AUSTRALIAN HIV OBSERVATIONAL DATABASE (AHOD) ANNUAL REPORT

(Volume 22, Number 1: November 2022)

Incidence of dyslipidaemia in people with HIV who are treated with integrase inhibitors versus other antiretroviral agents in RESPOND

The last decade has seen the introduction and rapid uptake of newer antiretroviral classes, including integrase inhibitors (INSTIs). Data from clinical trials suggest that INSTI may not adversely affect lipid levels, compared to other antiretroviral agents. However, several studies have associated INSTIs with weight gain, a key risk factor for elevated lipids. Although the clinical impact of INSTI-induced metabolic changes is unclear, these drugs may be associated with elevations in lipids due to their association with weight gain.

Using data from the International Cohort Consortium of Infectious Disease (RESPOND), the RESPOND study group (2021)[1], determined whether abnormal lipids were more likely to develop in people living with HIV who are treated with INSTIs compared to treatment with other modern antiretroviral regimens. AHOD is one of the 17 member cohorts of RESPOND. This analysis included adult participants who were receiving three-drug regimens comprising two nucleoside reverse transcriptase inhibitors and either an INSTI (dolutegravir, raltegravir or elvitegravir), a non-nucleoside reverse transcriptase inhibitor (NNRTI: rilpivirine or efavirenz), or a protease inhibitor (atazanavir or darunavir). We defined abnormal lipids as starting anti-lipid treatment, abnormal elevations in total cholesterol, low-density cholesterol, triglycerides, or abnormally low high-density cholesterol.

During a median follow-up of 1.7 years, 1460 people developed abnormal lipids. Of these, 407 (27.9%) had ≥2 abnormal lipids or initiated lipid-lowering therapy, 207 (14.2%) only had elevations in total cholesterol, 407 (27.9%) had elevations in triglycerides alone, 396 (27.1%) had low HDL levels alone, while 43 (2.9%) were initiated on anti-lipid treatment. Participants receiving INSTI had a 29% lower risk of dyslipidaemia than those on protease inhibitors but a 35% higher risk than those on NNRTIs. The results were compared and remained consistent in people who were receiving ART before baseline as well as those who were newly initiated on ART (Figure 1).

We then compared the risk of developing abnormal lipids in people receiving individual drugs to dolutegravir, the most prescribed INSTI in many cohorts. Compared to dolutegravir, abnormal lipids were 20% and 24% more likely to develop in individuals receiving elvitegravir or raltegravir, respectively. Similarly, participants taking protease inhibitors had a higher risk of dyslipidaemia compared to dolutegravir. On the other hand, the risk of developing dyslipidaemia was 23% lower with rilpivirine-based ART compared to dolutegravir. In addition, treatment with elvitegravir or raltegravir or protease inhibitors was associated with a higher risk of developing elevated total cholesterol and triglycerides, but the agents were also associated with a lower risk of having low high-density cholesterol.

In conclusion, treatment with INSTIs was associated with a lower risk of developing abnormal lipids compared to protease inhibitors. People receiving rilpivirine had a lower risk of developing abnormal lipids compared to treatment with elvitegravir or raltegravir. Therefore, people receiving INSTIs should be closely monitored for abnormal lipids, and rilpivirine should be considered a treatment option in people with a high risk of cardiovascular disease.

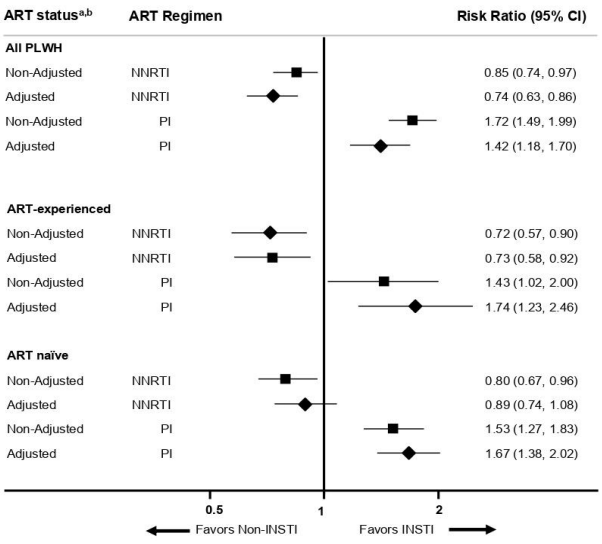


Figure 1: Adjusted and un-adjusted incidence rate ratios of dyslipidaemia in people receiving protease inhibitors (PIs) or non-nucleoside reverse transcriptase inhibitors (NNRTI) versus INSTIs.

References

1. Byonanebye, D. M. *et al.* Incidence of dyslipidemia in people with HIV who are treated with integrase inhibitors versus other antiretroviral agents. *Aids* **35**, 869–882 (2021).

Recruitment and loss to follow up

In 2022, 17 sites in Australia provided data for the period between 1st April 2021 and 31st March 2022. Seven sites in Australia ceased participation in the AHOD study in 2021 and therefore did not contribute to the data this year (2021/2022). Data from the sites that are no longer participating are censored at their last data transfer. In total, 4663 patients had been recruited between 01st January 1999 and 31st March 2022 (4663 patients up until 31st March 2022); of these, 1358 are being actively followed up as of 31st March 2022.

The largest recruitment numbers occurred between 1999 and 2000, with 213 (15%) of those recruited in 1999 and 195 (14%) patients recruited in 2001. A total of 1389 participants remained in the cohort as of the 31st December 2021 (Figure 2). This year's number of active participants is significantly fewer than last year's (n=1830) because seven clinics ceased participation in AHOD in 2021 (NSW=5, VIC=1, SA=1). The sites that ceased participation had 298 active participants as of 01st April 2021.

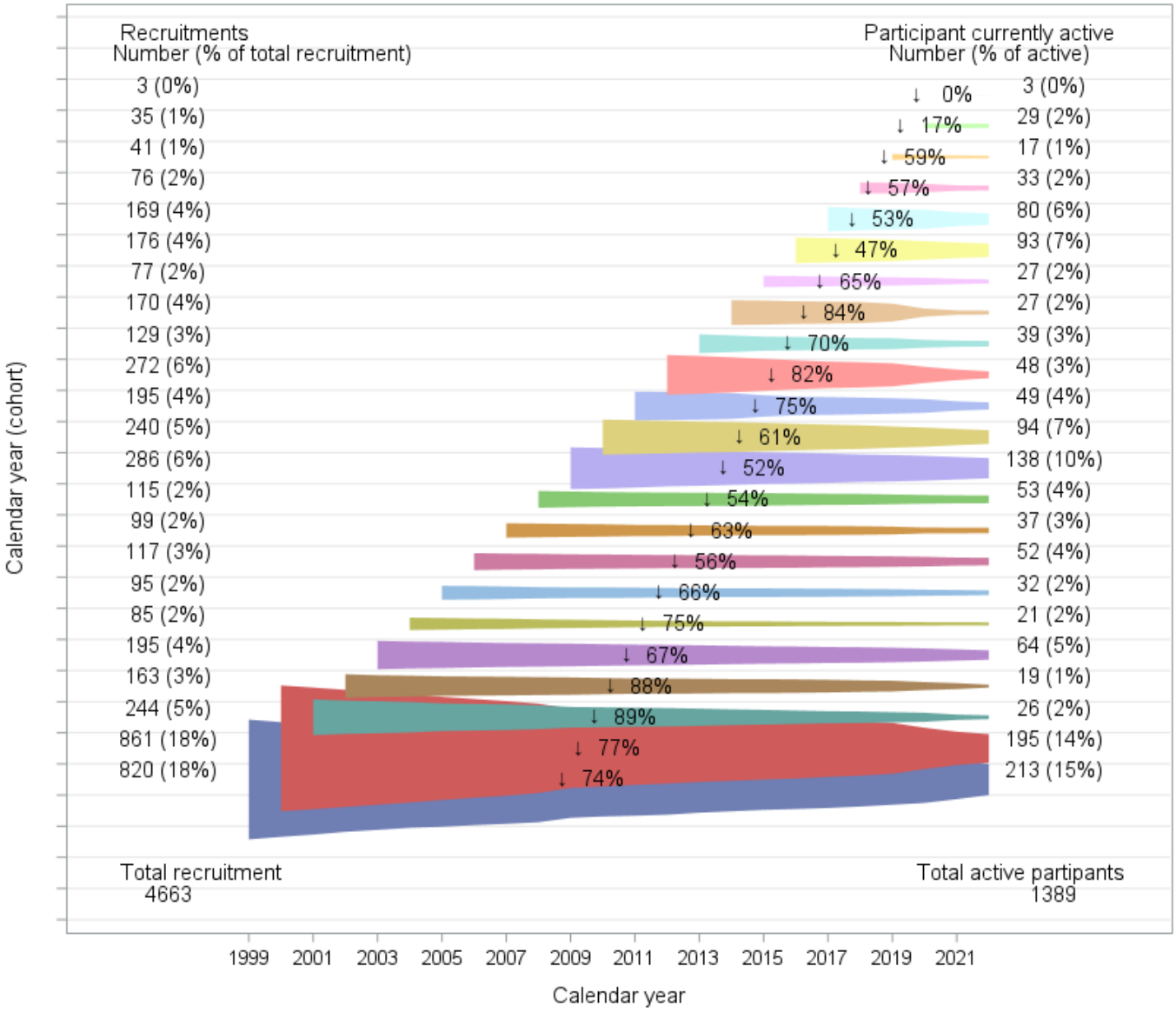


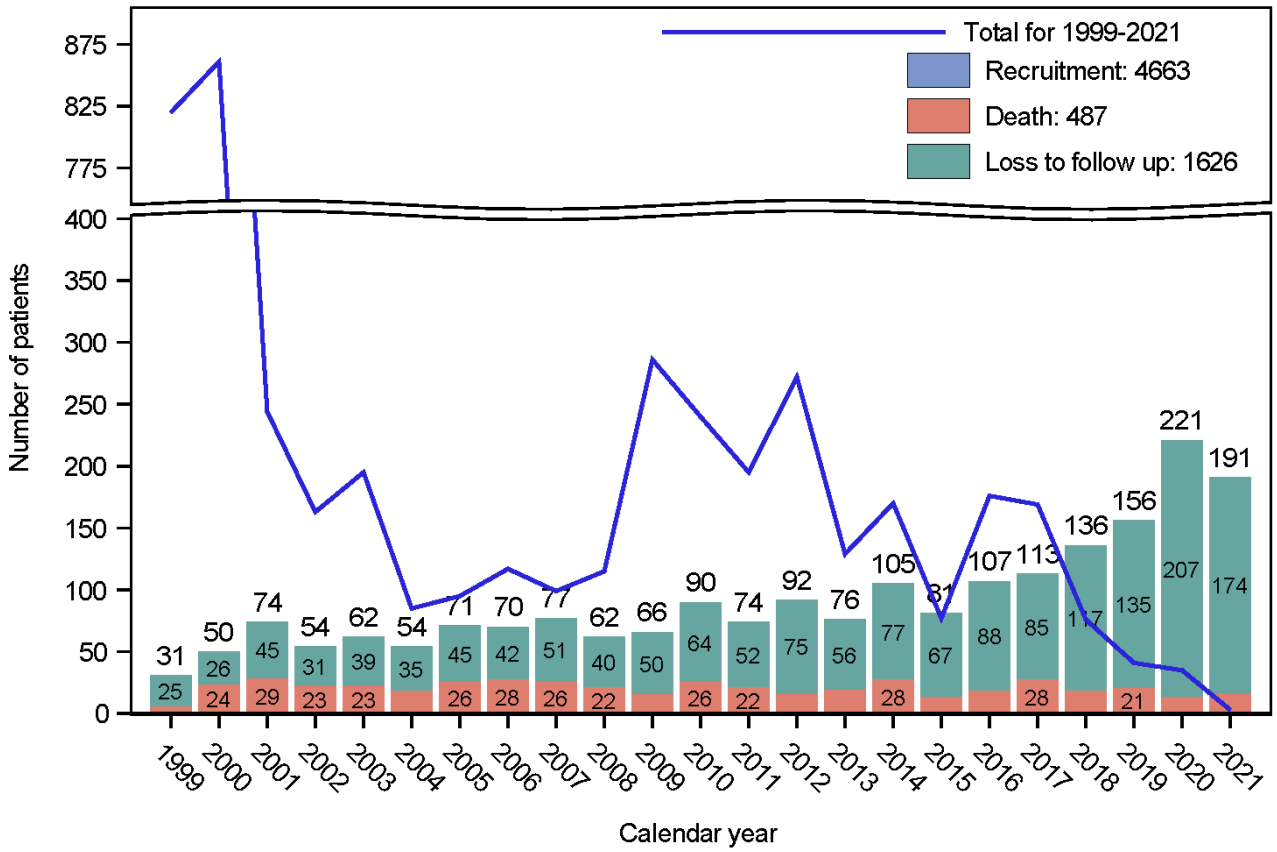
Figure 2: Recruitment and loss to follow-up/death by calendar year

1. Total number recruited between 1999 and 2021.
2. Left column: total number recruited, and percentage of total recruited by calendar year between 1999 and 2019.
3. Right column: Active patients and percentage of total active patients as of 31st December 2021 by calendar year. This number also includes participants from Sexual Health and HIV Service in Metro North which exited AHOD on 31st March 2022.
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 (as defined by applied site-specific censoring) (Figure 3). The incidence 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 patient 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). Patients who were still being actively followed up by a clinic that has since ceased participation or patients who have died are not considered lost to follow-up.

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

1. Patients who have died or any patients seen at the clinic site within the last 12 months (1st April 2021 – 31st March 2022) are considered to have completed follow-up.



Demographics

The majority of all participants in AHOD are male (~90.6%), born in Australia or New Zealand (56%), and the majority are receiving care from general practice or Sexual health clinics. The characteristics of participants who are actively being followed up are quite comparable to the characteristics of the general population originally enrolled in AHOD (Table 1)

Table 1: Demographics of all (n=4,663) versus active (n=1,358) AHOD participants[1]

	Number (%)			
	All (n=4663)		Active (n=1358)	
Sex				
Male	4227	(90.6)	1211	(89.2)
Female	428	(9.2)	143	(10.5)
Transgender	8	(0.2)	4	(0.3)
Age at enrolment (Years)				
<20	12	(0.3)	3	(0.2)
20-29	512	(11.0)	143	(10.5)
30-39	1634	(35.0)	440	(32.4)
40-49	1466	(31.4)	454	(33.4)
50+	1039	(22.3)	318	(23.4)
Mean [SD]	41.8	[10.8]	42.2	[10.7]
Aboriginal and Torres Strait Islander				
Yes	83	(1.8)	36	(2.7)
No	3441	(73.8)	1218	(89.7)
Missing	1139	(24.4)	104	(7.7)
Exposure Category				
Male-to-male sex	3282	(70.4)	973	(71.6)
Male-to-male sex and IDU	189	(4.1)	48	(3.5)
Injecting drug user (IDU)	107	(2.3)	23	(1.7)
Heterosexual contact	827	(17.7)	237	(17.5)
Receipt of blood/blood products	36	(0.8)	5	(0.4)
Other	119	(2.6)	38	(2.8)
Missing	103	(2.2)	34	(2.5)
Year of HIV diagnosis				
<1990	556	(11.9)	174	(12.8)
1990-1999	1899	(40.7)	423	(31.1)
2000-2009	1342	(28.8)	412	(30.3)
2010-2019	817	(17.5)	344	(25.3)
2020	7	(0.2)	5	(0.4)
Missing	42	(0.9)	42	(0.9)
Patient care setting				
General Practitioner	1567	(33.6)	495	(36.1)
Hospital Tertiary Centre	991	(21.2)	332	(24.2)
Sexual Health Clinic	2106	(45.2)	543	(39.6)
Region of birth				
Australia and New Zealand	2619	(56.2)	878	(64.7)
Asia and Oceania	425	(9.1)	165	(12.2)
Britain and Ireland	179	(3.8)	58	(4.3)
Europe*	131	(2.8)	52	(3.8)
Africa and the Middle East	169	(3.6)	55	(4.1)
North America	50	(1.1)	6	(0.4)
South and Central America	64	(1.4)	21	(1.5)
Missing	1026	(22.0)	123	(9.1)

	Number (%)			
	All (n=4663)		Active (n=1358)	
CD4 at enrolment (cells/µl)[1]				
<200	411	(9.0)	89	(6.6)
200-299	414	(9.0)	124	(9.1)
300-499	1254	(27.3)	365	(26.9)
500+	2060	(44.9)	641	(47.2)
Missing	451	(9.8)	139	(10.2)
Mean [SD]	531	[284.7]	554.0	[287.9]
HIV viral load at enrolment (copies/ml)[1]				
<=50	1995	(43.5)	599	(44.1)
51-400	792	(17.3)	285	(21.0)
401-10000	638	(13.9)	158	(11.6)
>10000	825	(18.0)	200	(14.7)
Missing	340	(7.4)	116	(8.5)
Median [LQ - UQ]	100	[49 - 3700]	71	[40 - 1100]
Prior AIDS-defining illness[1]				
Yes	765	(16.4)	239	(17.6)
No	3898	(83.6)	1119	(82.4)
Hepatitis B ever				
Yes	192	(4.1)	45	(3.3)
No	3674	(78.8)	1178	(86.7)
No Test	797	(17.1)	135	(9.9)
Hepatitis C ever				
Yes	468	(10.0)	115	(8.5)
No	3673	(78.8)	1170	(86.2)
No Test	522	(11.2)	73	(5.4)
Total patients active in 12 months [4]	1358	29.1		
Recent CD4 (cells/µl)[5]				
<200	19	(1.4)	19	(1.4)
200-299	33	(2.4)	33	(2.4)
300-499	150	(11.0)	150	(11.0)
500+	633	(46.6)	634	(46.7)
Missing	523	(38.5)	522	(38.4)
Mean [SD]	740	[321.1]	740.1	[320.9]
Recent HIV viral load (copies/ml)[5]				
<=50	1095	(80.6)	1098	(80.9)
51-400	66	(4.9)	63	(4.6)
401-10000	6	(0.4)	6	(0.4)
>10000	6	(0.4)	6	(0.4)
Missing	185	(13.6)	185	(13.6)
Median [LQ - UQ]	20	[19 - 23]	20	[19 - 22]

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. Patients who had the most recent visit between 01st April 2021 and 31st March 2022 and have not died.
5. Most recent CD4 count and HIV viral load between 01st April 2021 and 31st March 2022.

*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 4663 participants cumulatively enrolled, 8 (0.2%) patients are identified as transgender.

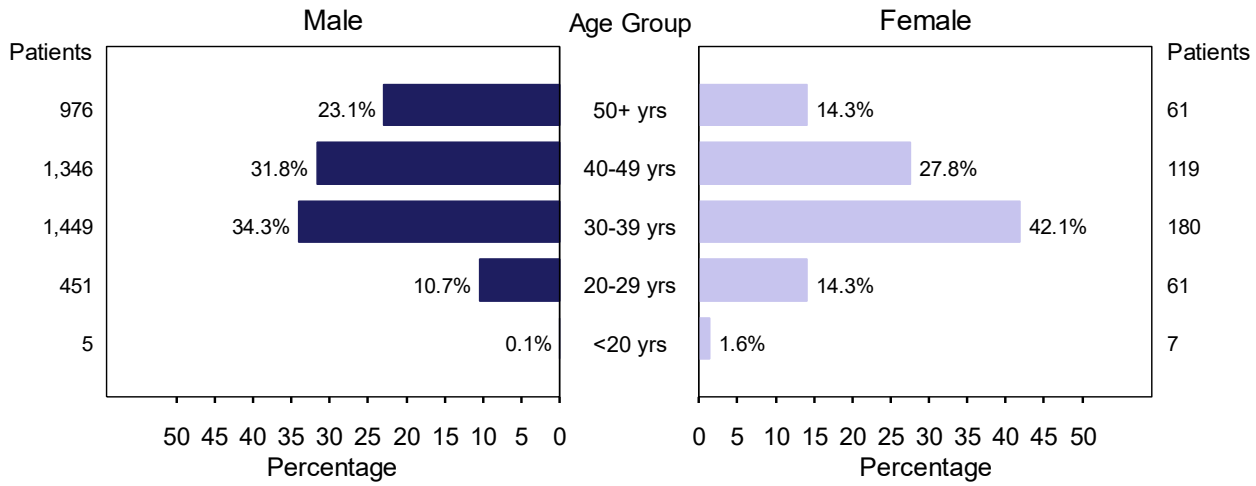


Figure 4: Age distribution of all AHOD patients, grouped by sex.

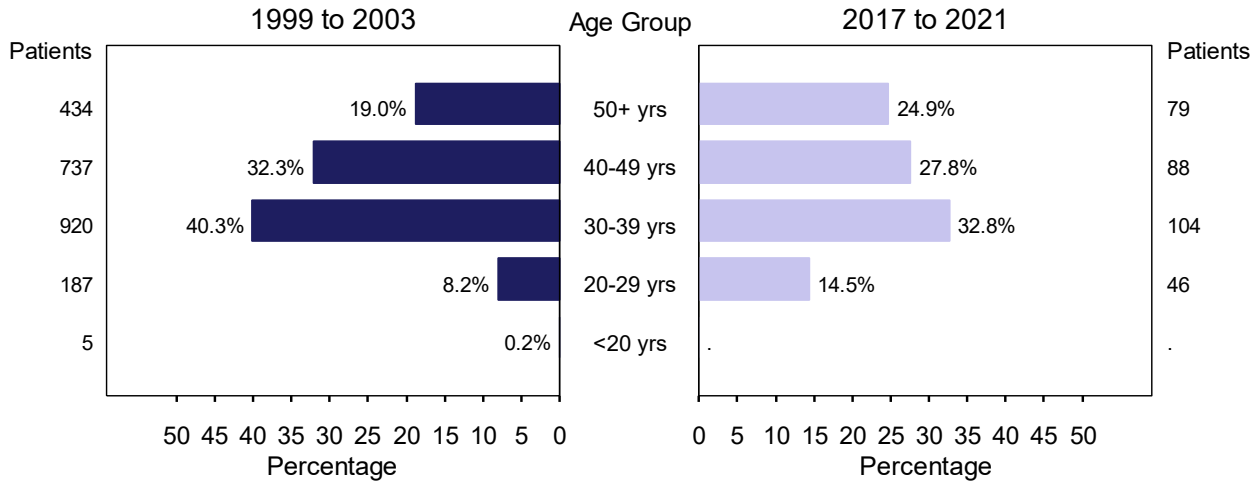


Figure 5: Age at enrolment 1999-2003 and 2017-2021

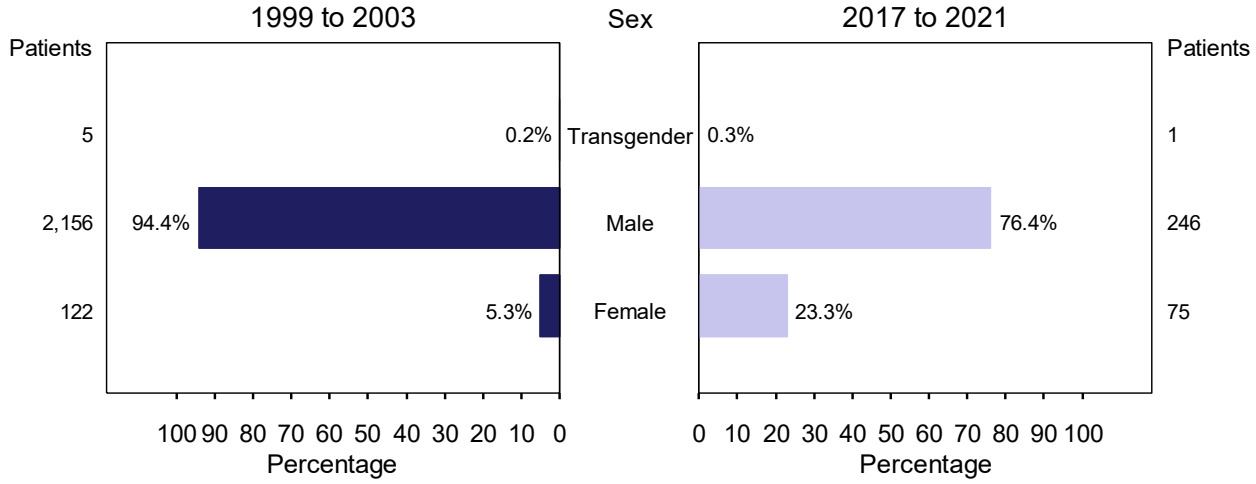


Figure 6: Gender at enrolment 1999-2003 and 2017-2021

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

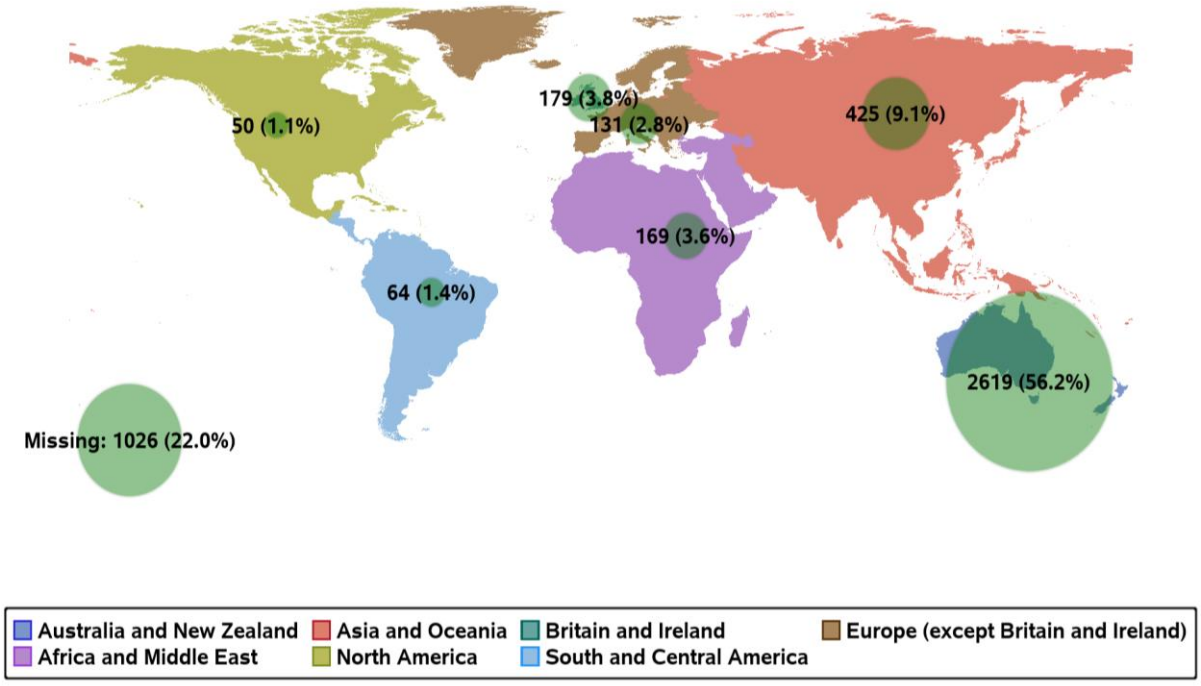


Figure 7: Region of birth of participants in AHOD

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.

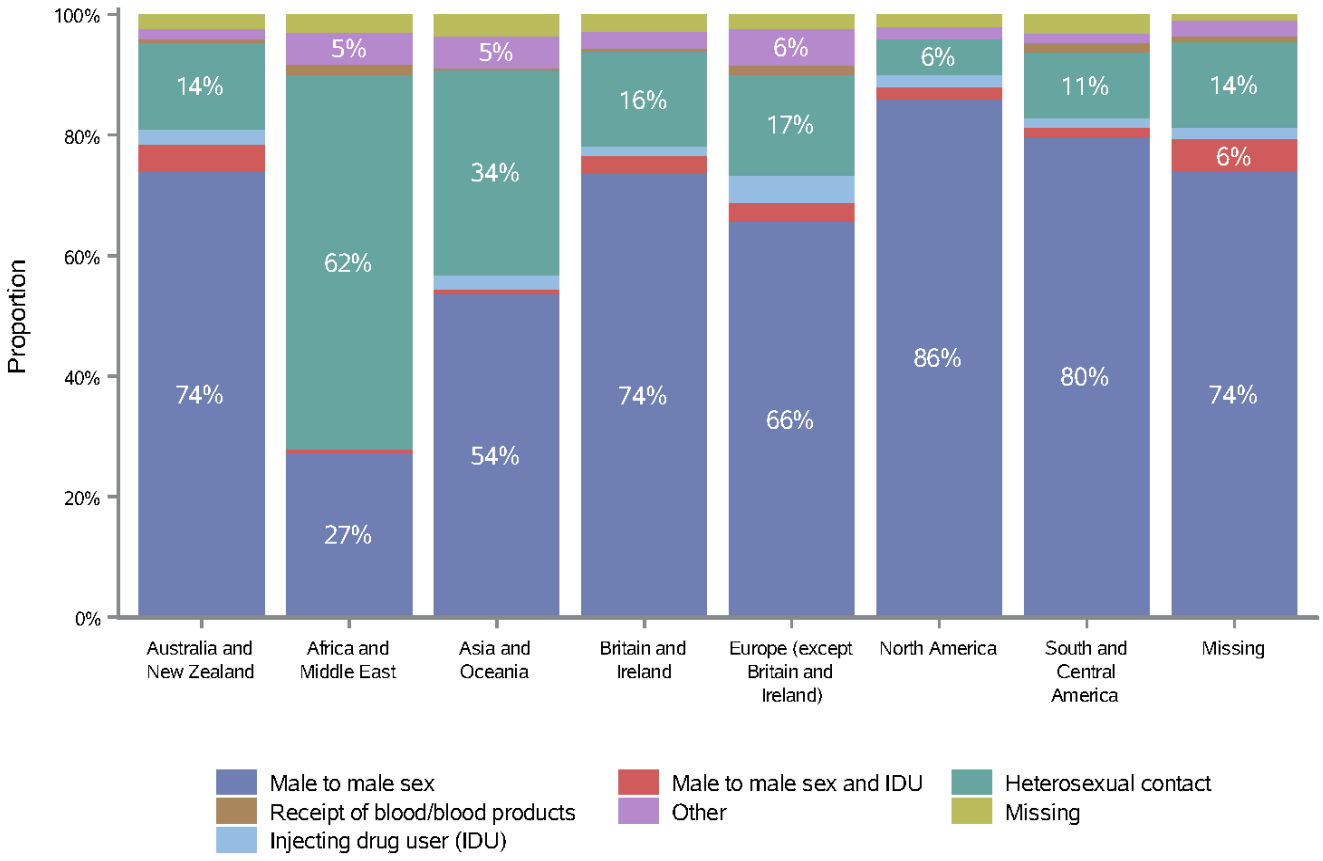


Figure 8: Mode of HIV acquisition by region of birth for all AHOD patients

Hepatitis C rates are 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 European 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	3.6	79.4	17.0	10.6	78.1	11.3
Africa and the Middle East	4.7	82.2	13.0	1.2	85.2	13.6
Asia and Oceania	6.4	73.4	20.2	5.6	81.4	12.9
Britain and Ireland	4.5	82.7	12.8	7.8	84.9	7.3
Europe (except Britain and Ireland)	1.5	80.9	17.6	13.0	74.8	12.2
North America	2.0	72.0	26.0	8.0	80.0	12.0
South and Central America	3.1	76.6	20.3	3.1	87.5	9.4
Missing	4.8	78.5	16.8	12.5	77.1	10.4

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)

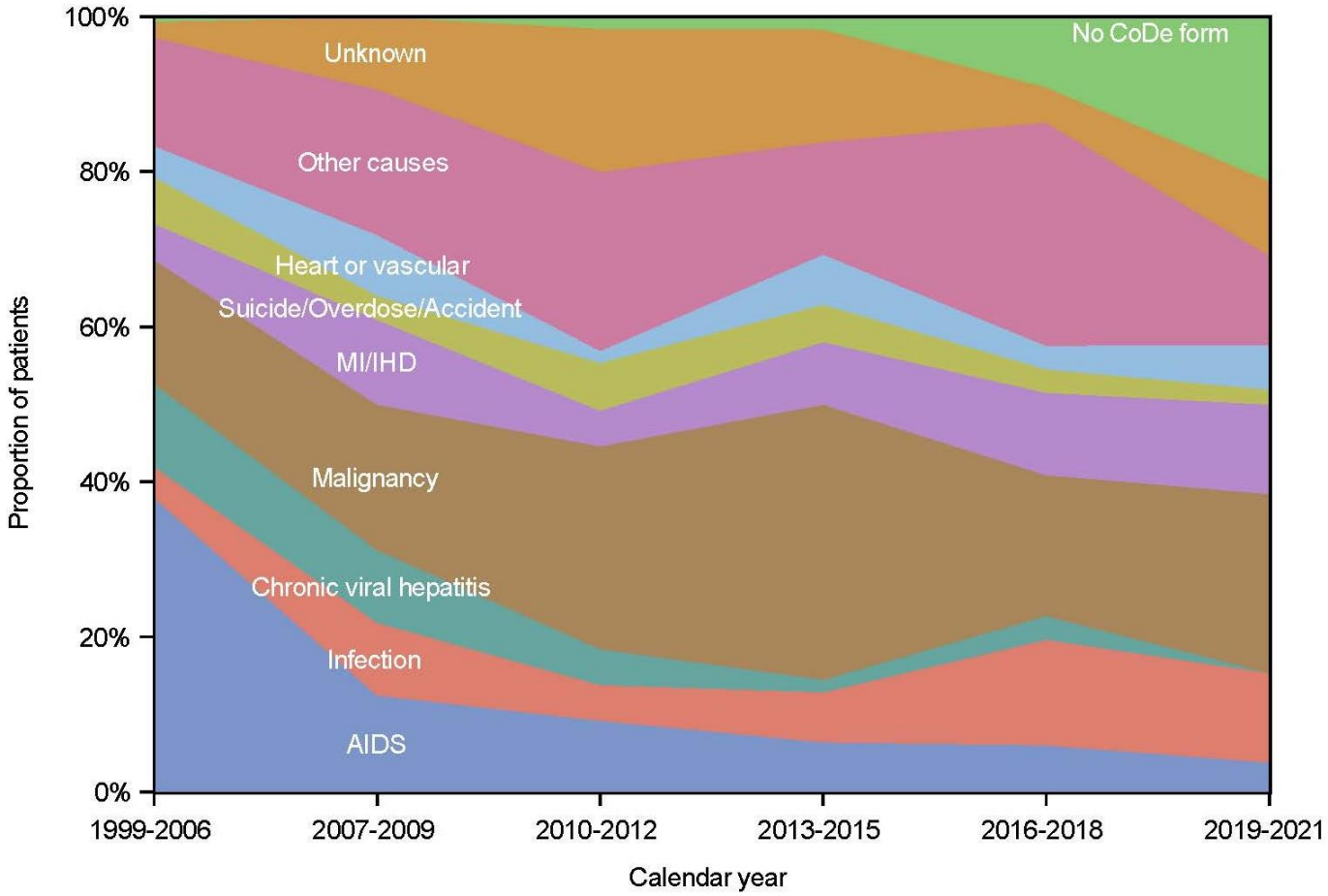


Figure 9: Distribution of cause of death during follow-up periods

1. A list of "Other causes" and their frequency can be found in Table 3.

Table 3: Other causes of death 1999-2021

Other causes of death	Number of deaths
Liver failure	12
Renal failure	10
Stroke	10
CNS disease	8
Other causes*	8
Respiratory disease	7
Chronic obstructive lung disease	6
Digestive system disease	3
Lactic acidosis	2
Gastro-intestinal haemorrhage	2
Diabetes Mellitus	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%.

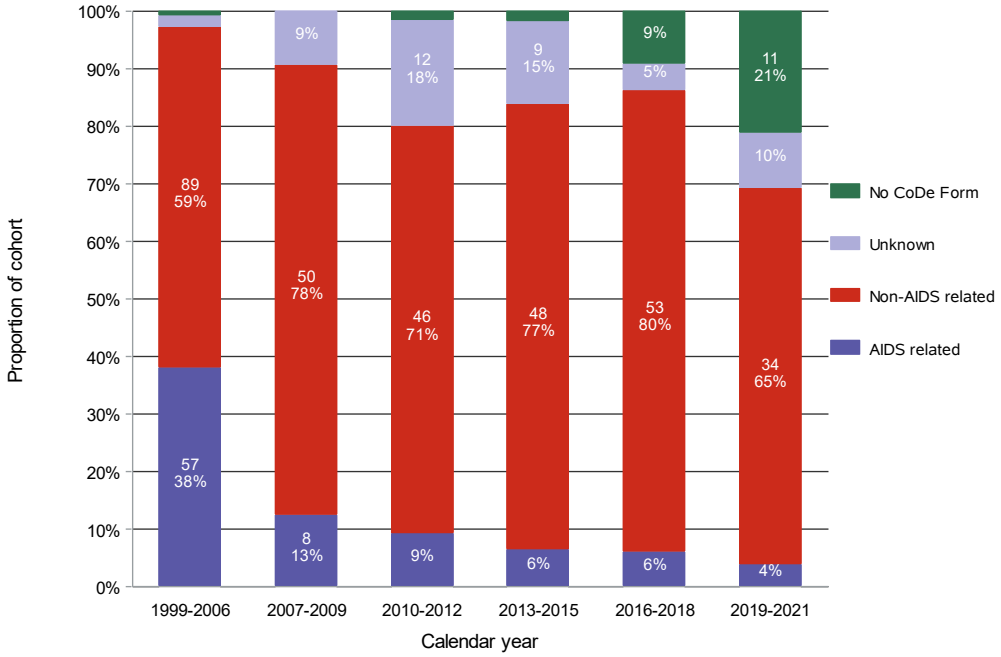


Figure 10: Distribution of AIDS and non-AIDS-related deaths in AHOD since cohort inception, by calendar year grouping

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

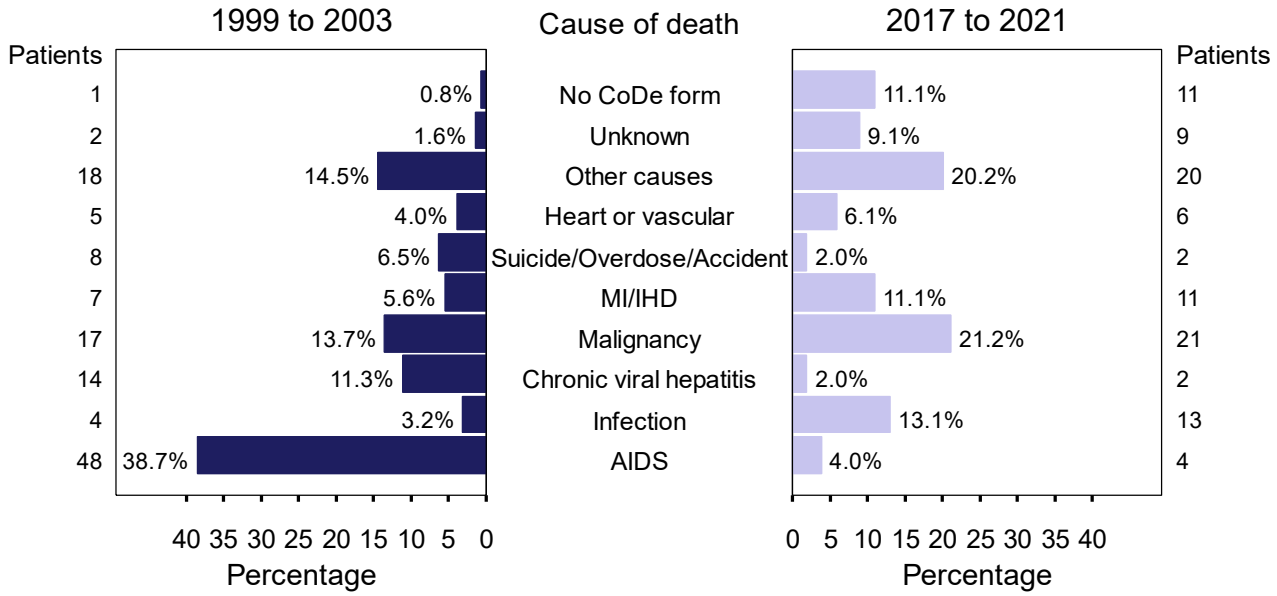


Figure 11: Cause of death 1999-2003 and 2017-2020

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

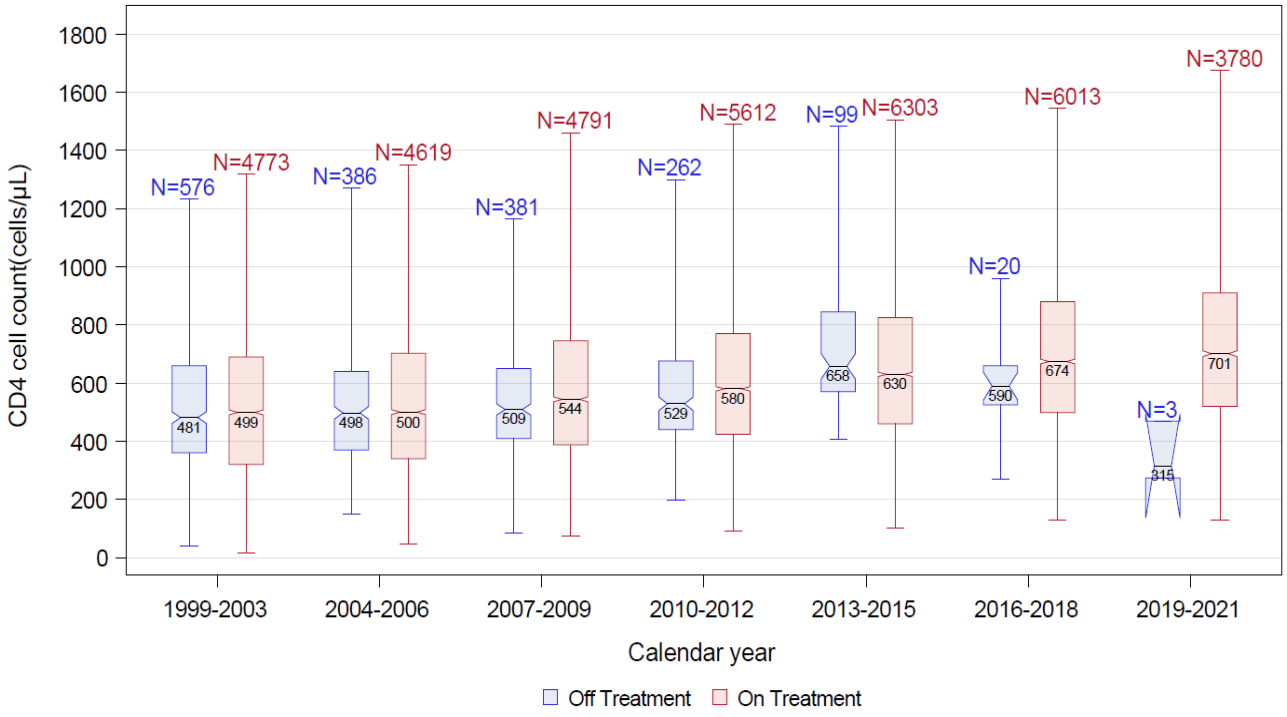


Figure 12: CD4 trends[1] for patients off[2] and on[3] treatment by calendar year groupings
1. Includes retrospective and prospective data. CD4 counts taken as the median value during a given calendar year.
2. Patients who have not received treatment of duration greater than 14 days during the calendar year
3. Patients who received ART over 14 days during the calendar year.
'N=' value includes patients with a viral load/CD4 measured during the calendar year.

The median CD4 at ART initiation has progressively been increasing, from 310 (IQR 170-486) to 590 (IQR 449-807) in 2019 and 2021, respectively. The increase in median CD4 is probably due to the overall increase in the proportion of people on ART (Figure 13).

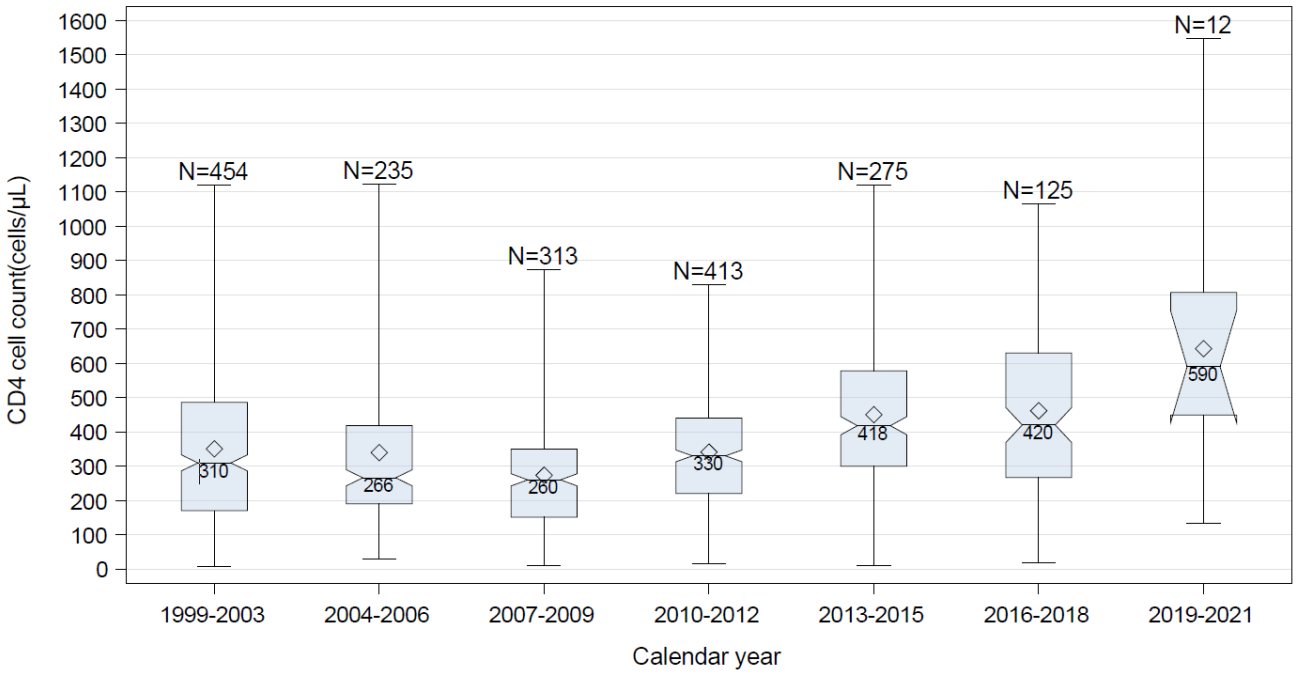


Figure 13: CD4 cell count distribution at antiretroviral therapy (ART) initiation by year of ART initation[1-3]
1. ART is defined as a combination of 3 or more antiretroviral agents or duo therapy and a duration of ART>14 days. Includes both retrospective and prospective data. Australian Temporary Residents Access Study (ATRAS) study patients 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. Patients 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 85% in 2012 to 90% in 2021 (Figure 14)

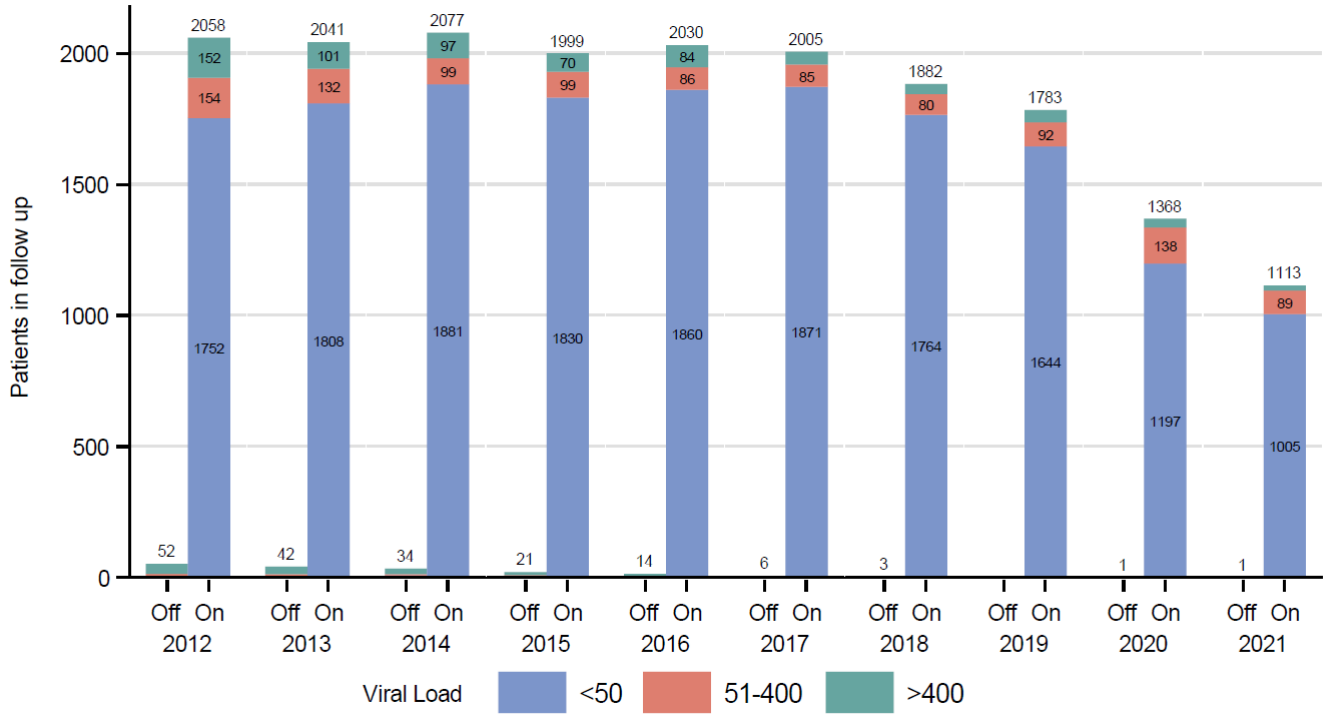


Figure 14: Patients with an undetectable viral load by treatment status (off /on treatment) and year[1]
1. Off treatment if never on a regimen of duration greater than 14 days for a given calendar year. Viral load taken as the median value during a regimen of the longest duration for a given calendar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

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

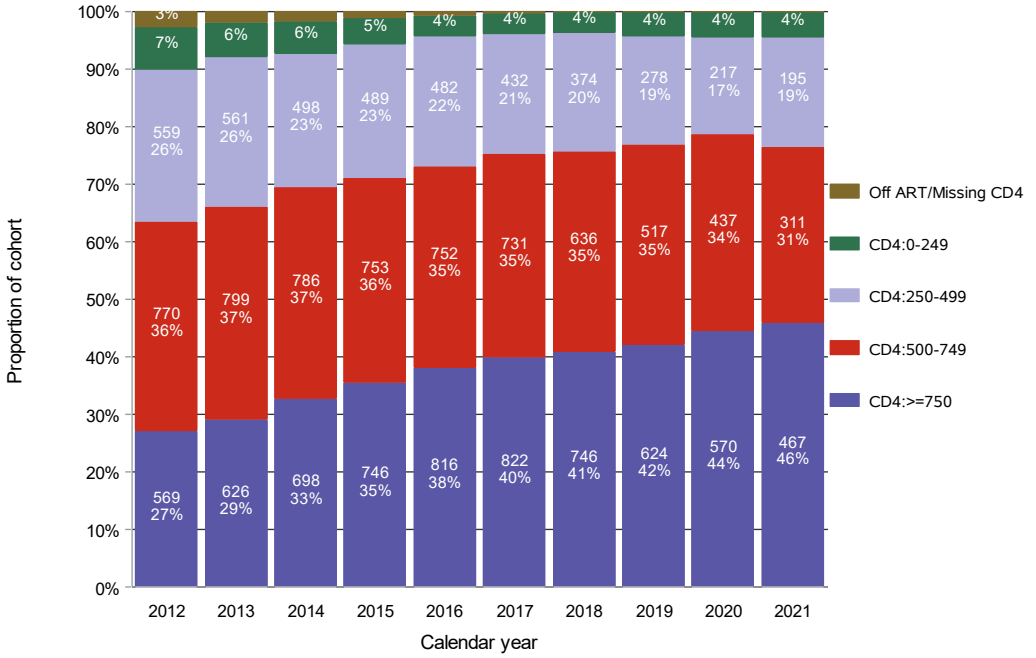


Figure 15: CD4 cell counts (cells/μL) in patients receiving treatment by calendar year[1-3]
1. Includes patients with a prospective CD4 measure during the relevant calendar year.
2. For patients on treatment, analysis is based on the initial treatment intent, not on the treatment administered (ITT), i.e., no adjustments are made for off-treatment following ART initiation.
3. Patients off treatment include those who have enrolled and have not initiated combination antiretroviral therapy.

Antiretroviral treatment

In 2021, 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 2021. A total of 1825 combination regimens were recorded among these patients throughout 2021. Approximately 77% of AHOD patients were on a 3-drug regimen (excluding ritonavir and cobicistat) in 2021, which is consistent with other years. Around 9.3% were on a 2-drug regimen, an increment from 6% in 2021.

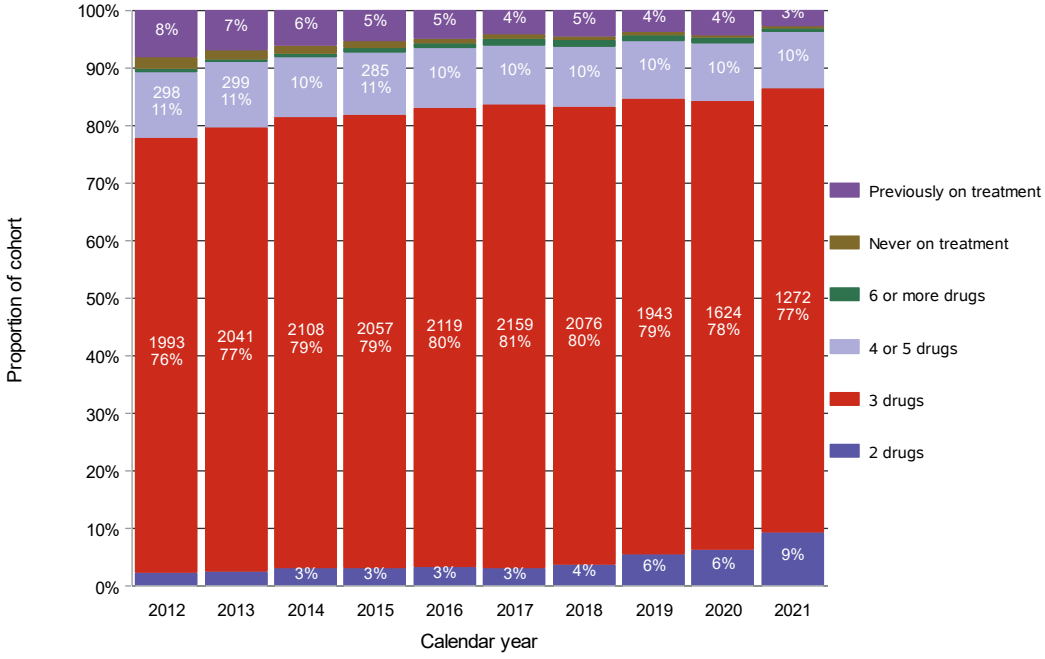


Figure 16: Trends in the number of drugs comprising antiretroviral treatment
For patients who switch regimes during a particular calendar year, the number of drugs is based on the regimen of the latest switch. The number of drugs excludes boosters (Cobicistat and Ritonavir).

In 2021, 84% of those treated were on an Integrase Strand Transfer Inhibitor (INSTI), an increase from 22% in 2012. In contrast, the proportion of patients on non-nucleoside reverse transcriptase inhibitors (NNRTI) decreased from 53% in 2012 to 22% in 2021, while those on protease inhibitors (PI) decreased from 53% to 15% during the same period (Figure 17).

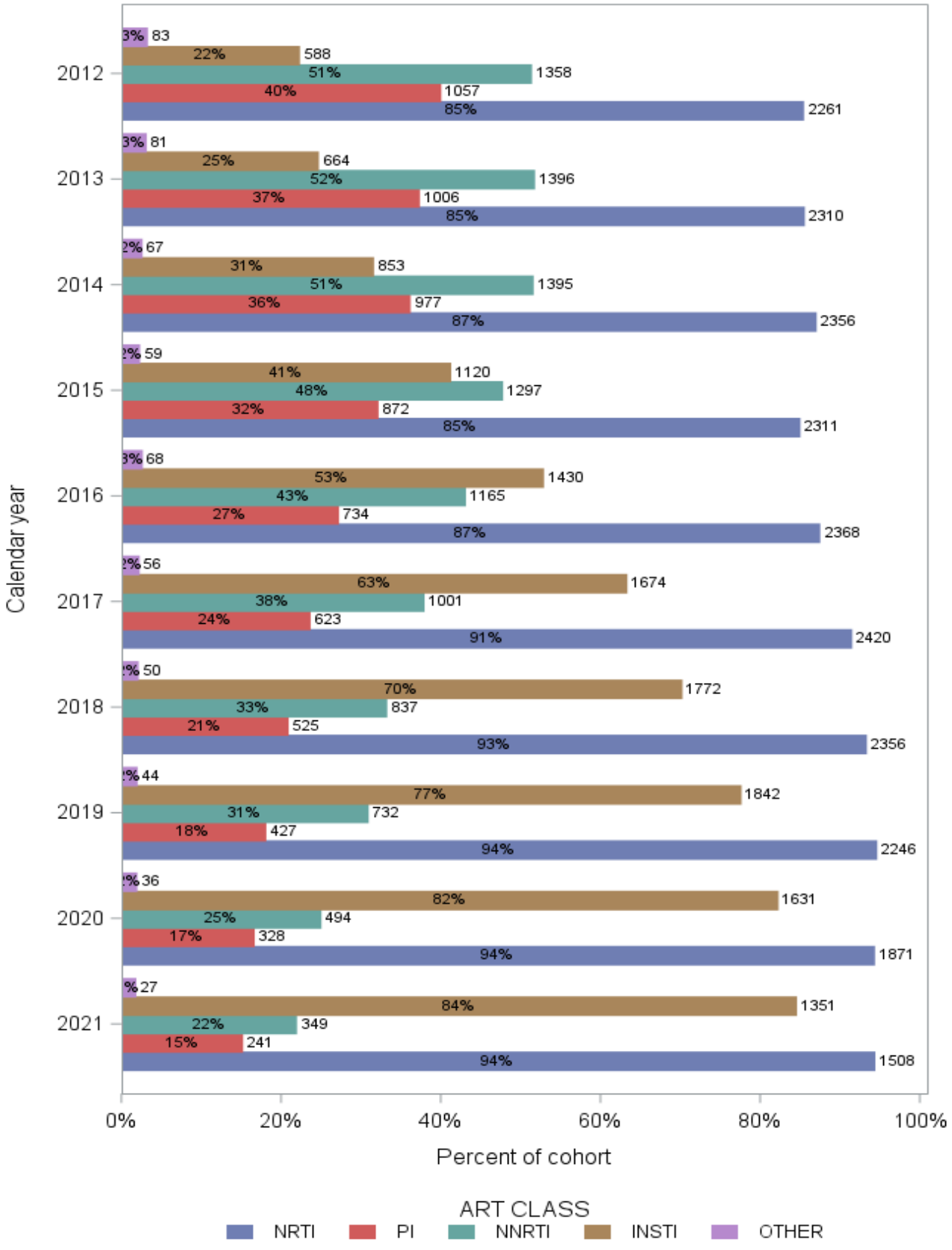
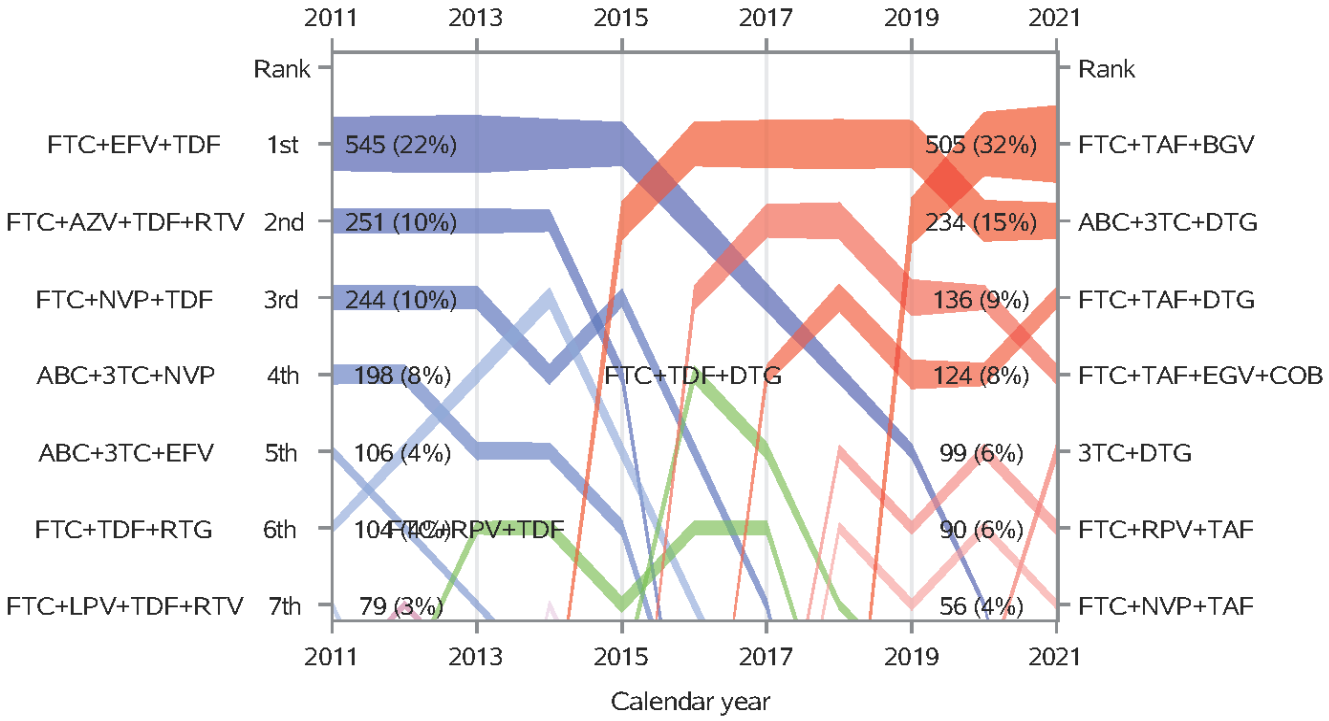


Figure 17: Trends in the classes of drugs making up combination antiretroviral treatment
Each class of drugs is counted once when more than one combination includes it within each calendar year. Boosters (Cobicistat and Ritonavir) are not included.
NRTI = nucleoside reverse transcriptase inhibitor, PI = 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 2011, but this has been replaced by INSTI-based regimens (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 2011-2021)

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 patients 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 2021, 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).

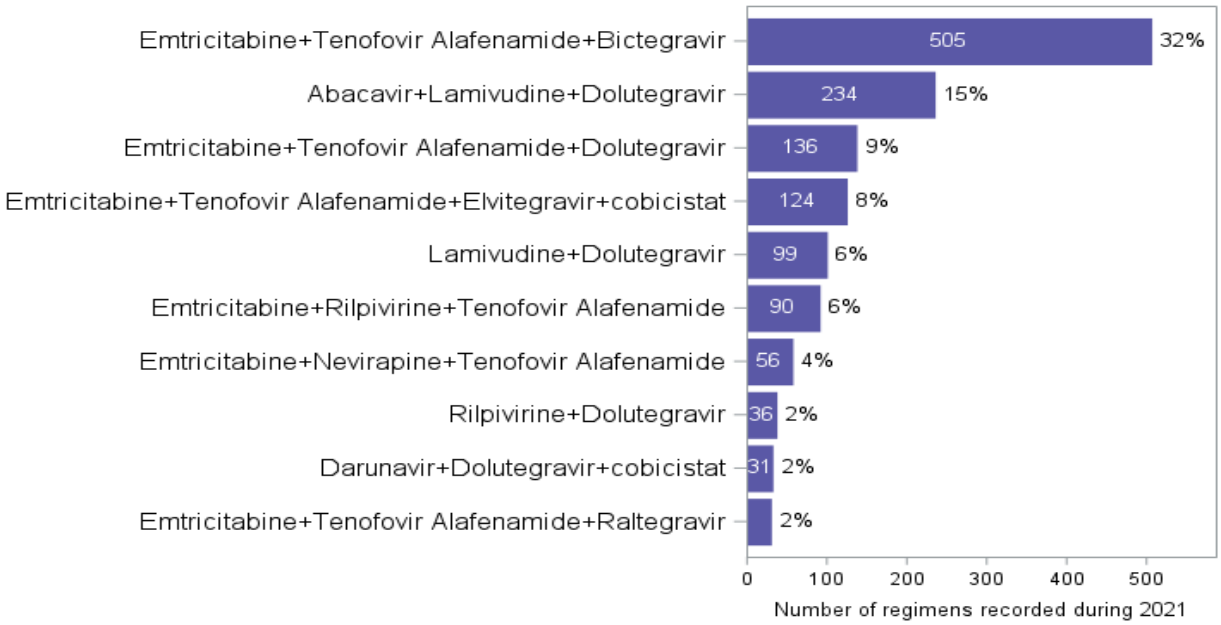


Figure 19: Top 10 ART regimes in 2020

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 2021 than in 2011. 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 2021).

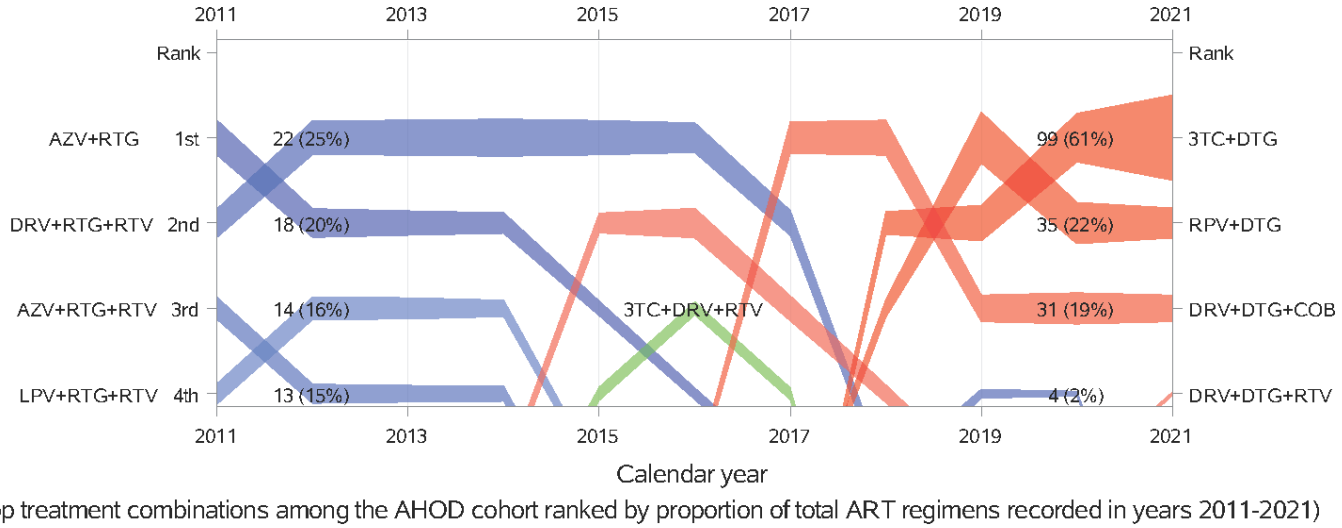
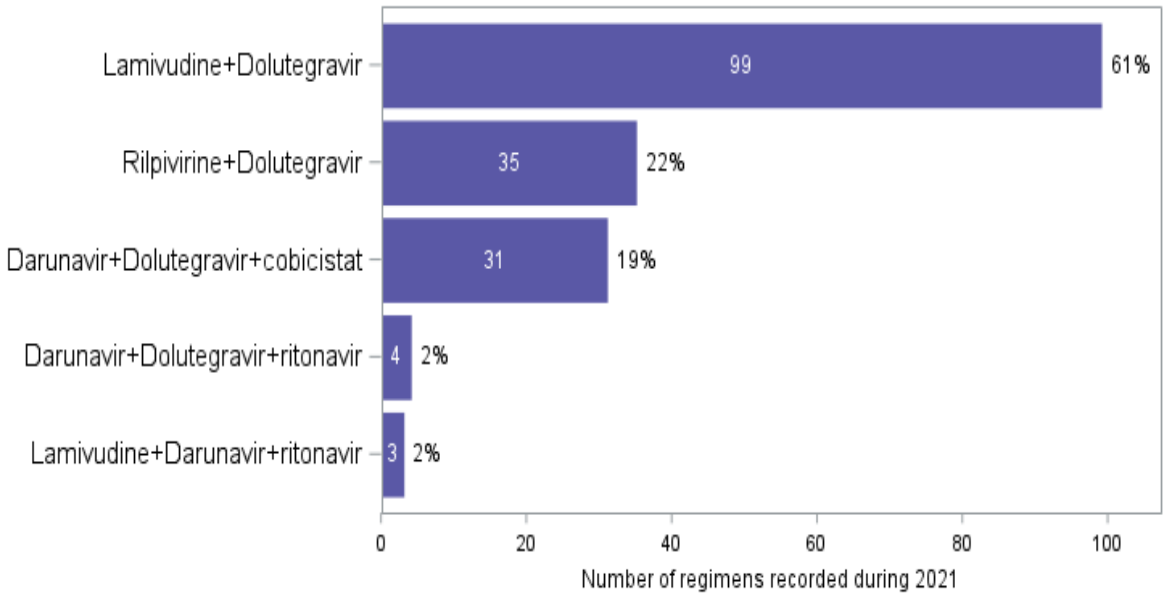


Figure 20: Top Duo ART regimes[1] among the AHOD cohort[2] ranked by proportion[3] of total ART regimens
1. Only the valid two-drug therapy combinations only were included.
2. Includes z and prospective data. Fixed dose combinations are separated into individual component antiretroviral drugs.
3. Proportion 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 patients 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 2021
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	2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Nucleoside analogue reverse transcriptase inhibitors (NRTI)																						
Abacavir	218	(9)	195	(7)	173	(7)	170	(6)	162	(6)	140	(5)	119	(4)	85	(3)	71	(3)	49	(2)	35	(2)
Apricitabine	1	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Combivir	78	(3)	67	(3)	58	(2)	48	(2)	46	(2)	36	(1)	33	(1)	23	(1)	14	(1)	5	(0)	2	(0)
Deskovy	1	(0)	1	(0)	1	(0)	2	(0)	3	(0)	54	(2)	398	(15)	490	(19)	476	(19)	371	(18)	237	(14)
Didanosine	37	(2)	33	(1)	24	(1)	25	(1)	20	(1)	15	(1)	12	(0)	12	(0)	10	(0)	5	(0)	2	(0)
Emtricitabine	111	(5)	115	(4)	122	(5)	127	(5)	132	(5)	140	(5)	175	(7)	151	(6)	159	(6)	124	(6)	114	(7)
Kivexa	353	(14)	390	(15)	396	(15)	433	(16)	408	(16)	253	(10)	200	(7)	161	(6)	125	(5)	70	(3)	40	(2)
Lamivudine	278	(11)	252	(10)	236	(9)	243	(9)	244	(9)	227	(9)	208	(8)	166	(6)	167	(7)	131	(6)	107	(6)
Stavudine	32	(1)	26	(1)	23	(1)	25	(1)	17	(1)	14	(1)	12	(0)	10	(0)	10	(0)	8	(0)	3	(0)
Tenofovir Alafenamide	0	(0)	0	(0)	1	(0)	1	(0)	1	(0)	16	(1)	67	(3)	78	(3)	86	(4)	80	(4)	72	(4)
Tenofovir Disoproxil	301	(12)	278	(11)	277	(10)	258	(10)	238	(9)	209	(8)	174	(6)	108	(4)	93	(4)	64	(3)	49	(3)
Trizivir	28	(1)	20	(1)	16	(1)	15	(1)	12	(0)	10	(0)	9	(0)	7	(0)	5	(0)	4	(0)	0	(0)
Truvada	632	(26)	703	(27)	708	(27)	726	(27)	677	(26)	607	(23)	456	(17)	196	(8)	136	(6)	68	(3)	72	(4)
Zidovudine	27	(1)	29	(1)	29	(1)	24	(1)	21	(1)	19	(1)	13	(0)	8	(0)	7	(0)	3	(0)	1	(0)
Non-nucleoside reverse transcriptase inhibitors (NNRTI)																						
Efavirenz	212	(9)	225	(9)	188	(7)	161	(6)	148	(6)	125	(5)	90	(3)	63	(2)	42	(2)	24	(1)	13	(1)
Etravirine	99	(4)	116	(4)	122	(5)	128	(5)	134	(5)	131	(5)	121	(5)	104	(4)	76	(3)	59	(3)	41	(2)
Nevirapine	496	(20)	488	(19)	461	(17)	428	(16)	395	(15)	357	(13)	365	(14)	277	(11)	233	(9)	159	(8)	104	(6)
Rilpivirine	5	(0)	10	(0)	23	(1)	24	(1)	31	(1)	40	(2)	61	(2)	60	(2)	66	(3)	55	(3)	45	(3)
Dual Regimens																						
Dovato	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(0)	4	(0)	21	(1)	67	(4)
Juluca	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	8	(0)	53	(2)	44	(2)	35	(2)
Entry Inhibitor (EI)																						
Enfuvirtide	9	(0)	6	(0)	5	(0)	3	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Fostemsavir	0	(0)	0	(0)	0	(0)	0	(0)	1	(0)	2	(0)	2	(0)	1	(0)	2	(0)	2	(0)	2	(0)

1. All treatment records of ≥2 weeks of treatment in any calendar year were included in this analysis. The denominator includes all patients that could have been on antiretroviral therapy (i.e., HIV positive) in any calendar year. The proportion of patients on each drug in any calendar year does not add up to 100% across all ART drug groups in each calendar year, as patients 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	2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Protease Inhibitors (PIs)																						
Amprenavir	5	(0)	7	(0)	6	(0)	3	(0)	3	(0)	3	(0)	3	(0)	1	(0)	0	(0)	0	(0)	0	(0)
Atazanavir	482	(20)	462	(18)	460	(17)	428	(16)	351	(13)	257	(10)	184	(7)	111	(4)	86	(4)	49	(2)	34	(2)
Darunavir	220	(9)	273	(10)	292	(11)	349	(13)	379	(15)	373	(14)	368	(14)	266	(10)	214	(9)	169	(8)	129	(8)
Evotaz	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	16	(1)	35	(1)	27	(1)	28	(1)	11	(1)	7	(0)
Fosamprenavir	22	(1)	18	(1)	21	(1)	19	(1)	13	(0)	8	(0)	9	(0)	6	(0)	1	(0)	1	(0)	1	(0)
Indinavir	16	(1)	15	(1)	13	(0)	11	(0)	9	(0)	11	(0)	8	(0)	6	(0)	7	(0)	2	(0)	1	(0)
Kaletra	179	(7)	157	(6)	131	(5)	110	(4)	78	(3)	63	(2)	46	(2)	26	(1)	14	(1)	10	(0)	5	(0)
Lopinavir	58	(2)	58	(2)	51	(2)	43	(2)	34	(1)	20	(1)	14	(1)	8	(0)	8	(0)	5	(0)	2	(0)
Nelfinavir	6	(0)	5	(0)	4	(0)	6	(0)	7	(0)	6	(0)	7	(0)	5	(0)	5	(0)	2	(0)	0	(0)
Prezcobix	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	23	(1)	108	(4)	116	(4)	113	(5)	114	(5)	83	(5)
Saquinavir	15	(1)	12	(0)	12	(0)	10	(0)	10	(0)	10	(0)	7	(0)	4	(0)	6	(0)	2	(0)	0	(0)
Tipranavir	4	(0)	2	(0)	2	(0)	2	(0)	2	(0)	1	(0)	1	(0)	2	(0)	2	(0)	2	(0)	2	(0)
Integrase Inhibitors (INSTIs)																						
Bictegravir	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(0)	2	(0)	7	(0)	33	(1)	35	(2)	37	(2)
Cabotegravir	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(0)	3	(0)	6	(0)	6	(0)	6	(0)	7	(0)
Dolutegravir	2	(0)	7	(0)	9	(0)	177	(7)	330	(13)	367	(14)	586	(22)	595	(23)	577	(24)	403	(19)	322	(20)
Elvitegravir	2	(0)	6	(0)	8	(0)	7	(0)	7	(0)	14	(1)	15	(1)	18	(1)	15	(1)	9	(0)	7	(0)
Raltegravir	457	(19)	540	(20)	599	(23)	619	(23)	532	(20)	460	(17)	441	(16)	307	(12)	237	(10)	182	(9)	135	(8)
Class Combinations[2]																						
Atripla	277	(11)	305	(12)	315	(12)	288	(11)	259	(10)	208	(8)	158	(6)	108	(4)	76	(3)	42	(2)	27	(2)
Biktarvy	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(0)	0	(0)	12	(0)	431	(18)	513	(25)	499	(30)
Complera (or Eviplera)	1	(0)	48	(2)	98	(4)	124	(5)	132	(5)	132	(5)	127	(5)	46	(2)	20	(1)	6	(0)	4	(0)
Genvoya	1	(0)	1	(0)	15	(1)	14	(1)	22	(1)	249	(9)	355	(13)	395	(15)	378	(15)	224	(11)	139	(8)
Odefsey	0	(0)	0	(0)	0	(0)	0	(0)	1	(0)	1	(0)	93	(3)	125	(5)	126	(5)	113	(5)	95	(6)
Stribild (or Quad)	0	(0)	1	(0)	6	(0)	76	(3)	118	(5)	121	(5)	38	(1)	11	(0)	9	(0)	6	(0)	1	(0)
Symtuza	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	18	(1)	29	(2)
Triumeq	2	(0)	2	(0)	2	(0)	4	(0)	259	(10)	366	(14)	382	(14)	384	(15)	346	(14)	243	(12)	173	(11)
Chemokine Receptor (CCR5) Antagonist																						
Maraviroc	34	(1)	41	(2)	48	(2)	53	(2)	58	(2)	60	(2)	60	(2)	49	(2)	43	(2)	40	(2)	31	(2)

1. All treatment records of ≥2 weeks of treatment in any calendar year were included in this analysis. The denominator includes all patients that could have been on antiretroviral therapy (i.e., HIV positive) in any calendar year. The proportion of patients on each drug in any calendar year does not add up to 100% across all ART drug groups in each calendar year, as patients 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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