# AUSTRALIAN HIV OBSERVATIONAL DATABASE (AHOD) ANNUAL REPORT

**(Volume 23, Number 1: October 2024)**

## Rates and predictors of viral blips, low-level viraemia and virological failure in the Australian HIV observational database

Australia has made significant progress towards achieving the UNAIDS's 95-95-95 cascade targets including HIV viral suppression. However, a small proportion of people with HIV on treatment in Australia still experience viraemia despite highly efficacious antiretroviral treatment (ART) options. Detectable HIV viraemia may occur due to viral load blips, which are brief, minor increases in viral load; low-level viraemia (LLV), characterized by persistent but low levels of viraemia; or virologic failure (VF), defined by confirmed viraemia levels above 200 copies/mL. A thorough understanding of the factors linked to HIV viraemia can guide clinicians in managing virological blips and low-level viraemia (LLV) in HIV care, thereby helping Australia achieve the UNAIDS target for viral suppression.

We used the Australian HIV observational database (AHOD) data to investigate the proportions of individuals

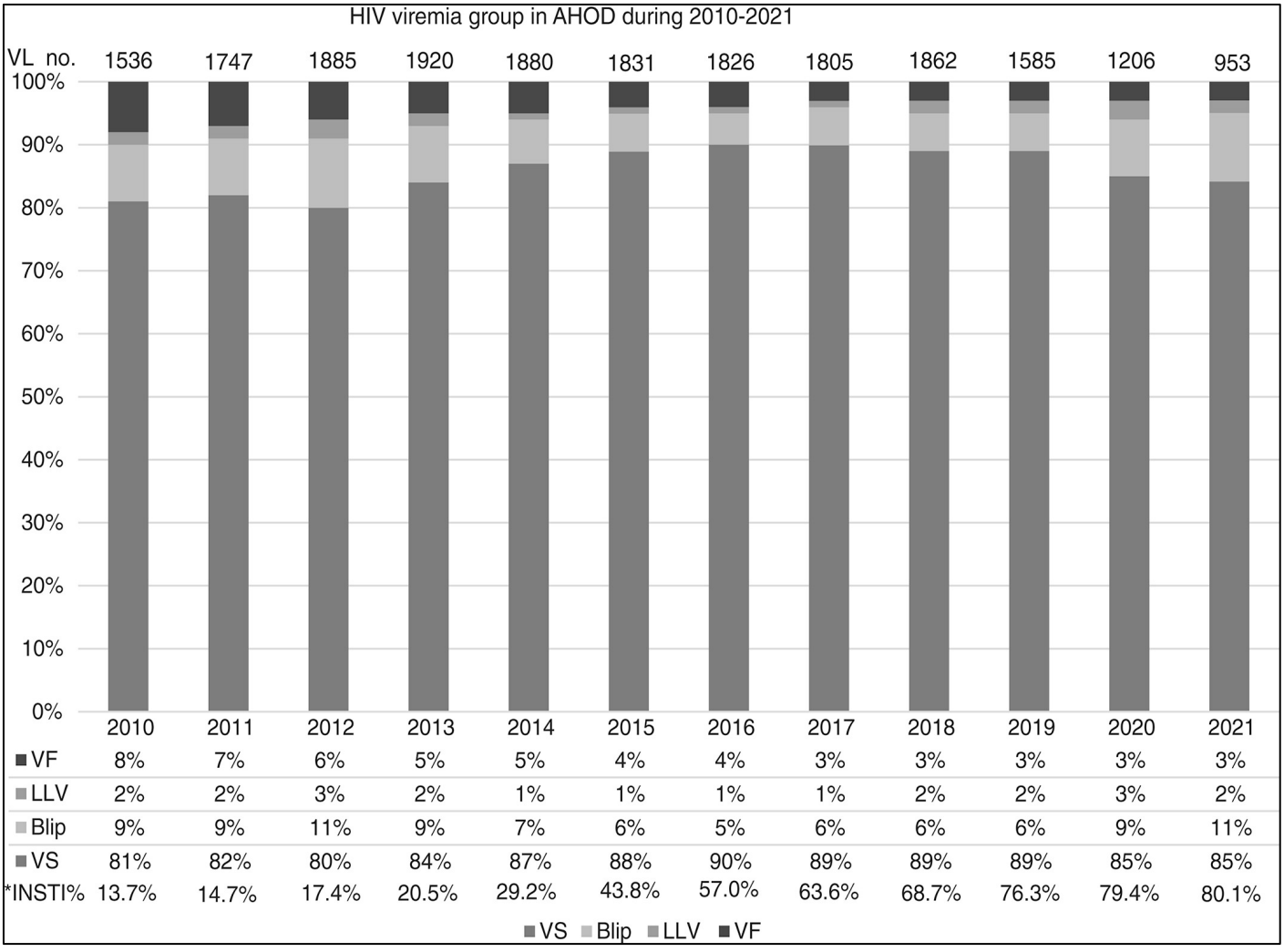



**Figure**. HIV viraemia group (viral suppression, blip, low-level viraemia and virological failure) in AHOD. The proportion of VS, blip, LLV and VF are presented for each year between 2010 and 2021 in AHOD. *The proportion of integrase strand transfer inhibitors (INSTI) use over time is presented for each year.

with VF, detectable viral loads due to blips and LLV between 2010 and 2021 [1]. We assessed whether blips and LLV are linked to the development of subsequent VF, as well as predictors associated with blips, LLV,

and VF. We included AHOD participants who were on at least three-drug combination ART or national guideline-endorsed dual therapy since 2010. 'VF' was defined as two consecutive VLs of ≥200 copies/mL or a single VL of ≥1000 copies/mL while on ART while a single 'blip' was defined as a single/isolated VL of between 51-999 copies/mL immediately preceded and followed by a VL ≤50 copies/mL. We defined 'LLV' as ≥2 consecutive VLs of 51–200 copies/mL ≥30 days apart.

A total of 2544 people living with HIV who were on ART were included. During a median of 7.6 [3.7–10.9] years, 444 participants experienced VF with an incidence rate of 2.45 per 100 person-years of follow-up. The proportion of participants with VF decreased in the more recent years – from 9% in 2010 to 3% in 2021 (**Figure**). Likewise, the proportion of participant with blip was stable at 1%–4% over the years although there is a trend with slight increase in recent years. The probability of VF was higher in participants with LLV and blip than in those with viral suppression, log-rank $p < 0.001$).

We found that participants with hepatitis B co-infection, those experienced longer treatment interruption, those on protease inhibitors as initial ART regimen (vs. non-nucleoside reverse transcriptase inhibitors), those who had viral blip and LLV were associated with increased VF risk. On the other hand, older age, higher CD4 count at ART start and a longer duration of ART were associated with a reduced risk of VF. For blips, lower CD4 cell count, longer duration of treatment interruption, longer ART duration and clients from hospitals compared to those attending sexual health services had an increased risk of experiencing blips during follow-up.

In summary, VF and blips were common in AHOD but showed a steady decline over the years 2010–2021. We found that participants with viral blips and LLV had increased risks of subsequent VF. Given these findings, ongoing monitoring of blips and LLV remains crucial. Further research is needed to explore whether newer ART regimens, such as long-acting injectable ART and dual therapies, can reduce the occurrence of blips and LLV, and to determine whether blips and LLV associated with these regimens affect subsequent virological outcomes.

**References**

1. Han WM, et al. Investigating rates and predictors of viral blips, low-level viraemia and virological failure in the Australian HIV observational database. Trop Med Int Health. 2024;29(1):42-56. doi:10.1111/tmi.13951.

## Recruitment and loss to follow up

In 2023, 17 sites in Australia provided data for the period between 1st April 2023 and 31st March 2024. Seven sites in Australia ceased participation in the AHOD study in 2021 and therefore they have not contributed to the data since then. For the 17 sites, a total of 3043 participants had been recruited between 01st January 1999 and 31st March 2024 (3043 participants up until 31st March 2024); of these, 1245 are being actively followed up as of 31st March 2024.

The largest recruitment numbers occurred between 1999 and 2000, with 480 (16%) of those recruited in 1999 and 537 (18%) participants recruited in 2001. A total of 1245 participants remained in the cohort as of the 31st March 2024 (Figure 2).

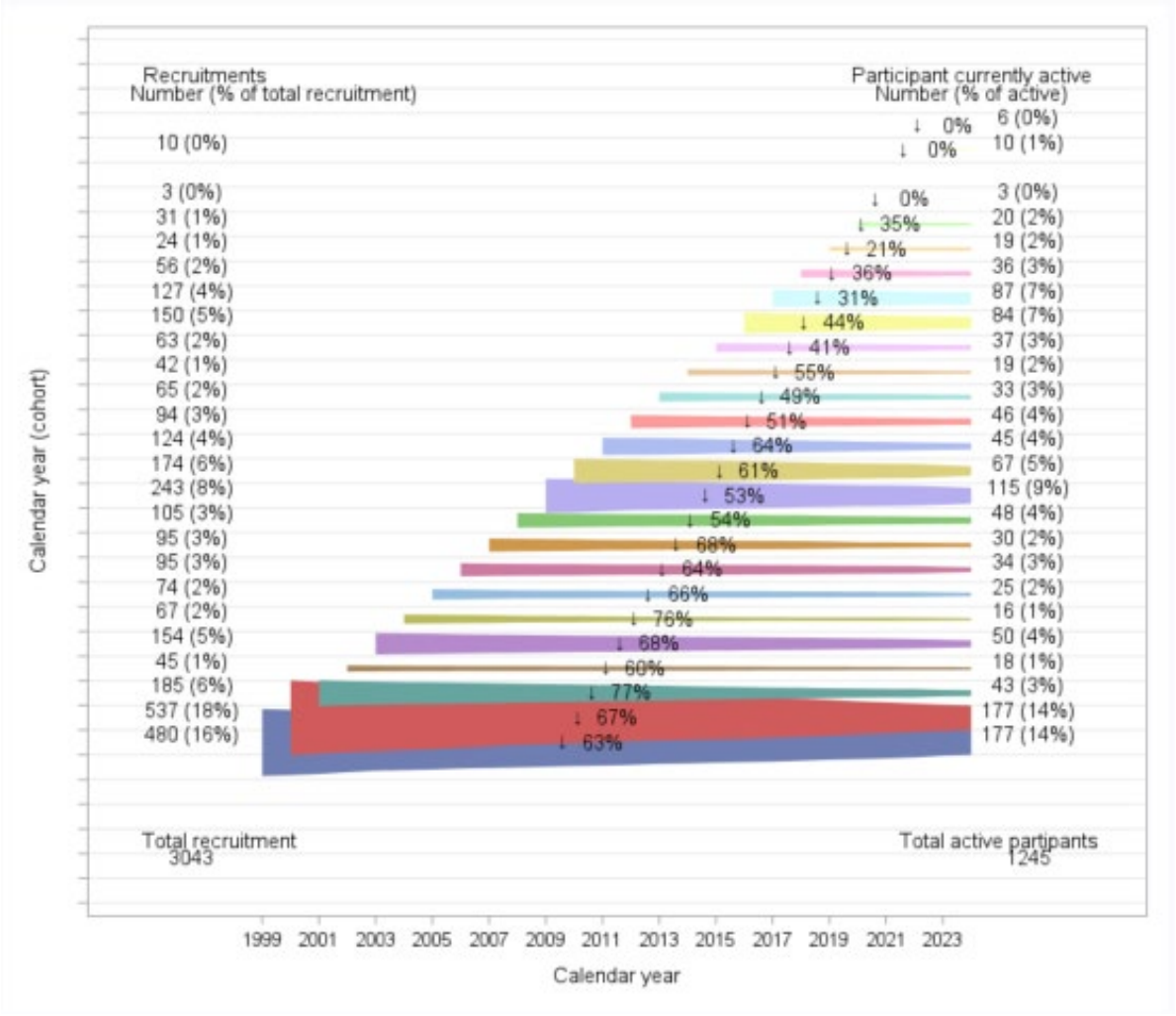


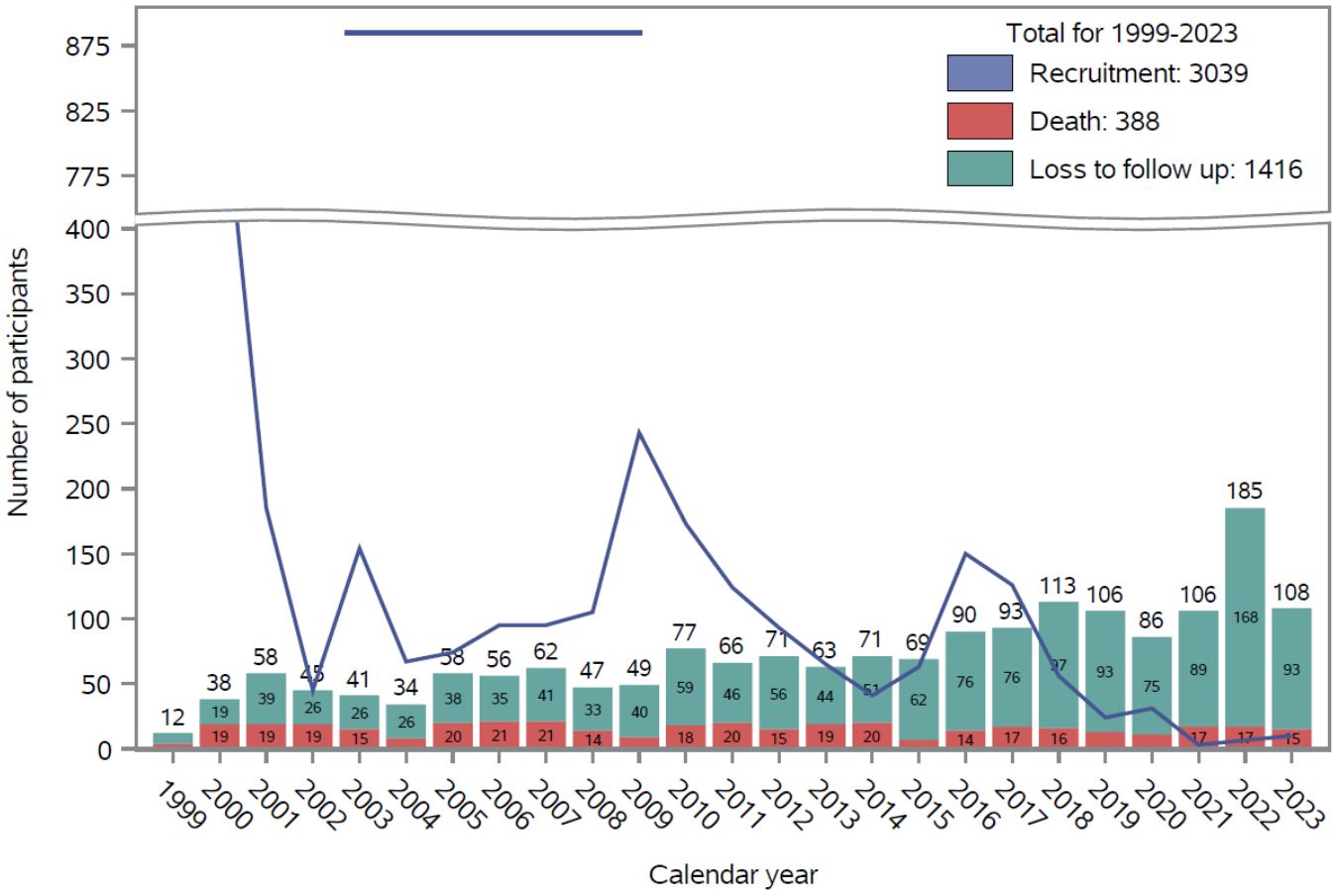

**Figure 2: Recruitment and loss to follow-up/death by calendar year**

1. Total number recruited between 1999 and 2023.
2. Left column: total number recruited, and percentage of total recruited by calendar year between 1999 and 2023.
3. Right column: Active participants and percentage of total active Participants as of 31st December 2023 by calendar year.
4. The number in the middle of each bar represents the percentage attrition due to deaths and loss to follow-up.

Overall, 3037 (65.1%) of participants had complete follow-up visits (as defined by applied site-specific censoring) (Figure 3). The incidence rate of loss to follow-up and mortality (per 100 person-years) in the AHOD cohort is estimated at 3.58 (95% CI: 3.41-3.76) and 1.09 (95% CI: 1.00-1.19), respectively. Lost-to-follow-up is defined as a participant who has indicated they will no longer be attending a study clinic or has not had a visit to a study clinic within the required amount of time (between the dates 01st April 2021 and 31st March 2022). Participants who were still being actively followed up by a clinic that has since ceased participation or participants who have died are not considered lost to follow-up.

**Figure 3: Follow-up status by calendar year[1]**

1. Participants who have died or any participants seen at the clinic site within the last 12 months (1st April 2023 – 31st March 2024) are considered to have completed follow-up.




## Demographics

The majority of all participants in AHOD are male (~90.4%), born in Australia or New Zealand (60.2%), and are receiving care from general practice or sexual health clinics. The characteristics of participants who are actively being followed up are comparable to the characteristics of the general population originally enrolled in AHOD (Table 1).

**Table 1: Demographics of all (n=3,043) versus active (n=1,245) AHOD participants[1]**

| | Number (%) | | | |
|---|---|---|---|---|
| | All (n=3043) | | Active (n=1245) | |
| **Sex** | | | | |
| Male | 2752 | (90.4) | 1081 | (87.0) |
| Female | 285 | (9.3) | 159 | (12.8) |
| Transgender | 6 | (0.2) | 2 | (0.2) |
| **Age at enrolment (Years)** | | | | |
| <20 | 7 | (0.2) | 1 | (0.1) |
| 20-29 | 318 | (10.4) | 130 | (10.5) |
| 30-39 | 1053 | (34.5) | 407 | (32.8) |
| 40-49 | 973 | (31.9) | 422 | (34.0) |
| 50+ | 698 | (22.9) | 282 | (22.7) |
| Mean [SD] | 42 | [10.8] | 42.2 | [10.7] |
| **Aboriginal and Torres Strait Islander** | | | | |
| Yes | 74 | (2.4) | 24 | (1.9) |
| No | 2504 | (82.1) | 1155 | (93.0) |
| Missing | 471 | (15.4) | 63 | (5.7) |
| **Exposure Category** | | | | |
| Male-to-male sex | 2210 | (72.5) | 840 | (70.7) |
| Male-to-male sex and IDU | 140 | (4.6) | 40 | (3.4) |
| Injecting drug user (IDU) | 72 | (2.4) | 22 | (1.9) |
| Heterosexual contact | 428 | (14.0) | 254 | (21.4) |
| Receipt of blood/blood products | 22 | (0.7) | 5 | (0.4) |
| Other | 85 | (2.8) | 27 | (2.3) |
| Missing | 92 | (3.0) | 54 | (4.3) |
| **Year of HIV diagnosis** | | | | |
| <1990 | 410 | (13.4) | 162 | (13.0) |
| 1990-1999 | 1164 | (38.2) | 381 | (30.6) |
| 2000-2009 | 879 | (28.8) | 364 | (29.3) |
| 2010-2019 | 560 | (18.4) | 330 | (26.6) |
| 2020 | 8 | (0.3) | 5 | (0.4) |
| Missing | 28 | (0.9) | 0 | (0.0) |
| **Patient care setting** | | | | |
| General Practitioner | 989 | (32.3) | 441 | (35.5) |
| Hospital Tertiary Centre | 678 | (22.1) | 311 | (25.0) |
| Sexual Health Clinic | 1397 | (45.6) | 490 | (39.45) |
| **Region of birth** | | | | |
| Australia and New Zealand | 1836 | (60.2) | 803 | (64.7) |
| Asia and Oceania | 295 | (9.7) | 168 | (13.5) |
| Britain and Ireland | 133 | (4.4) | 21 | (1.7) |
| Europe* | 101 | (3.3) | 78 | (6.3) |
| Africa and the Middle East | 110 | (3.6) | 66 | (5.3) |
| North America | 31 | (1.0) | 3 | (0.4) |
| South and Central America | 39 | (1.3) | 16 | (1.3) |
| Missing | 504 | (16.5) | 87 | (7.0) |

| | Number (%) | | | |
|---|---|---|---|---|
| | All (n=3043) | | Active (n=1245) | |
| **CD4 at enrolment (cells/μl)[1]** | | | | |
| <200 | 257 | (8.6) | 91 | (7.3) |
| 200-299 | 290 | (9.7) | 107 | (8.6) |
| 300-499 | 811 | (27.1) | 323 | (26.0) |
| 500+ | 1318 | (44.1) | 575 | (46.4) |
| Missing | 314 | (10.5) | 144 | (11.6) |
| Mean [SD] | 531.5 | [286.7] | 551.7 | [287.6] |
| **HIV viral load at enrolment (copies/ml)[1]** | | | | |
| <=50 | 1248 | (41.7) | 575 | (46.4) |
| 51-400 | 579 | (19.4) | 251 | (20.2) |
| 401-10000 | 392 | (13.1) | 137 | (11.0) |
| >10000 | 531 | (17.8) | 169 | (13.6) |
| Missing | 240 | (8.0) | 108 | (8.7) |
| Median [LQ - UQ] | 160 | [49 - 3240] | 50 | [40 - 678] |
| **Prior AIDS-defining illness[1]** | | | | |
| Yes | 541 | (17.7) | 220 | (17.7) |
| No | 2508 | (82.3) | 1022 | (82.3) |
| **Hepatitis B ever** | | | | |
| Yes | 294 | (9.6) | 178 | (14.3) |
| No | 2323 | (76.2) | 906 | (73.0) |
| No Test | 432 | (14.2) | 158 | (12.72) |
| **Hepatitis C ever** | | | | |
| Yes | 469 | (15.4) | 203 | (16.3) |
| No | 2289 | (75.1) | 933 | (75.1) |
| No Test | 291 | (9.5) | 106 | (8.5) |
| Total participants active in 12 months [4] | 1245 | | | |
| **Recent CD4 (cells/μl)[5]** | | | | |
| <200 | 21 | (1.7) | 18 | (1.4) |
| 200-299 | 37 | (3.0) | 35 | (2.8) |
| 300-499 | 143 | (11.5) | 126 | (10.1) |
| 500+ | 608 | (49.0) | 499 | (40.2) |
| Missing | 433 | (34.9) | 564 | (45.4) |
| Mean [SD] | 745.9 | (343.1) | 738.8 | (347.3) |
| **Recent HIV viral load (copies/ml)[5]** | | | | |
| <=50 | 1018 | (82.0) | 1018 | (82.0) |
| 51-400 | 54 | (4.3) | 54 | (4.3) |
| 401-10000 | 6 | (0.5) | 6 | (0.5) |
| >10000 | 4 | (0.3) | 4 | (0.3) |
| Missing | 160 | (12.9) | 160 | (12.9) |
| Median [LQ - UQ] | 20 | (19-21) | 20 | (19-21) |

1. CD4 count and HIV viral load closest to and within three months of cohort enrolment date.
2. Year of HIV diagnosis is based on the earliest blood test consistent with a positive HIV status.
3. LQ = Lower quartile UQ = Upper quartile.
4. Participants who had the most recent visit between 1st Jan 2023 and 31st March 2024 and have not died.
5. Most recent CD4 count and HIV viral load between 1st Jan 2023 and 31st March 2024.

*Excluding Britain and Ireland

Overall, there are more males than females aged >40 years (Figure 4), and there has been a progressive increase in the age at enrolment (Figure 5) and the proportion of females enrolled in AHOD since 1999. Of the 3043 participants cumulatively enrolled, 4 (0.3%) participants identified as transgender.

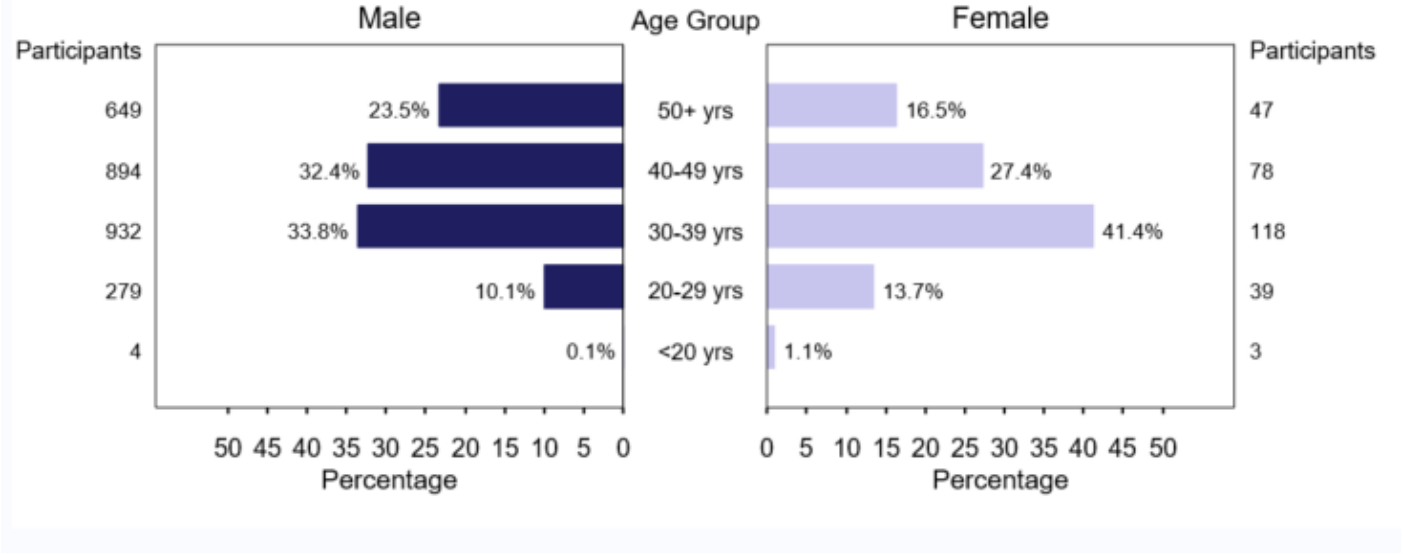



**Figure 4: Age distribution of all AHOD participants, grouped by sex.**

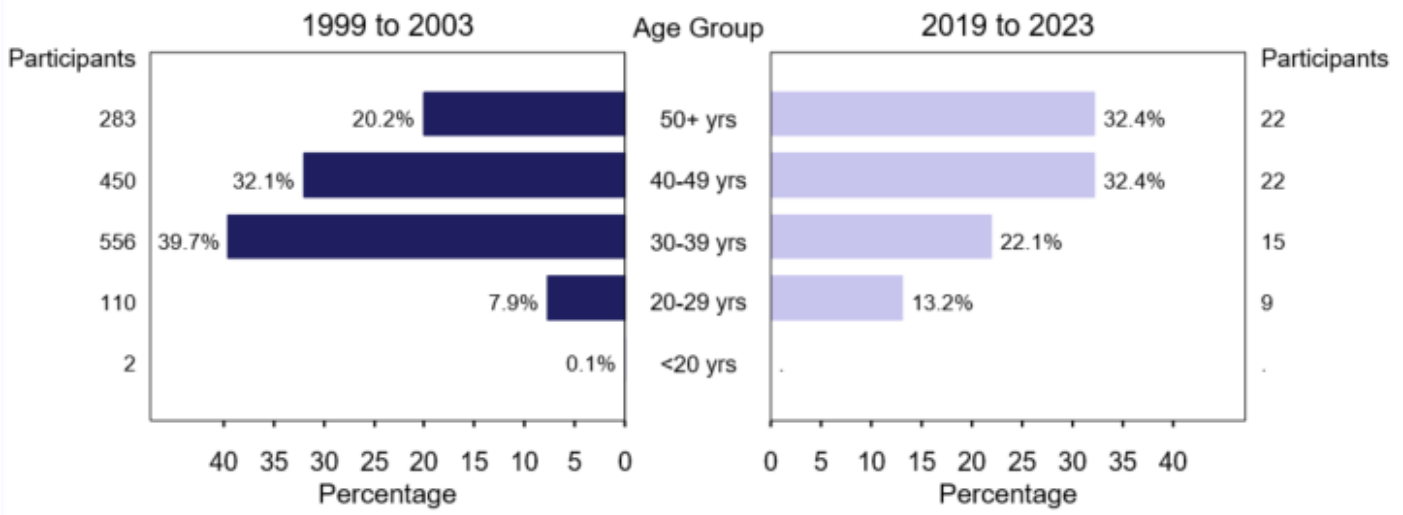



**Figure 5: Age at enrolment 1999-2003 and 2019-2023**

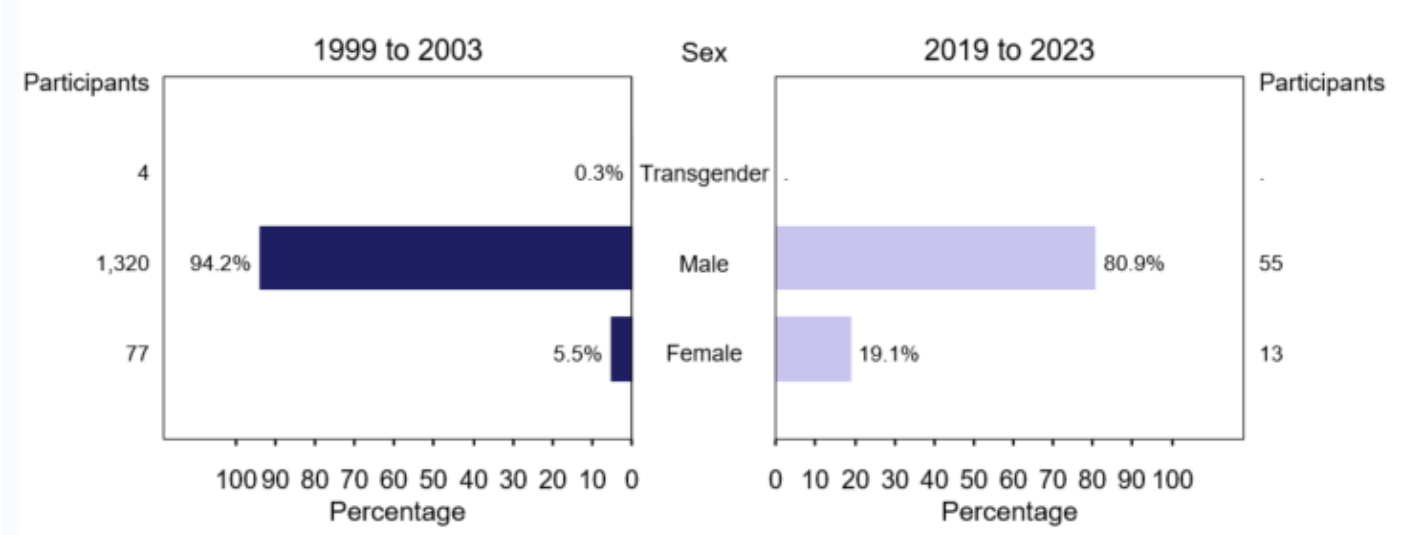



**Figure 6: Gender at enrolment 1999-2003 and 2021-2023**

The majority of AHOD participants were born in Australia and New Zealand, while a substantial number immigrated from Asia-Pacific countries (Figure 7)

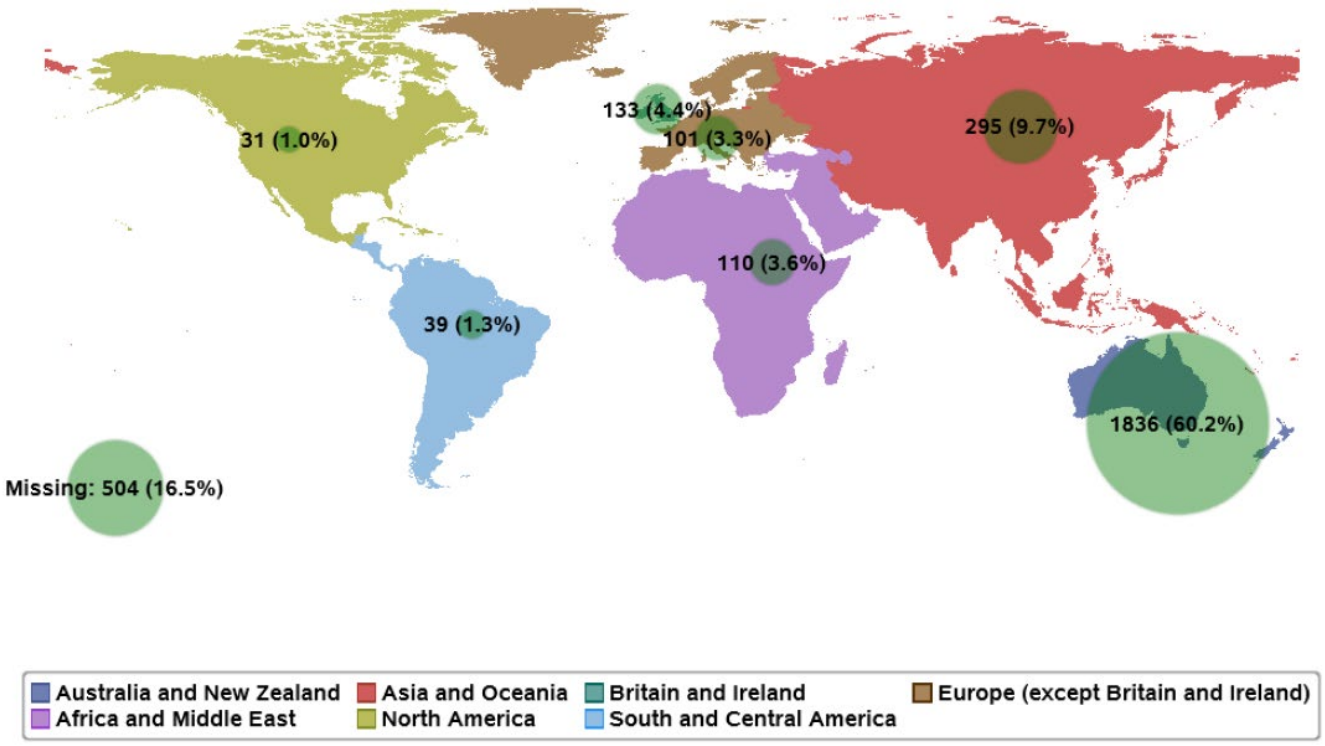



**Figure 7: Region of birth of participants in AHOD**

Regardless of the region of birth, the commonest mode of HIV acquisition was via male-to-male sex, except for those born in Africa and the middle east, in whom heterosexual transmission was the commonest route.

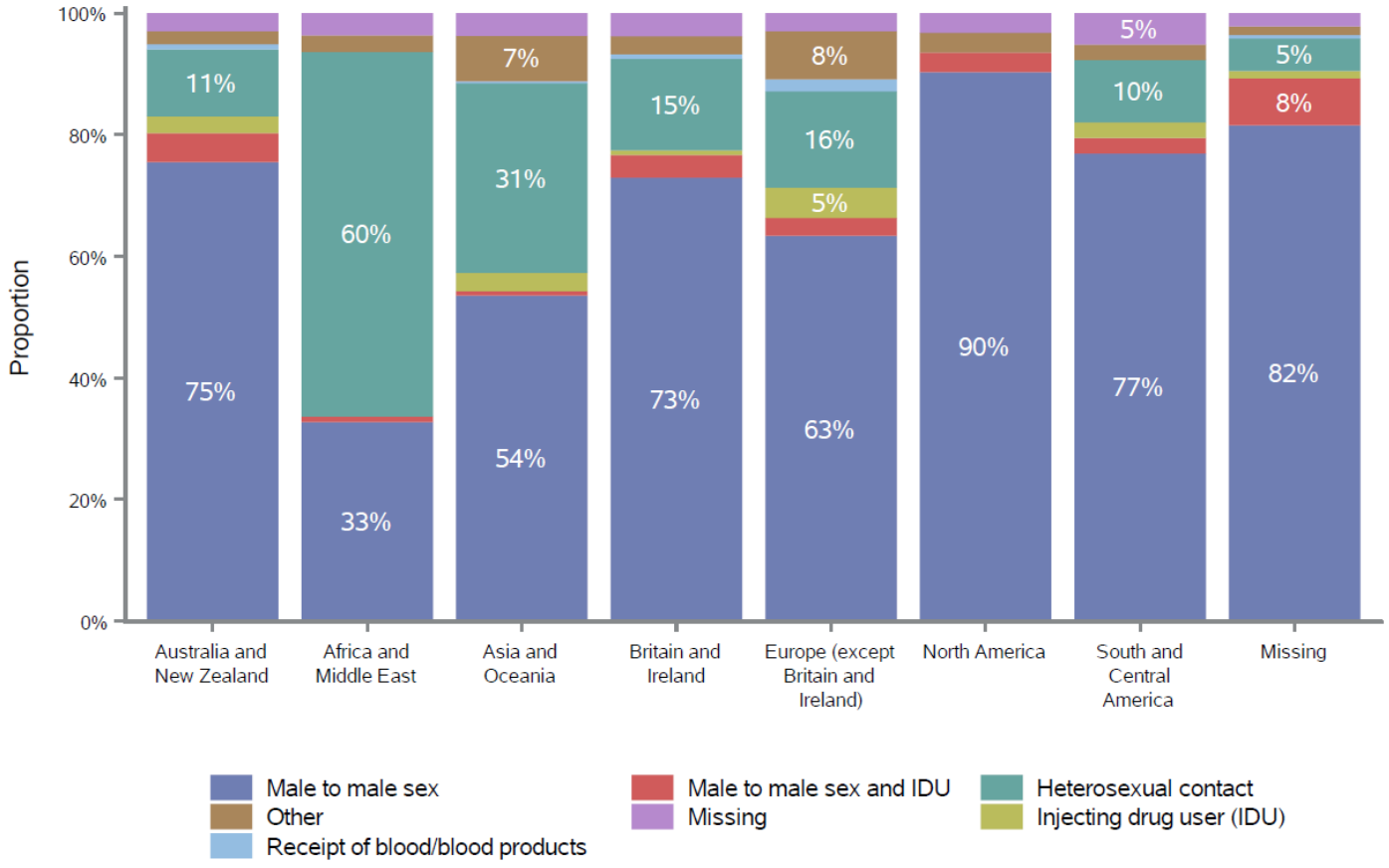


**Figure 8: Mode of HIV acquisition by region of birth for all AHOD participants.**
Hepatitis C rates are the highest in participants born in Australia, New Zealand, or the European Union, while Hepatitis B co-infection is more common in participants from Asia and Oceania and lowest in North America immigrants (Table 2).

**Table 2: Hepatitis B and Hepatitis C status[1] by region of birth**

| | Hep B Surface Antigen[2] % | | | Hep C Antibody[2] % | | |
|---|---|---|---|---|---|---|
| **Region** | **Positive** | **Negative** | **Missing** | **Positive** | **Negative** | **Missing** |
| **Australia and New Zealand** | 7.4 | 80.1 | 12.5 | 15.9 | 76.3 | 7.8 |
| **Africa and the Middle East** | 15.5 | 65.5 | 19.1 | 1.5 | 67.3 | 17.3 |
| **Asia and Oceania** | 20.3 | 60.0 | 19.7 | 5.3 | 65.8 | 14.9 |
| **Britain and Ireland** | 7.5 | 87.2 | 5.3 | 8.3 | 84.2 | 7.5 |
| **Europe (except Britain and Ireland)** | 6.9 | 77.2 | 15.8 | 21.8 | 68.3 | 9.9 |
| **North America** | 3.2 | 74.2 | 22.6 | 6.5 | 80.6 | 12.9 |
| **South and Central America** | 5.1 | 74.4 | 20.5 | 7.7 | 82.1 | 10.3 |
| **Missing** | 12.1 | 71.0 | 16.9 | 12.9 | 75.8 | 11.3 |

1. Hepatitis (Hep) B and C status is the latest available and can represent infection before or after enrolment.
2. All numbers are percentages

## Deaths

Deaths are reported by AHOD sites using Coding of Death classification (CoDe) forms. Deaths classified as 'No CoDe form' were notified by a site without a completed CoDe form. Deaths are classified as 'Unknown' when a site cannot determine the cause of death based on available information. Overall, the number and percentage of HIV-related deaths have progressively reduced over time (Figure 9).

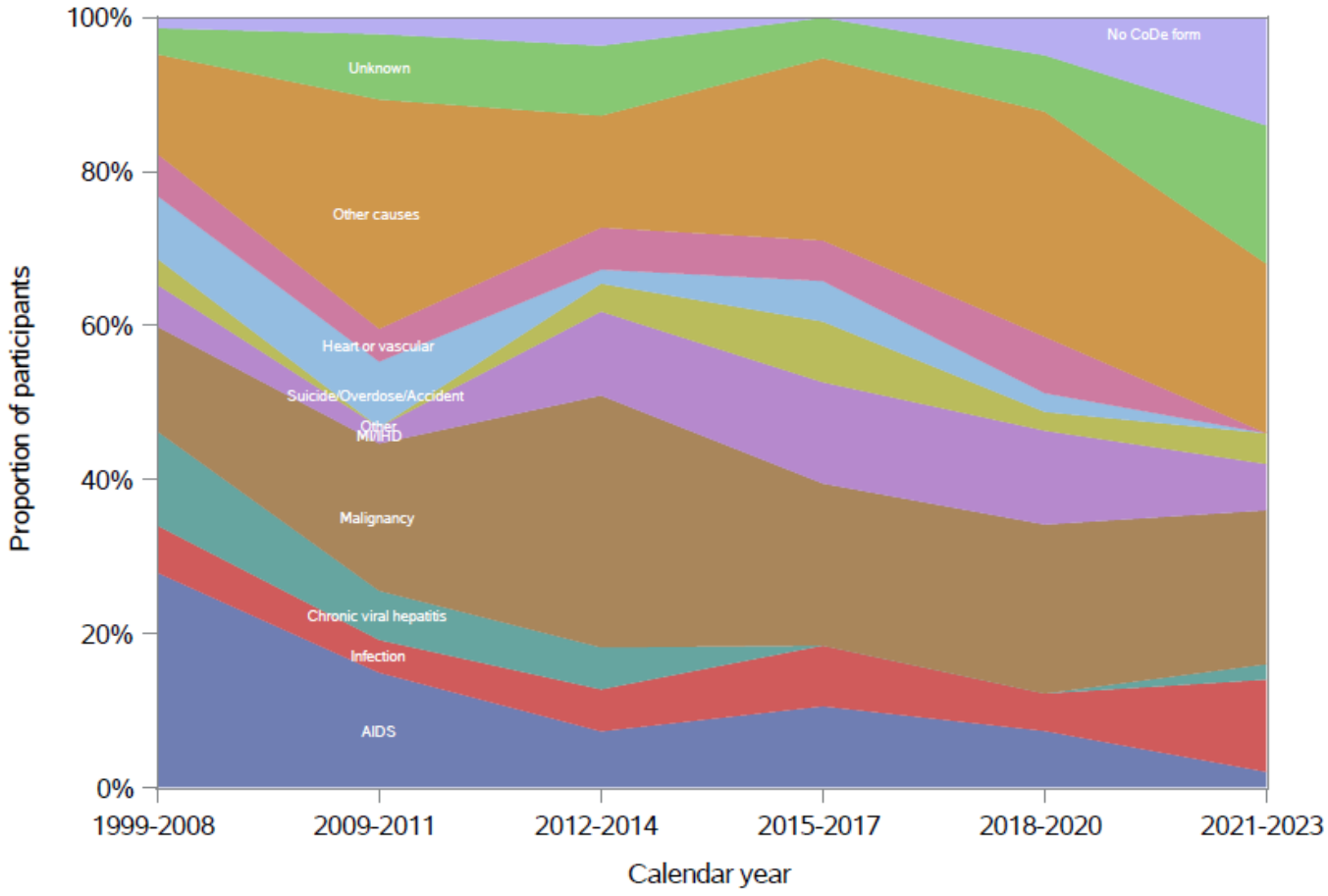



**Figure 9: Distribution of cause of death during follow-up periods**
1. A list of "Other causes" and their frequency can be found in Table 3.

**Table 3: Other causes of death 1999-2023**

| Other causes of death | Number of deaths |
|---|---|
| Renal failure | 10 |
| Respiratory disease | 9 |
| Stroke | 9 |
| Chronic obstructive lung disease | 7 |
| Other causes | 6 |
| Digestive system disease | 6 |
| CNS disease | 5 |
| Unclassifiable causes | 2 |
| Lactic acidosis | 2 |
| Psychiatric disease | 2 |
| Primary pulmonary hypertension | 1 |
| Urogenital disease | 1 |
| Lung embolus | 1 |

**Including unknown/unclassified causes*

The proportion of HIV-related deaths dropped from 38% before 2006 to less than 4% between 2019-2021. Conversely, the proportion of deaths that are due to non-AIDS causes has increased from 59% to 65%.

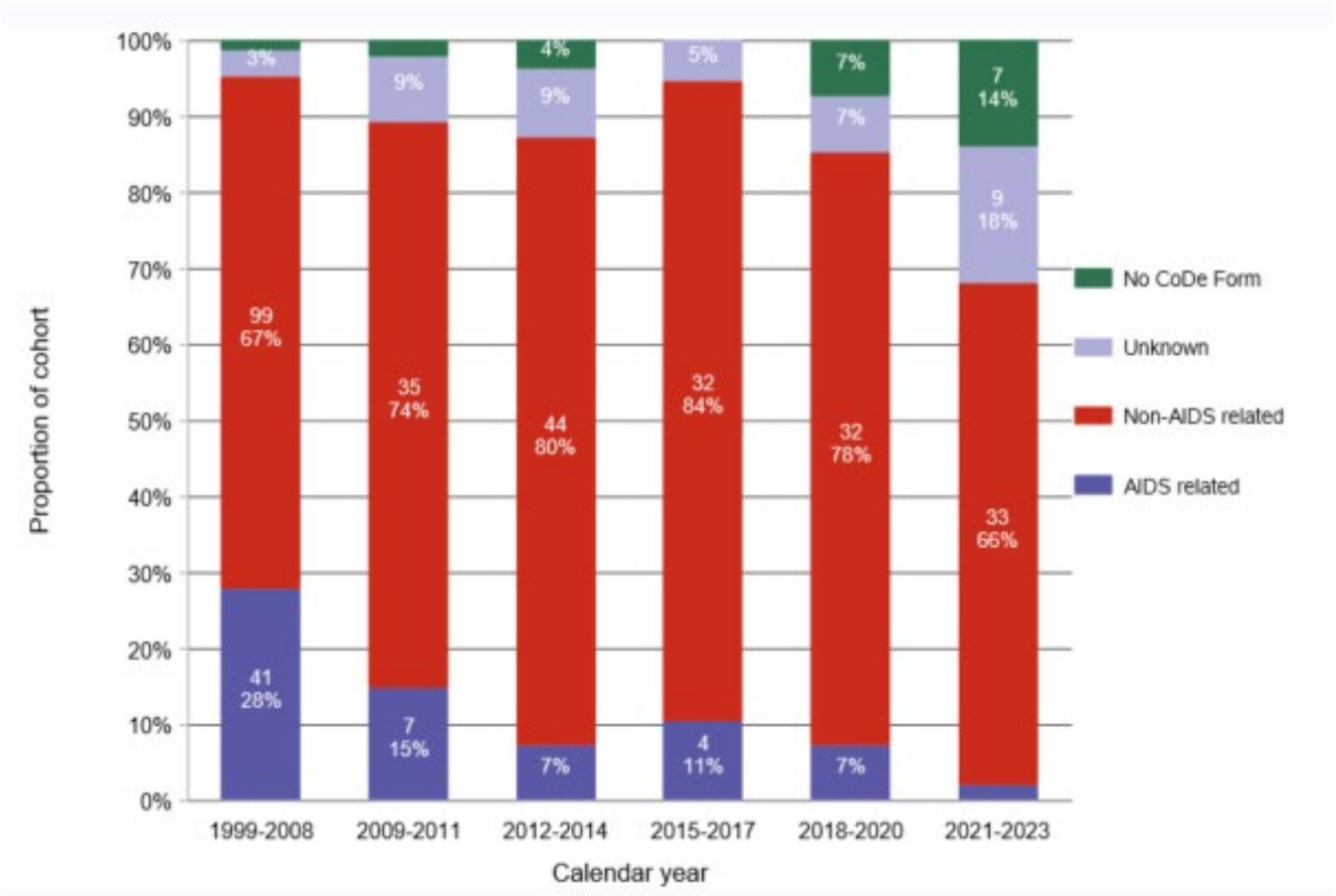



**Figure 10: Distribution of AIDS and non-AIDS-related deaths in AHOD since cohort inception, by calendar year grouping**

There is a trend towards an increase in cancer-related deaths and a reduction in suicide, AIDS, and chronic viral hepatitis (Figure 11).

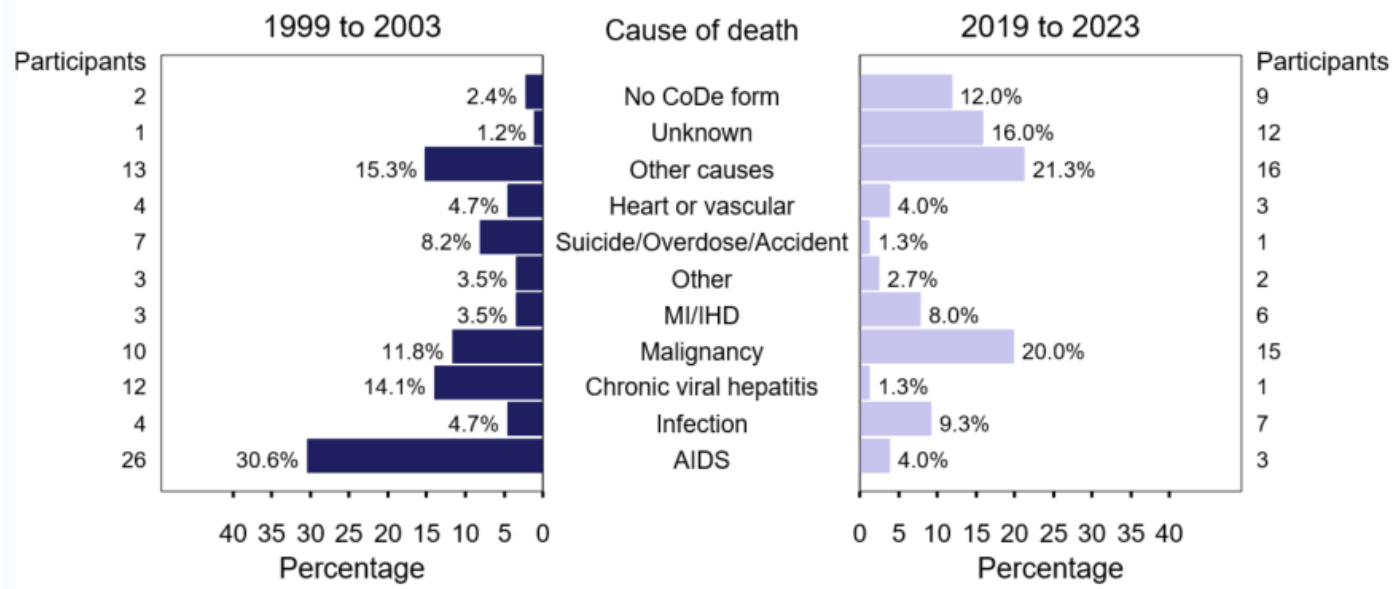



**Figure 11: Cause of death 1999-2003 and 2017-2023**

## Immunological and virological trends

There has been a progressive increase in the CD4 cell counts in both participants currently receiving antiretroviral therapy and in those not on treatment

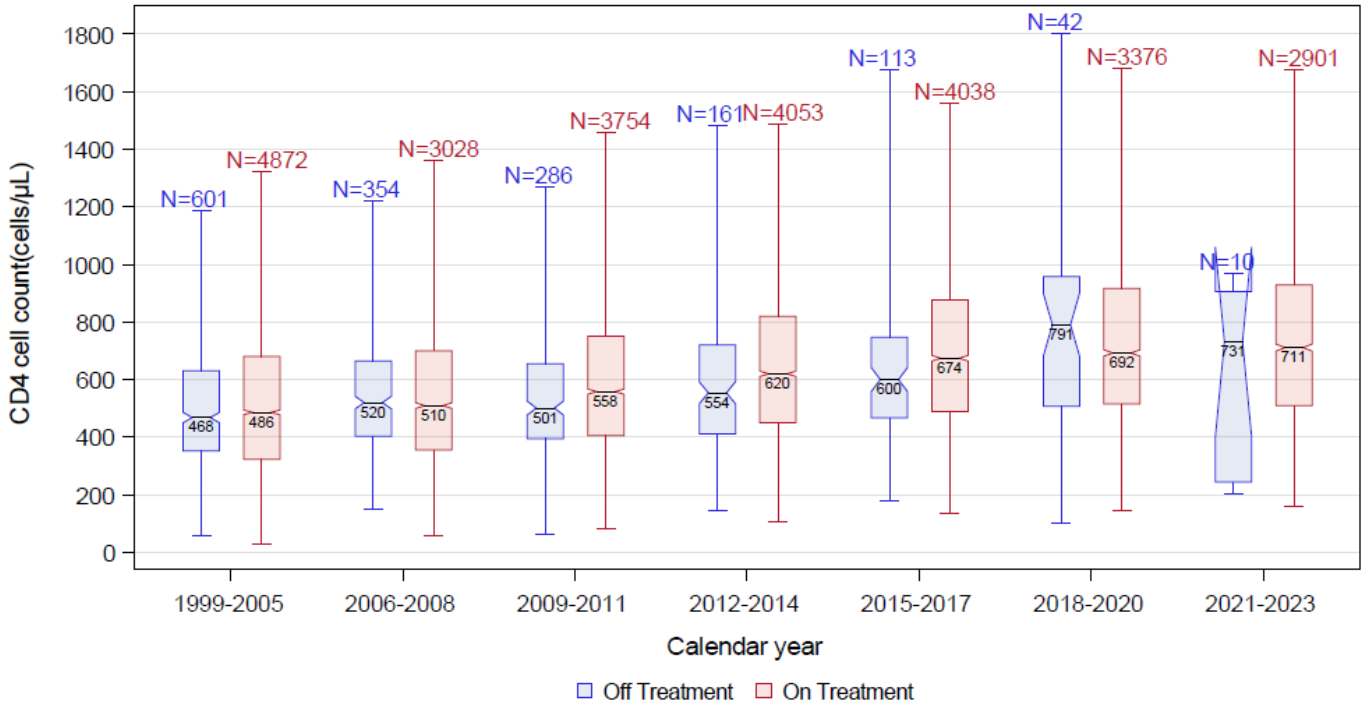



**Figure 12: CD4 trends[1] for participants off[2] and on[3] treatment by calendar year groupings**

1. Includes retrospective and prospective data. CD4 counts taken as the median value during a given calendar year.
2. Participants who have not received treatment of duration greater than 14 days during the calendar year
3. Participants who received ART over 14 days during the calendar year.

'N=' value includes participants with a viral load/CD4 measured during the calendar year.

The median CD4 at ART initiation has progressively been increasing. The increase in median CD4 is probably due to the overall increase in the proportion of people on ART (Figure 13).

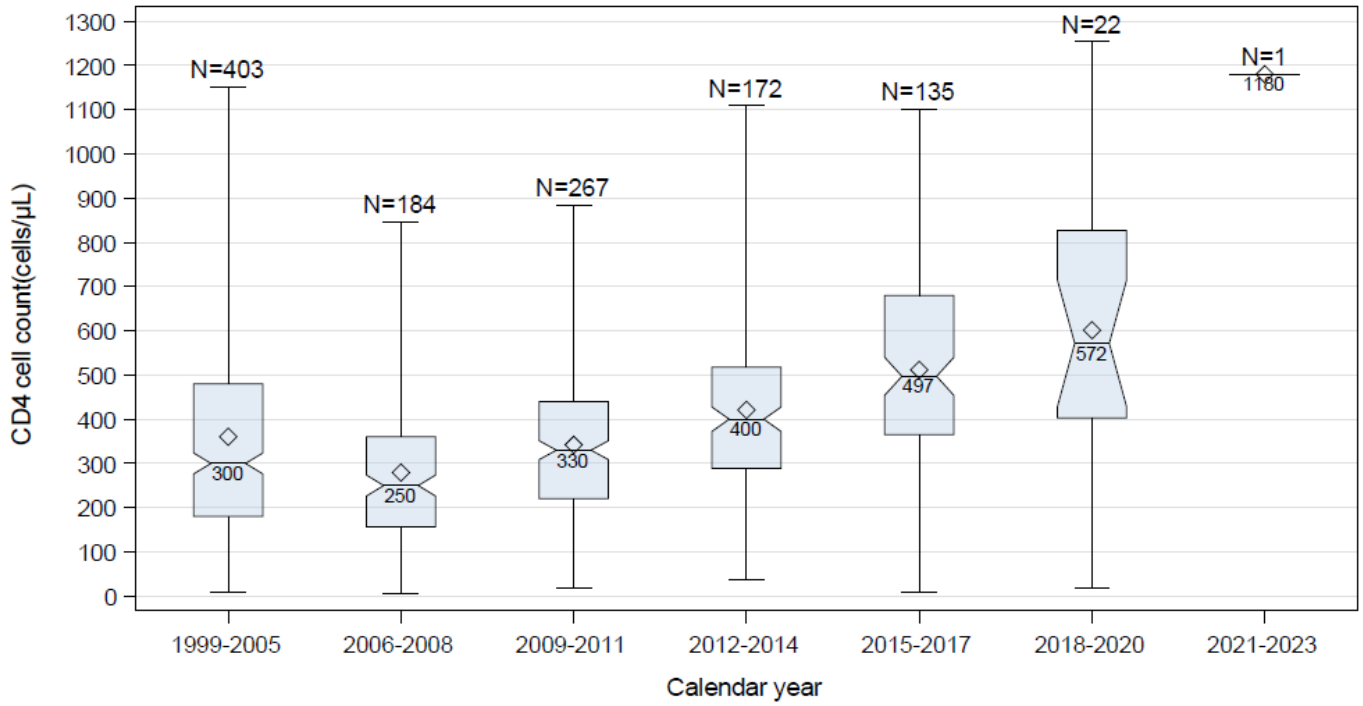



**Figure 13: CD4 cell count distribution at antiretroviral therapy (ART) initiation by year of ART initation[1-3]**
1. ART is defined as a combination of 3 or more antiretroviral agents or duo therapy and a duration of ART>14 days. Includes both retrospective and prospective data. Australian Temporary Residents Access Study (ATRAS) study participants were excluded.
2.CD4 cell count selected from the observation closest to the ART start date within a timeframe window of 12 months before the ART start date and 7 days post ART start date.
3. Participants were excluded from the analysis if they had an undetectable viral load result or were missing a viral load measurement before initiating ART.

The proportion of participants with viral suppression (HIV RNA <50 copies/mL) increased from 91% in 2014 to 93% in 2023 (Figure 14).

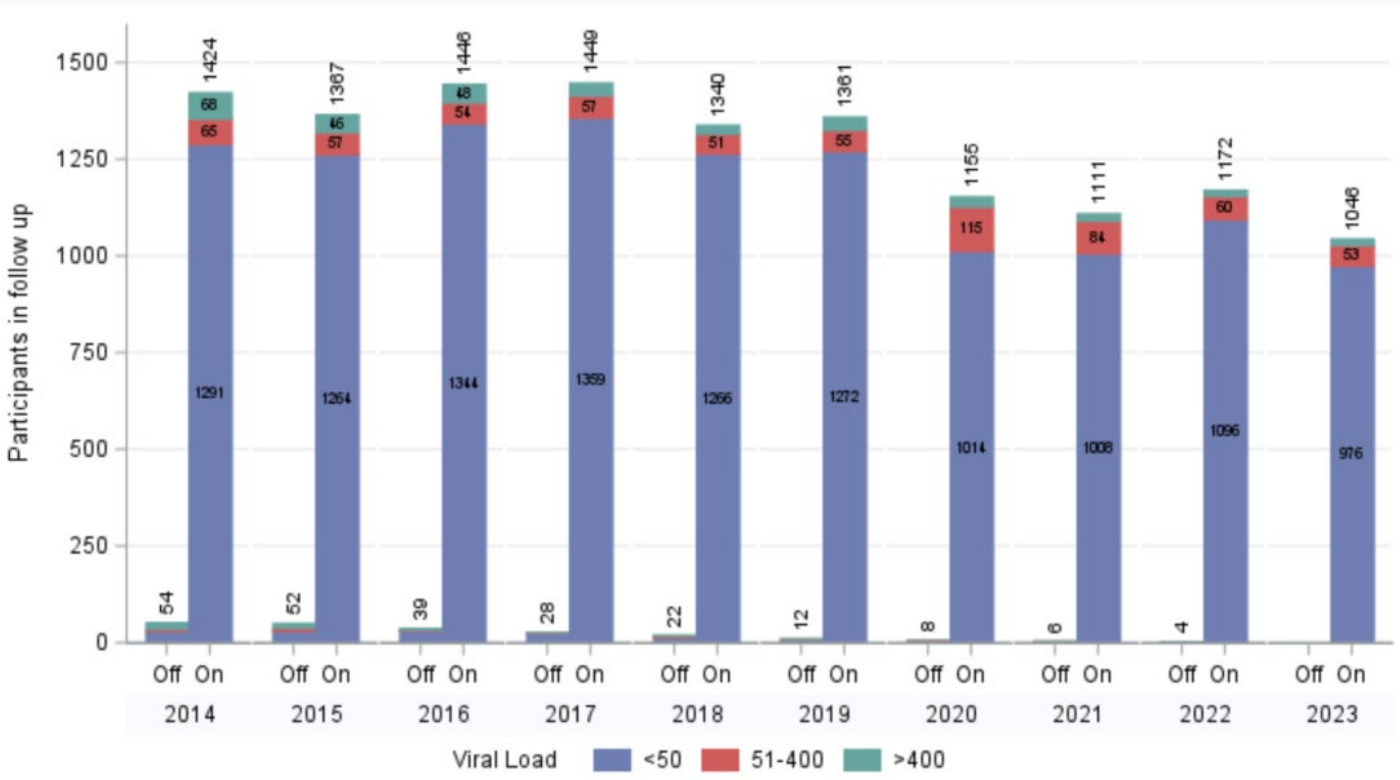



**Figure 14: Participants with an undetectable viral load by treatment status (off /on treatment) and year[1]**
1. Off treatment if never on a regimen of duration greater than 14 days for a given calendar year. Viral load taken as the median value during a regimen of the longest duration for a given calendar year.

Overall, there has been a progressive increase in current CD4 cell counts in AHOD participants (Figure 15). The majority of participants had CD4≥500 cells/mL and the proportion of participants with CD4>750 has progressively increased over time. The proportion of participants with CD4 <250 remained low throughout the calendar years from 2014-2023.

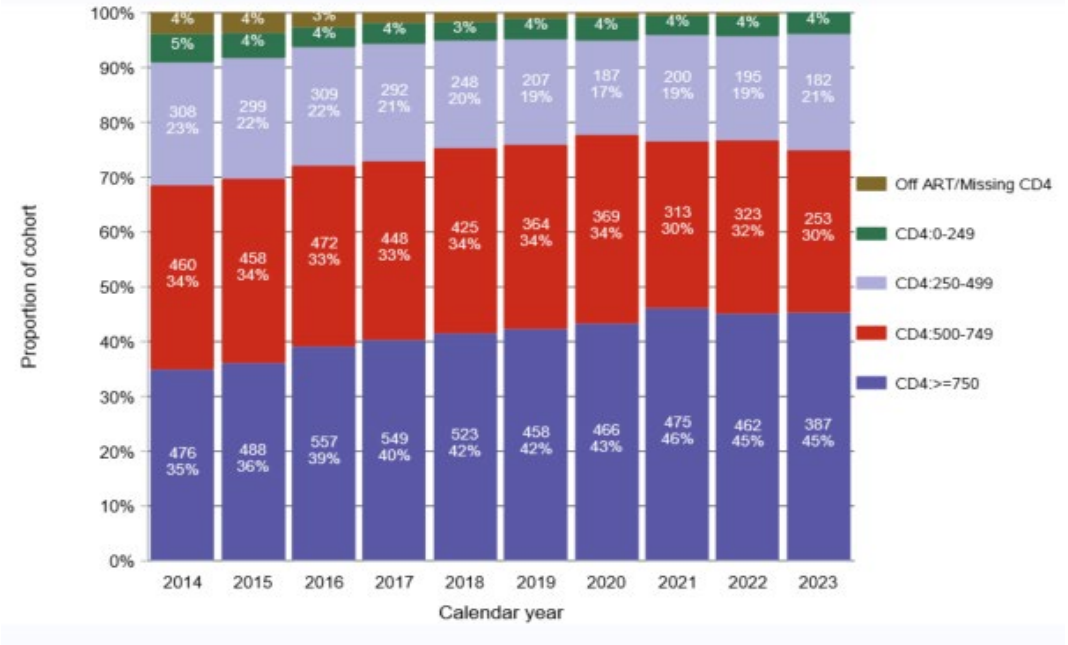



**Figure 15: CD4 cell counts (cells/μL) in Participants receiving treatment by calendar year[1-3]**

1. Includes participants with a prospective CD4 measure during the relevant calendar year.
2. For participants on treatment, analysis is based on the initial treatment intent, not on the treatment administered (ITT), i.e., no adjustments are made for off-treatment following ART initiation.
3. Participants off treatment include those who have enrolled and have not initiated combination antiretroviral therapy.

## Antiretroviral treatment

In 2023, there were a total of 179 unique antiretroviral treatment (ART) combinations (5 of which contain trial drugs) among the 1600 AHOD participants who received ART in 2023. A total of 1825 combination regimens were recorded among these Participants throughout 2023. Approximately 81% of AHOD participants were on a 3-drug regimen (excluding ritonavir and cobicistat) in 2023, which is consistent with other years. Around 14% were on a 2-drug regimen, an increment from 12% in 2022.

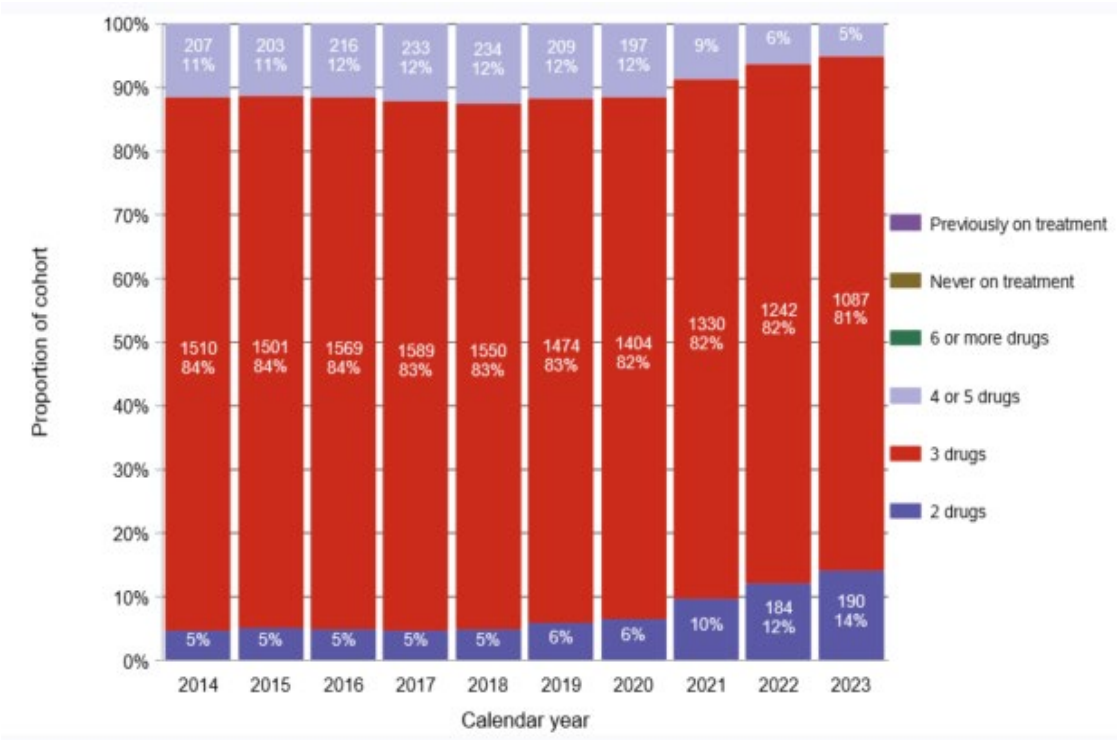



**Figure 16: Trends in the number of drugs comprising antiretroviral treatment.**

For participants who switch regimes during a particular calendar year, the number of drugs is based on the regimen of the latest switch. The number of drugs excludes boosters (Cobicistat and Ritonavir).

In 2023, 86% of those treated were on an Integrase Strand Transfer Inhibitor (INSTI), an increase from 36% in 2014. In contrast, the proportion of participants on non-nucleoside reverse transcriptase inhibitors (NNRTI) decreased from 47% in 2014 to 20% in 2023, while those on protease inhibitors (PI) decreased from 36% to 15% during the same period (Figure 17).

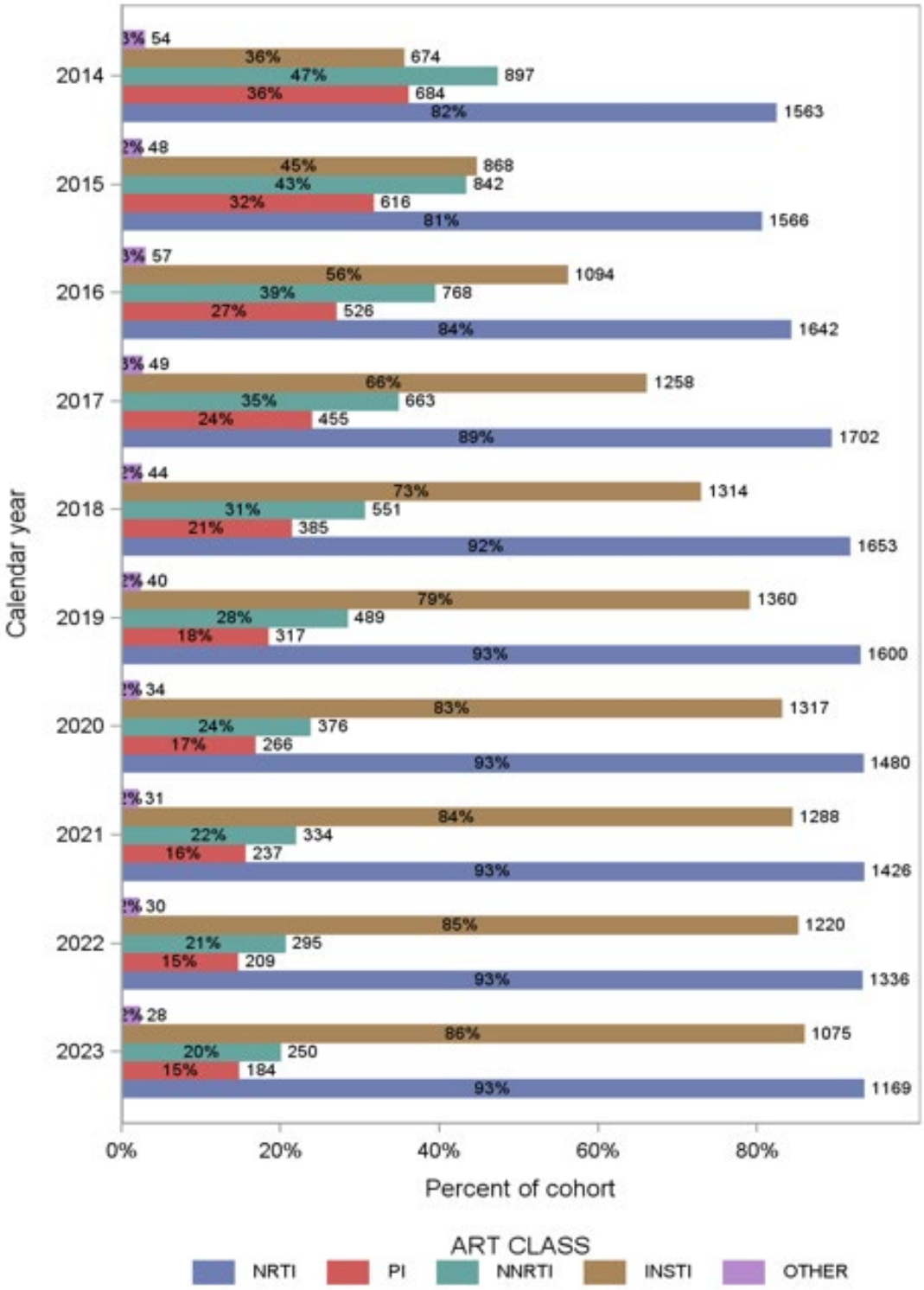
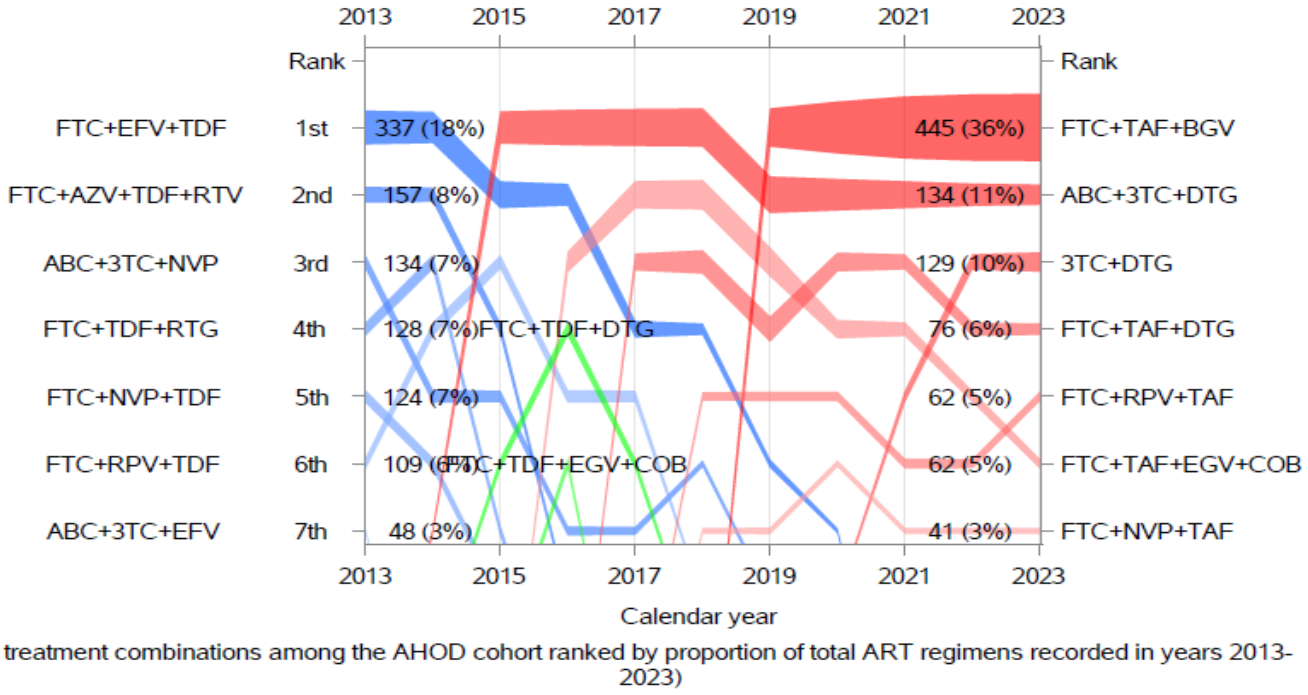



**Figure 17: Trends in the classes of drugs making up combination antiretroviral treatment**
Each class of drugs is counted once when more than one combination includes it within each calendar year. Boosters (Cobicistat and Ritonavir) are not included.
NRTI = nucleoside reverse transcriptase inhibitor, PI = protease inhibitor, NNRTI = non-nucleoside reverse transcriptase inhibitor, INSTI = Integrase Strand Transfer Inhibitor, OTHER = include entry inhibitors and CCR5 inhibitor

Atripla (TDF/FTC/EFV) was the dominant ART regimen in 2013, but this has been replaced by INSTI-based regimens over time (Figure 18). In addition, there has been an increase in participants receiving dual ART regimens since 2015. Additionally, there is a trend towards replacing TDF regimens with TAF-based regimens.




Top treatment combinations among the AHOD cohort ranked by proportion of total ART regimens recorded in years 2013-2023)

**Figure 18: Top treatment combinations among the AHOD cohort[1] ranked by proportion[2] of total ART regimens**

1. Includes retrospective and prospective data. Combinations include three or more antiretroviral drugs. Fixed dose (single tablet) combinations are separated into individual component antiretroviral drugs.
2. Proportion is defined as the frequency of the ART regimen divided by the total number of ART regimens recorded. Numbers in brackets represent the number of participants on the regime.
3. 3TC = Lamivudine; ABC = Abacavir; AZV = Atazanavir; BGV = Bictegravir; COB = Cobicistat; DTG = Dolutegravir; EFV = Efavirenz; EGV = Elvitegravir; FTC = Emtricitabine; LPV = Lopinavir; NVP = Nevirapine; RPV = Rilpivirine; RTV = Ritonavir; TAF = Tenofovir Alafenamide; TDF = Tenofovir Disoproxil; ZDV = Zidovudine

In 2023, three-drug regimens were the most preferred ART choice. Bictegravir/emtricitabine/tenofovir alafenamide (TAF/FTC/BIC) and abacavir/Lamivudine/Dolutegravir (ABC/3TC/DTG) were the most dominant three-drug ART regimens, and PIs are no longer preferred ART options (Figure 19).

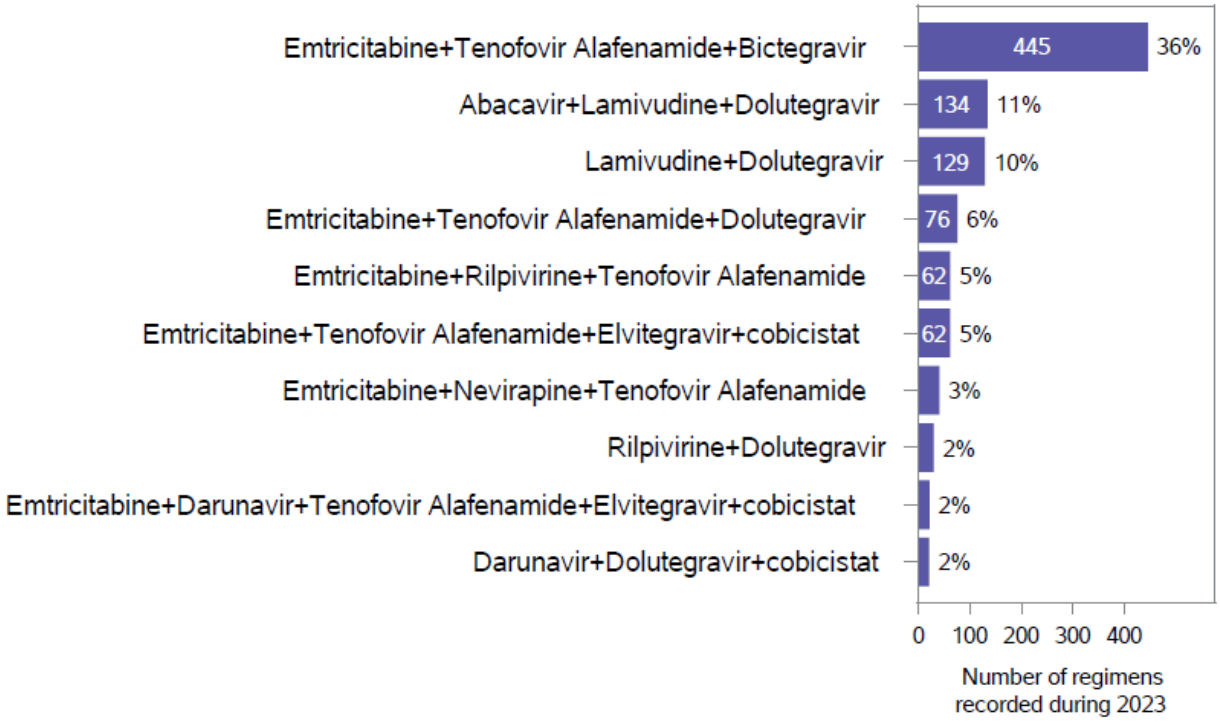



**Figure 19: Top 10 ART regimes in 2023**

Includes retrospective and prospective data. Fixed dose (single tablet) combinations are separated into individual component antiretroviral drugs.

Dual ART regimens are increasingly prescribed for AHOD participants in 2023 than in 2013. Before 2017, dual regimens were likely to be prescribed in clinical trial settings. Dolutegravir with Lamivudine (3TC/DTG) or rilpivirine (RPV/DTG) are the most used dual ART regimens (Figures 20 and 2023).

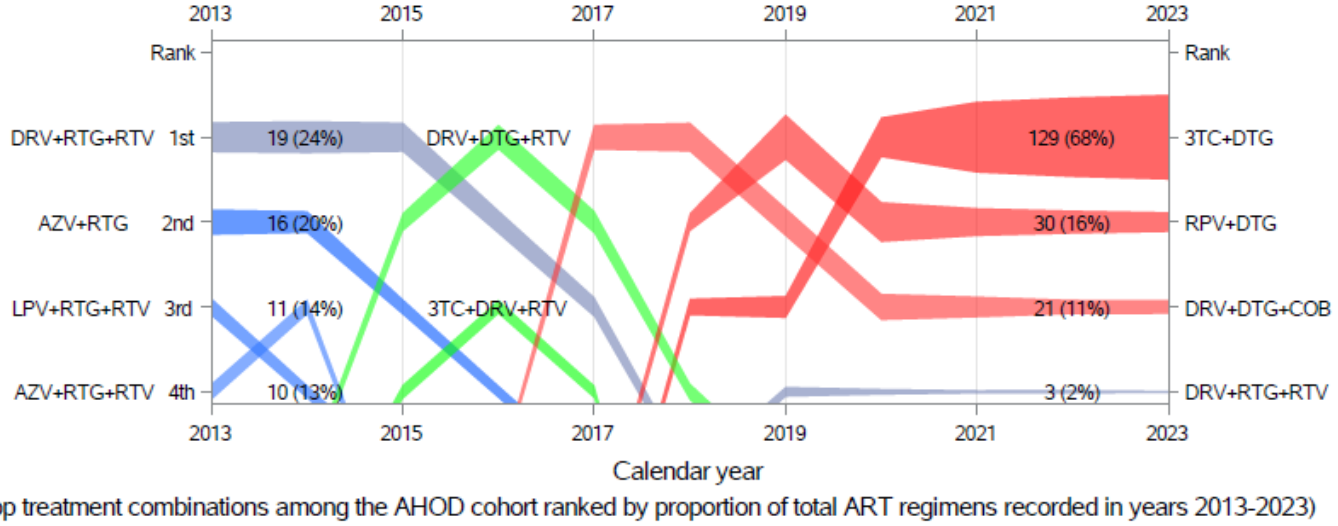
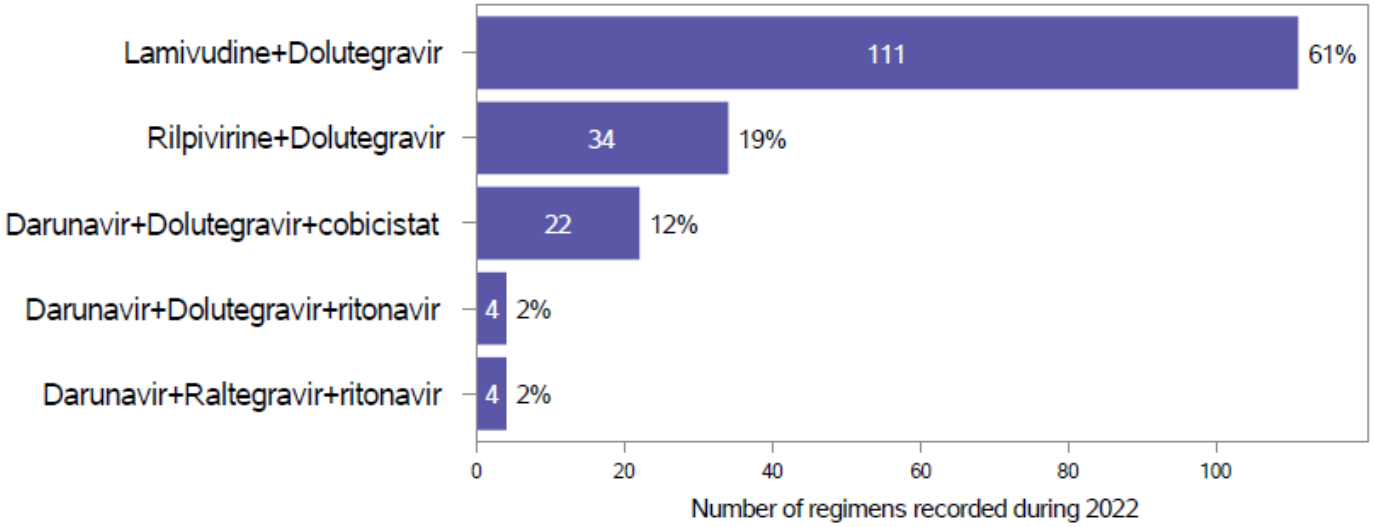



**Figure 20: Top Duo ART regimes[1] among the AHOD cohort[2] ranked by proportion[3] of total ART regimens.**

1. Only the valid two-drug therapy combinations only were included.
2. Includes z and prospective data. Fixed dose combinations are separated into individual component antiretroviral drugs.
3. Proportion is defined as the frequency of the ART regimen divided by the total number of ART regimens recorded. Numbers in brackets represent the number of participants on the regime.




3TC = Lamivudine; AZV = Atazanavir; COB = Cobicistat; DRV = Darunavir; DTG = Dolutegravir; LPV = Lopinavir; RPV = Rilpivirine; RTG = Raltegravir; RTV = Ritonavir; TDF = Tenofovir Disoproxil

**Figure 21: Top five Duo ART regimes (excluding boosters) in 2023**

Includes retrospective and prospective data. Fixed dose (single tablet) combinations are separated into individual component antiretroviral drugs.

In table 4 below, we summarise the number of participants receiving individual antiretroviral drugs or fixed-dose drug combinations. The results show a progressive increase in the number of participants receiving INSTIs combinations and a reduction in the number of participants receiving NNRTIs and PIs. Tenofovir and emtricitabine are the most preferred NRTIs. Dolutegravir is the most preferred INSTI, while Atazanavir and Darunavir are the dominant PIs. Despite the low resistance barrier, nevirapine is still common in AHOD.

**Table 4: Current use of individual antiretroviral treatments[1]**

| ART/ARVs | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| **Nucleoside analogue reverse transcriptase inhibitors (NRTI)** | | | | | | | | | | | | | | | | | | | | | | |
| Abacavir | 174 | (7) | 170 | (6) | 161 | (6) | 136 | (5) | 115 | (4) | 82 | (3) | 67 | (3) | 48 | (2) | 34 | (2) | 31 | (2) | 22 | (2) |
| Combivir | 61 | (2) | 51 | (2) | 50 | (2) | 42 | (2) | 36 | (1) | 27 | (1) | 18 | (1) | 10 | (0) | 5 | (0) | 6 | (0) | 1 | (0) |
| Deskovy | 1 | (0) | 2 | (0) | 3 | (0) | 52 | (2) | 386 | (14) | 477 | (18) | 461 | (19) | 340 | (16) | 250 | (14) | 160 | (11) | 141 | (10) |
| Didanosine | 24 | (1) | 25 | (1) | 20 | (1) | 15 | (1) | 12 | (0) | 12 | (0) | 10 | (0) | 6 | (0) | 3 | (0) | 4 | (0) | 2 | (0) |
| Emtricitabine | 123 | (5) | 128 | (5) | 132 | (5) | 141 | (5) | 190 | (7) | 164 | (6) | 156 | (6) | 111 | (5) | 98 | (5) | 84 | (6) | 82 | (6) |
| Kivexa | 396 | (15) | 434 | (16) | 411 | (16) | 255 | (10) | 200 | (7) | 162 | (6) | 127 | (5) | 69 | (3) | 35 | (2) | 24 | (2) | 20 | (1) |
| Lamivudine | 239 | (9) | 247 | (9) | 247 | (9) | 229 | (9) | 210 | (8) | 171 | (7) | 167 | (7) | 130 | (6) | 105 | (6) | 85 | (6) | 68 | (5) |
| Stavudine | 24 | (1) | 26 | (1) | 17 | (1) | 15 | (1) | 13 | (0) | 11 | (0) | 11 | (0) | 9 | (0) | 4 | (0) | 3 | (0) | 3 | (0) |
| Tenofovir Alafenamide | 1 | (0) | 1 | (0) | 1 | (0) | 16 | (1) | 67 | (2) | 78 | (3) | 84 | (3) | 77 | (4) | 71 | (4) | 65 | (4) | 62 | (5) |
| Tenofovir Disoproxil | 279 | (11) | 257 | (10) | 240 | (9) | 211 | (8) | 175 | (6) | 107 | (4) | 76 | (3) | 45 | (2) | 31 | (2) | 22 | (2) | 18 | (1) |
| Trizivir | 16 | (1) | 15 | (1) | 12 | (0) | 10 | (0) | 9 | (0) | 7 | (0) | 6 | (0) | 5 | (0) | 1 | (0) | 1 | (0) | 0 | (0) |
| Truvada | 709 | (27) | 729 | (27) | 682 | (26) | 610 | (23) | 461 | (17) | 202 | (8) | 142 | (6) | 66 | (3) | 30 | (2) | 22 | (2) | 23 | (2) |
| Zidovudine | 27 | (1) | 23 | (1) | 20 | (1) | 19 | (1) | 13 | (0) | 8 | (0) | 6 | (0) | 3 | (0) | 1 | (0) | 1 | (0) | 2 | (0) |
| **Non-nucleoside reverse transcriptase inhibitors (NNRTI)** | | | | | | | | | | | | | | | | | | | | | | |
| Efavirenz | 187 | (7) | 161 | (6) | 148 | (6) | 125 | (5) | 90 | (3) | 64 | (2) | 43 | (2) | 26 | (1) | 12 | (1) | 8 | (1) | 6 | (0) |
| Etravirine | 123 | (5) | 129 | (5) | 135 | (5) | 131 | (5) | 121 | (4) | 103 | (4) | 75 | (3) | 57 | (3) | 42 | (2) | 24 | (2) | 27 | (2) |
| Nevirapine | 461 | (17) | 426 | (16) | 394 | (15) | 358 | (13) | 361 | (13) | 279 | (11) | 235 | (10) | 159 | (8) | 111 | (6) | 78 | (5) | 72 | (5) |
| Rilpivirine | 23 | (1) | 24 | (1) | 30 | (1) | 39 | (1) | 60 | (2) | 59 | (2) | 64 | (3) | 49 | (2) | 41 | (2) | 40 | (3) | 40 | (3) |
| **Dual Regimens** | | | | | | | | | | | | | | | | | | | | | | |
| Cabenuva | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 1 | (0) | 6 | (0) |
| Dovato | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 1 | (0) | 5 | (0) | 23 | (1) | 70 | (4) | 89 | (6) | 119 | (9) |
| Juluca | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 8 | (0) | 54 | (2) | 44 | (2) | 38 | (2) | 33 | (2) | 32 | (2) |
| **Entry Inhibitor (EI)** | | | | | | | | | | | | | | | | | | | | | | |
| Enfurvirtide | 5 | (0) | 3 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) |
| Fostemsavir | 0 | (0) | 0 | (0) | 1 | (0) | 2 | (0) | 2 | (0) | 1 | (0) | 2 | (0) | 2 | (0) | 2 | (0) | 2 | (0) | 4 | (0) |

1. All treatment records of ≥2 weeks of treatment in any calendar year were included in this analysis. The denominator includes all participants that could have been on antiretroviral therapy (i.e., HIV positive) in any calendar year. The proportion of participants on each drug in any calendar year does not add up to 100% across all ART drug groups in each calendar year, as participants on more than one ARV during a calendar year period will be counted in all the relevant ART groups. Includes retrospective and prospective data.
2. See table 5 for the composition of fixed-dose combination formulations

**Table 4: Current use of individual antiretroviral treatments[1]**

| ART/ARVs | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| **Protease Inhibitors (PIs)** | | | | | | | | | | | | | | | | | | | | | | |
| Amprenavir | 6 | (0) | 3 | (0) | 3 | (0) | 3 | (0) | 3 | (0) | 1 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) |
| Atazanavir | 463 | (17) | 430 | (16) | 356 | (14) | 261 | (10) | 188 | (7) | 114 | (4) | 88 | (4) | 52 | (2) | 36 | (2) | 26 | (2) | 17 | (1) |
| Darunavir | 295 | (11) | 353 | (13) | 384 | (15) | 376 | (14) | 373 | (14) | 270 | (10) | 216 | (9) | 156 | (7) | 115 | (6) | 88 | (6) | 88 | (7) |
| Evotaz | 0 | (0) | 0 | (0) | 0 | (0) | 16 | (1) | 35 | (1) | 27 | (1) | 28 | (1) | 11 | (1) | 7 | (0) | 6 | (0) | 7 | (1) |
| Fosamprenavir | 21 | (1) | 19 | (1) | 13 | (0) | 8 | (0) | 9 | (0) | 6 | (0) | 1 | (0) | 1 | (0) | 1 | (0) | 1 | (0) | 0 | (0) |
| Indinavir | 13 | (0) | 11 | (0) | 9 | (0) | 11 | (0) | 8 | (0) | 6 | (0) | 7 | (0) | 2 | (0) | 1 | (0) | 0 | (0) | 0 | (0) |
| Kaletra | 131 | (5) | 108 | (4) | 76 | (3) | 63 | (2) | 47 | (2) | 28 | (1) | 15 | (1) | 12 | (1) | 6 | (0) | 6 | (0) | 2 | (0) |
| Lopinavir | 52 | (2) | 44 | (2) | 35 | (1) | 22 | (1) | 13 | (0) | 9 | (0) | 9 | (0) | 5 | (0) | 2 | (0) | 0 | (0) | 0 | (0) |
| Nelfinavir | 4 | (0) | 6 | (0) | 7 | (0) | 6 | (0) | 7 | (0) | 5 | (0) | 5 | (0) | 2 | (0) | 0 | (0) | 0 | (0) | 54 | (4) |
| Prezcobix | 0 | (0) | 0 | (0) | 0 | (0) | 21 | (1) | 106 | (4) | 112 | (4) | 108 | (4) | 98 | (5) | 78 | (4) | 56 | (4) | 0 | (0) |
| Saquinavir | 12 | (0) | 10 | (0) | 10 | (0) | 10 | (0) | 7 | (0) | 4 | (0) | 6 | (0) | 2 | (0) | 0 | (0) | 0 | (0) | 1 | (0) |
| Tipranavir | 2 | (0) | 2 | (0) | 2 | (0) | 1 | (0) | 1 | (0) | 2 | (0) | 2 | (0) | 2 | (0) | 2 | (0) | 2 | (0) | 0 | (0) |
| **Integrase Inhibitors (INSTIs)** | | | | | | | | | | | | | | | | | | | | | | |
| Bictegravir | 0 | (0) | 0 | (0) | 0 | (0) | 2 | (0) | 2 | (0) | 7 | (0) | 33 | (1) | 36 | (2) | 38 | (2) | 32 | (2) | 33 | (2) |
| Cabotegravir | 0 | (0) | 0 | (0) | 0 | (0) | 1 | (0) | 3 | (0) | 6 | (0) | 6 | (0) | 6 | (0) | 7 | (0) | 12 | (1) | 20 | (1) |
| Dolutegravir | 9 | (0) | 178 | (7) | 329 | (12) | 365 | (14) | 579 | (21) | 590 | (23) | 569 | (23) | 394 | (19) | 312 | (17) | 235 | (16) | 214 | (16) |
| Elvitegravir | 8 | (0) | 7 | (0) | 7 | (0) | 14 | (1) | 15 | (1) | 18 | (1) | 15 | (1) | 9 | (0) | 7 | (0) | 6 | (0) | 5 | (0) |
| Raltegravir | 594 | (22) | 618 | (23) | 534 | (20) | 461 | (17) | 445 | (17) | 312 | (12) | 240 | (10) | 163 | (8) | 120 | (7) | 94 | (6) | 85 | (6) |
| **Class Combinations[2]** | | | | | | | | | | | | | | | | | | | | | | |
| Atripla | 313 | (12) | 287 | (11) | 259 | (10) | 208 | (8) | 159 | (6) | 107 | (4) | 75 | (3) | 42 | (2) | 27 | (2) | 23 | (2) | 11 | (1) |
| Biktarvy | 0 | (0) | 0 | (0) | 0 | (0) | 1 | (0) | 0 | (0) | 13 | (0) | 432 | (18) | 521 | (25) | 539 | (30) | 486 | (34) | 445 | (33) |
| Complera or Eviplera | 98 | (4) | 124 | (5) | 132 | (5) | 132 | (5) | 127 | (5) | 46 | (2) | 20 | (1) | 6 | (0) | 4 | (0) | 3 | (0) | 2 | (0) |
| Genvoya | 14 | (1) | 13 | (0) | 21 | (1) | 250 | (9) | 357 | (13) | 397 | (15) | 382 | (15) | 230 | (11) | 153 | (9) | 101 | (7) | 76 | (6) |
| Odefsey | 0 | (0) | 0 | (0) | 1 | (0) | 1 | (0) | 92 | (3) | 124 | (5) | 125 | (5) | 115 | (5) | 102 | (6) | 69 | (5) | 68 | (5) |
| Quad or Stribild | 6 | (0) | 76 | (3) | 119 | (5) | 122 | (5) | 40 | (1) | 13 | (0) | 11 | (0) | 8 | (0) | 2 | (0) | 2 | (0) | 1 | (0) |
| Symtuza | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 18 | (1) | 29 | (2) | 27 | (2) | 29 | (2) |
| Triumeq | 1 | (0) | 3 | (0) | 257 | (10) | 366 | (14) | 383 | (14) | 386 | (15) | 345 | (14) | 241 | (11) | 180 | (10) | 117 | (8) | 96 | (7) |
| **Chemokine Receptor (CCR5) Antagonist** | | | | | | | | | | | | | | | | | | | | | | |
| Maraviroc | 48 | (2) | 53 | (2) | 58 | (2) | 61 | (2) | 62 | (2) | 52 | (2) | 44 | (2) | 35 | (2) | 31 | (2) | 25 | (2) | 24 | (2) |

1. All treatment records of ≥2 weeks of treatment in any calendar year were included in this analysis. The denominator includes all participants that could have been on antiretroviral therapy (i.e., HIV positive) in any calendar year. The proportion of participants on each drug in any calendar year does not add up to 100% across all ART drug groups in each calendar year, as participants on more than one ARV during a calendar year period will be counted in all the relevant ART groups. Includes retrospective and prospective data.
2. See table 5 for the composition of fixed-dose combination tablets (single tablets)

**Table 5: Composition of fixed-dose combination (single tablets)**

| Single tablet name(s) | Regime |
|---|---|
| Atripla | Efavirenz+Emtricitabine+Tenofovir Disoproxil |
| Biktarvy | Bictegravir+Emtricitabine+Tenofovir Alafenamide |
| Combivir | Lamivudine+Zidovudine |
| Complera | Emtricitabine+Rilpivirine+Tenofovir Disoproxil |
| Deskovy | Emtricitabine+Tenofovir Alafenamide |
| Dovato | Dolutegravir+Lamivudine |
| Evotaz | Atazanavir+*cobicistat* |
| Genvoya | Elvitegravir+Emtricitabine+Tenofovir Alafenamide+*cobicistat* |
| Juluca | Dolutegravir+Rilpivirine |
| Kaletra | Lopinavir+*ritonavir* |
| Kivexa | Abacavir+Lamivudine |
| Odefsey | Emtricitabine+Rilpivirine+Tenofovir Alafenamide |
| Prezcobix | Darunavir+*cobicistat* |
| Stribild | Elvitegravir+Emtricitabine+Tenofovir Disoproxil+*cobicistat* |
| Symtuza | Darunavir+Emtricitabine+Tenofovir Alafenamide+*cobicistat* |
| Triumeq | Abacavir+Dolutegravir+Lamivudine |
| Trizivir | Abacavir+Lamivudine+Zidovudine |
| Truvada | Emtricitabine+Tenofovir Disoproxil |

Note: *Booster agents are italicised*

A full list of AHOD publications is available online:
https://kirby.unsw.edu.au/project/ahod

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