.1% | 0.0% | 0.0% | -2.0% | -3.9% |
| [3.2% vs. 3.3%] | [3.5% vs. 3.5%] | [4.6% vs. 4.6%] | [3.7% vs. 5.7%] | [2.7% vs. 6.5%] |
| **30-39 years** | 0.1% | 0.0% | -0.1% | -0.5% | -1.9% |
| [15.3% vs. 15.2%] | [14.0% vs. 14.1%] | [10.8% vs. 10.9%] | [8.6% vs. 9.1%] | [7.1% vs. 8.9%] |
| **40-49 years** | 0.0% | 0.0% | 0.0% | 0.1% | 0.1% |
| [39.5% vs. 39.5%] | [28.1% vs. 28.1%] | [20.1% vs. 20.1%] | [15.5% vs. 15.4%] | [12.2% vs. 12.1%] |
| **50-59 years** | 0.0% | 0.1% | 0.0% | 0.6% | 0.4% |
| [29.3% vs. 29.3%] | [35.8% vs. 35.7%] | [34.8% vs. 34.8%] | [28.2% vs. 27.6%] | [21.9% vs. 21.6%] |
| **60-69 years** | 0.0% | -0.1% | 0.0% | 1.4% | 2.9% |
| [10.5% vs. 10.5%] | [15.0% vs. 15.1%] | [22.8% vs. 22.8%] | [31.0% vs. 29.7%] | [33.6% vs. 30.7%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 0.5% | 2.3% |
| [2.2% vs. 2.1%] | [3.6% vs. 3.5%] | [6.9% vs. 6.9%] | [13.0% vs. 12.5%] | [22.5% vs. 20.2%] |
| **Black/AA heterosexual men** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -1.3% | -2.0% |
| [4.7% vs. 4.7%] | [5.7% vs. 5.7%] | [4.8% vs. 4.9%] | [2.9% vs. 4.2%] | [1.6% vs. 3.6%] |
| **30-39 years** | 0.1% | 0.0% | 0.0% | -1.2% | -3.1% |
| [18.5% vs. 18.5%] | [13.2% vs. 13.2%] | [13.3% vs. 13.2%] | [11.8% vs. 13.0%] | [8.4% vs. 11.4%] |
| **40-49 years** | 0.0% | 0.0% | 0.0% | -0.5% | -1.2% |
| [42.7% vs. 42.7%] | [32.7% vs. 32.6%] | [22.4% vs. 22.4%] | [17.1% vs. 17.7%] | [16.4% vs. 17.6%] |
| **50-59 years** | -0.1% | -0.1% | 0.0% | 0.8% | 0.2% |
| [26.0% vs. 26.1%] | [34.7% vs. 34.8%] | [36.8% vs. 36.8%] | [32.3% vs. 31.5%] | [24.5% vs. 24.3%] |
| **60-69 years** | 0.1% | 0.0% | 0.0% | 1.6% | 3.6% |
| [6.8% vs. 6.8%] | [11.5% vs. 11.4%] | [18.7% vs. 18.7%] | [27.8% vs. 26.2%] | [33.3% vs. 29.7%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 0.6% | 2.2% |
| [1.3% vs. 1.3%] | [2.2% vs. 2.2%] | [4.0% vs. 4.0%] | [8.0% vs. 7.5%] | [15.6% vs. 13.4%] |
| **Hispanic heterosexual men** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -0.7% | -0.9% |
| [7.6% vs. 7.6%] | [4.5% vs. 4.5%] | [2.8% vs. 2.8%] | [1.4% vs. 2.1%] | [0.7% vs. 1.6%] |
| **30-39 years** | 0.0% | 0.0% | 0.0% | -1.1% | -2.1% |
| [28.8% vs. 28.8%] | [20.3% vs. 20.3%] | [15.3% vs. 15.3%] | [9.0% vs. 10.1%] | [4.6% vs. 6.7%] |
| **40-49 years** | 0.0% | 0.1% | -0.1% | -0.5% | -1.5% |
| [35.7% vs. 35.7%] | [33.8% vs. 33.7%] | [29.5% vs. 29.6%] | [25.1% vs. 25.5%] | [18.4% vs. 19.9%] |
| **50-59 years** | 0.0% | 0.0% | 0.0% | 1.0% | 1.0% |
| [19.1% vs. 19.1%] | [27.2% vs. 27.2%] | [30.0% vs. 30.0%] | [32.0% vs. 31.0%] | [31.1% vs. 30.2%] |
| **60-69 years** | 0.0% | 0.0% | 0.1% | 1.1% | 2.6% |
| [7.1% vs. 7.1%] | [11.5% vs. 11.5%] | [16.7% vs. 16.7%] | [22.2% vs. 21.1%] | [28.3% vs. 25.7%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 0.2% | 1.1% |
| [1.6% vs. 1.6%] | [2.8% vs. 2.8%] | [5.7% vs. 5.7%] | [10.3% vs. 10.1%] | [16.9% vs. 15.9%] |
| **White heterosexual women** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -0.4% | -0.6% |
| [6.9% vs. 6.9%] | [6.1% vs. 6.1%] | [2.6% vs. 2.5%] | [0.8% vs. 1.3%] | [0.3% vs. 1.0%] |
| **30-39 years** | 0.0% | 0.0% | 0.0% | -0.9% | -1.7% |
| [26.1% vs. 26.1%] | [17.6% vs. 17.6%] | [14.8% vs. 14.8%] | [9.1% vs. 10.0%] | [3.9% vs. 5.6%] |
| **40-49 years** | 0.0% | -0.1% | 0.0% | -0.9% | -1.7% |
| [38.6% vs. 38.5%] | [33.9% vs. 33.9%] | [27.5% vs. 27.5%] | [22.4% vs. 23.2%] | [17.5% vs. 19.2%] |
| **50-59 years** | 0.0% | 0.0% | 0.0% | 0.4% | -0.3% |
| [21.0% vs. 21.0%] | [29.4% vs. 29.4%] | [33.3% vs. 33.3%] | [33.0% vs. 32.5%] | [29.2% vs. 29.5%] |
| **60-69 years** | 0.0% | 0.0% | 0.0% | 1.2% | 2.6% |
| [6.1% vs. 6.1%] | [10.5% vs. 10.5%] | [17.1% vs. 17.1%] | [25.5% vs. 24.3%] | [32.0% vs. 29.5%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 0.6% | 2.0% |
| [1.3% vs. 1.3%] | [2.5% vs. 2.5%] | [4.7% vs. 4.7%] | [9.1% vs. 8.6%] | [17.0% vs. 15.0%] |
| **Black/AA heterosexual women** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -0.8% | -1.0% |
| [10.7% vs. 10.8%] | [7.4% vs. 7.3%] | [4.0% vs. 4.0%] | [1.6% vs. 2.4%] | [0.7% vs. 1.7%] |
| **30-39 years** | 0.0% | 0.0% | 0.0% | -1.3% | -3.0% |
| [28.8% vs. 28.8%] | [21.6% vs. 21.6%] | [17.7% vs. 17.7%] | [12.5% vs. 13.8%] | [6.8% vs. 9.8%] |
| **40-49 years** | 0.0% | 0.0% | 0.0% | -0.4% | -1.6% |
| [35.0% vs. 35.0%] | [33.3% vs. 33.3%] | [28.8% vs. 28.8%] | [24.4% vs. 24.8%] | [20.6% vs. 22.2%] |
| **50-59 years** | 0.0% | 0.0% | 0.0% | 0.7% | 0.6% |
| [20.4% vs. 20.4%] | [27.4% vs. 27.5%] | [31.4% vs. 31.4%] | [32.4% vs. 31.7%] | [29.9% vs. 29.3%] |
| **60-69 years** | 0.0% | 0.0% | 0.0% | 1.2% | 3.1% |
| [4.6% vs. 4.6%] | [9.1% vs. 9.1%] | [15.1% vs. 15.1%] | [22.4% vs. 21.2%] | [28.6% vs. 25.5%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 0.5% | 2.0% |
| [0.4% vs. 0.4%] | [1.2% vs. 1.2%] | [2.9% vs. 2.9%] | [6.7% vs. 6.3%] | [13.4% vs. 11.4%] |
| **Hispanic heterosexual women** |  |  |  |  |  |
|  |  |  |  |  |
| **<30 years** | 0.0% | 0.0% | 0.0% | -2.5% | -4.1% |
| [10.3% vs. 10.3%] | [5.6% vs. 5.7%] | [4.9% vs. 4.9%] | [2.8% vs. 5.3%] | [1.9% vs. 5.9%] |
| **30-39 years** | 0.0% | 0.0% | 0.1% | -1.6% | -5.7% |
| [30.0% vs. 30.0%] | [25.2% vs. 25.2%] | [19.3% vs. 19.2%] | [14.7% vs. 16.3%] | [9.8% vs. 15.5%] |
| **40-49 years** | -0.1% | 0.0% | 0.0% | 1.2% | 1.8% |
| [33.3% vs. 33.3%] | [30.1% vs. 30.1%] | [26.9% vs. 26.9%] | [23.7% vs. 22.4%] | [19.5% vs. 17.7%] |
| **50-59 years** | 0.1% | 0.0% | -0.1% | 1.2% | 2.8% |
| [21.0% vs. 20.9%] | [26.6% vs. 26.6%] | [27.1% vs. 27.2%] | [26.3% vs. 25.1%] | [25.8% vs. 23.0%] |
| **60-69 years** | 0.0% | 0.0% | 0.0% | 1.2% | 3.0% |
| [5.0% vs. 5.0%] | [10.8% vs. 10.8%] | [17.2% vs. 17.2%] | [22.6% vs. 21.4%] | [25.4% vs. 22.4%] |
| **≥70 years** | 0.0% | 0.0% | 0.0% | 0.5% | 2.4% |
| [0.4% vs. 0.4%] | [1.7% vs. 1.7%] | [4.6% vs. 4.6%] | [9.9% vs. 9.3%] | [17.7% vs. 15.3%] |

# One-Way Sensitivity Analysis

We analyzed the sensitivity of 3 main outcomes to variation in value of 15 key parameters in the model. These outcomes include: Proportion of ART users aged 65 and over, number of deaths in care, and number of ART users by 2030 among all subgroups.

Using a threshold of 10%, we varied each parameter to 90% and 110% of its original value. These changes were modeled in year 2009 for parameters describing the initial population and from year 2020 – 2030 for all other dynamic parameters (**Table S30**). Variation in value of all each parameter was modeled via a multiplicative coefficient (at the agent-level) used to modify the final value generated from each parameter function in the code to 90% and 110% of its original value (e.g., multiplying the number of ART initiators generated in each year between 2020 to 2030 by 90% of its original value).

The sensitivity analysis was carried by simulating independent sets of 200 simulations where each parameter was varied at 90% (and 110%) of its original value, and comparing the results to the baseline simulations (200 replications) with all parameters in their original form. Table S30 shows the estimated average value of each parameter within the entire population at baseline and upper/lower sensitivity analysis scenarios. These values represent the estimated averages in year 2009 for parameters describing the initial population and in year 2020 for the remaining dynamic parameters. For parameters that are applied every year, the changes are modeled annually in each year from 2020 – 2030, but only the 2020 value is shown.

Figures S19-S21 present the results of the sensitivity analysis.

Table S 30: Table of parameters varied in the one-way sensitivity analysis

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Baseline scenario** | **Lower sensitivity analysis scenario** | **Upper sensitivity analysis scenario** |
| **Parameter groups** | **Estimated average** | **Estimated average (%change from baseline)** | **Estimated average (%change from baseline)** |
| **Number of ART Users in 2009** | 369,946 | 332,944 (-10.0%) | 406,934 (+10.0%) |
| **Age of ART Users in 2009** | 44.9 | 40.4 (-10.1%) | 49.4 (+10.1%) |
| **CD4 Count at ART Initiation for ART Users in 2009** | 260.2 | 234.19 (-10.0%) | 286.19 (+10.0%) |
| **Number of ART Non-users in 2009** | 42,272 | 38,080 (-9.9%) | 46,513 (+10.0%) |
| **Age of ART Non-users in 2009** | 44.3 | 39.8 (-10.1%) | 48.7 (+10.1%) |
| **CD4 Count at ART Initiation for ART non-users in 2009** | 255.7 | 229.98 (-10.1%) | 281.23 (+10.0%) |
| **Number of ART Initiators (2020)** | 32,963 | 29,691 (-9.9%) | 36,386 (+10.4%) |
| **Age at ART Initiation (2020)** | 36.5 | 32.8 (-10.2%) | 40.1 (+10.1%) |
| **CD4 Count at ART Initiation (2020)** | 485.55 | 436.59 (-10.1%) | 534.37 (+10.1%) |
| **Probability of Disengagement from ART (2020)** | 0.033 | 0.030 (-9.9%) | 0.036 (+10.0%) |
| **Number of Years to Reengagement at the Time of Disengagement (2020)a** | 1.86 | 1.78 (-4.6%) | 1.95 (+4.7%) |
| **Probability of Dying on ART (2020)** | 0.011 | 0.010 (-9.0%) | 0.012 (+8.8%) |
| **Probability of Dying off ART (2020)** | 0.014 | 0.013 (-9.8%) | 0.016 (+9.7%) |
| **Annual Increase in CD4 among ART Users (2020)b** | 14.795 | 13.41 (-9.4%) | 16.19 (+9.4%) |
| **Annual Decrease in CD4 among ART Non-Users (2020)b** | -112.318 | -118.73 (-5.7%) | -104.25 (+7.2%) |

1. Multiplier was applied on the parameter of the Poisson distribution used to model years out of care.
2. Multiplier was applied on new annual CD4 count rather than difference in CD4 count as reported here

Schematic

Description automatically generated with low confidence

**Figure S 19: One-way sensitivity analysis in proportion of ART-users ≥65y in year 2030 to variation of all simulation parameters. The percent changes in value of the main outcome relative to baseline scenario (x-axis) under one-way changes in model parameters (y-axis) are shown. The up/down arrows on the y-axis mark an increase/decrease in value of each parameter by 10%. Circles mark the median values and black bars represent the 95% uncertainty range for simulated outcomes. The baseline value is marked in black and shown as a dotted vertical line to compare against other scenarios. Scenarios are ranked in the order of effect. Red dots mark >10% variations from the baseline.**

Chart

Description automatically generated with medium confidence

**Figure S 20: One-way sensitivity analysis in number of deaths in care to variation of all simulation parameters. The percent changes in value of the main outcome relative to baseline scenario (x-axis) under one-way changes in model parameters (y-axis) are shown. The up/down arrows on the y-axis mark an increase/decrease in value of each parameter by 10%. Circles mark the median values and black bars represent the 95% uncertainty range for simulated outcomes. The baseline value is marked in black and shown as a dotted vertical line to compare against other scenarios. Scenarios are ranked in the order of effect. Red dots mark >10% variations from the baseline.**

Diagram

Description automatically generated with medium confidence

**Figure S 21: One-way sensitivity analysis in number of ART users in year 2030 to variation of all simulation parameters. The percent changes in value of the main outcome relative to baseline scenario (x-axis) under one-way changes in model parameters (y-axis) are shown. The up/down arrows on the y-axis mark an increase/decrease in value of each parameter by 10%. Circles mark the median values and black bars represent the 95% uncertainty range for simulated outcomes. The baseline value is marked in black and shown as a dotted vertical line to compare against other scenarios. Scenarios are ranked in the order of effect. Red dots mark >10% variations from the baseline.**

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1. Given the right-skewed distribution of CD4 counts, a square root transformation was applied to better approximate a normal distribution for CD4 counts in each year. [↑](#footnote-ref-2)