

**in
Austria**

**47th Report of the
Austrian HIV Cohort Study**

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HIV / AIDS in Austria

47th Report of the Austrian HIV Cohort Study

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1 Introduction

At the end of the year 2001, representatives of 5 Austrian HIV treatment centres (AKH Vienna, Penzing Hospital Vienna, Kepler Universitätsklinikum Med Campus III Linz, LKH Innsbruck and LKH Graz II West) have founded the „**Austrian HIV Cohort Study (AHIVCOS)**“. In 2008, two more centres (LKH Salzburg and LKH Klagenfurt), in 2016 Favoriten Hospital Vienna and in 2018 LKH Feldkirch joined the AHIVCOS. The responsibility for the medical and scientific coordination lies with Robert Zangerle from the Medical University of Innsbruck.

Aims of Austrian cohort study are:

- 1) Optimization of patient management
- 2) HIV surveillance
- 3) Research projects

A special software, the "*HIV Patient Management System (HIP)*" is used in all centres and has replaced the previous *HIV data base* in 2005. The input of data is (was) done peripherally in the HIV treatment centres which consistently use the data base for clinical care. The input of laboratory findings is mostly done electronically. Apart from nurses and doctors, additional professional groups are involved in data entry in some centres (social workers, psychologists). Before data can be merged, the cohort participants are made anonymous. Therefore, it is cumbersome to identify cohort participants who are/were treated in more than just one treatment centre. This cannot be done by the use of personal data such as initials, birthday or postal code, but with HIV specific data (date of the HIV test, CD4 cell counts etc.).

HIV Patient Management System:

Designed as a client-server application, the *HIP* stores its data in a persistent SQL database. The software is based on the model driven architecture paradigm and has been implemented with Microsoft .NET technology. The company DI Heinz Appoyer (now called *network vita*) was entrusted with the development of the *HIP*. The required hardware is provided by the local IT departments in the centres. In terms of data protection the programme fully complies with the Austrian data protection act (DSG 2000, valid since 1.1.2000). Access to the data base in the centres is restricted to authorized users only.

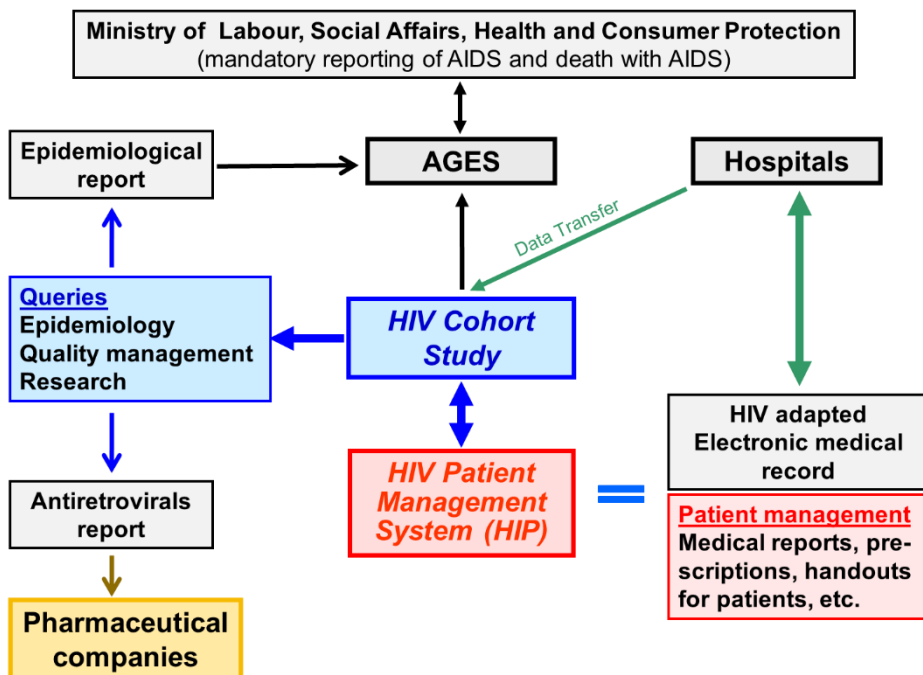
On the one hand, the *HIP* fulfils complex tasks for the clinical management of HIV infected patients, and on the other hand it allows queries and analyses to be performed by the users without restrictions. However, to allow both individual patient management and scientific queries is an enormous challenge which scientific HIV cohorts in other countries have not had to deal with. In Austria, there was no acceptance for a purely scientific data base. While for the clinical patient management the focus is on readability of diagnoses and therapies, creation of medical reports, prescriptions (trade names!), print-out of results etc., scientific queries need precise coding and categorization. Furthermore, the optimization of individual patient management requires an ongoing adjustment to the progress of information technology, whereas purely scientific data bases do not have such technological renewal pressure.

Special challenges for the HIV Patient Management System are:

- Checking of plausibility of the data after entry in the database
- Meeting the requirements of both clinical patient management and scientific database
- Weak/ overburdened infrastructure in HIV treatment centres

2 Organization of the Austrian HIV cohort study

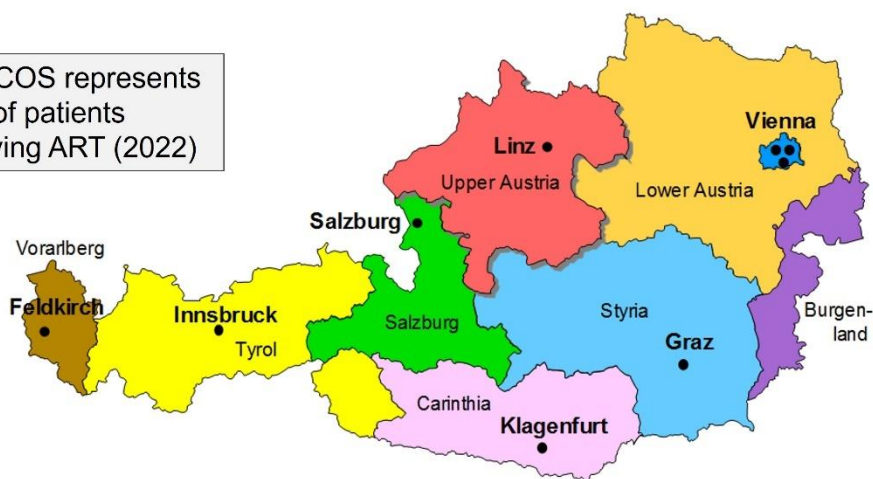
The organization and further development of the HIV cohort study will stay complex, because some goals of the *Austrian HIV Cohort Study* are also of interest to health authorities and/ or institutions. The Federal Ministry of Social Affairs, Health, Care and Consumer Protection (BMSGPK, Department VII/A/11, Dr.ⁱⁿ Sigrid Kiermayr) is in charge of HIV, whereas some agenda of this responsibility has been shifted to the Agency for Health and Food Safety (AGES). In contrast, patient care has to be provided by the different federal states, and the social insurance companies bear the costs of the HIV medication. The IT departments in the hospitals have to provide the IT hardware as well as the service/ data security. Because of the support of BMSGPK and AGES, the collaboration between the *Austrian HIV Cohort Study* and the hospitals, especially with the local IT departments (e. g. interfaces between HIP and local IT systems) is legitimized. For IT departments, HIP as an “isolated application” is seen as an additional liability. On the other hand, hospitals have also an interest in the *HIV Patient Management System* because tasks of quality management and standardization of care can be managed more efficiently by using HIP. The establishment of the *HIV Patient Management System* is a big advance in the management of patients with HIV/AIDS („Good Chronic Disease Practice“).



The development of the *HIV Patient Management System* incorporated the international standard format, the HIV Cohorts Data Exchange Protocol (HICDEP), so that data merging with networks of cohorts like ART-CC, EuroSIDA and RESPOND are greatly facilitated.

Centres of the Austrian HIV Cohort Study

AHIVCOS represents
64% of patients
receiving ART (2022)



■ Vienna Penzing	Pulmonary Medicine
■ Vienna AKH	Dermatovenereology
■ Vienna Favoriten	Infectious Diseases
■ Graz	Infectious Diseases
■ Linz	Dermatovenereology
■ Salzburg	Oncology/Infectious Diseases
■ Klagenfurt	Oncology
■ Innsbruck	Dermatovenereology
■ Feldkirch	Oncology/Infectious Diseases

3 Funding

The Austrian HIV Cohort Study (AHIVCOS) is supported by the public health sector (AGES, by order of the Federal Ministry of Health), the participating hospitals (routine maintenance of the *HIV Patient Management System* ("HIP"), the partners in the pharmaceutical industry (all relevant companies providing HIV drugs – GILEAD, GSK & ViiV and MSD) and international cohort collaboration RESPOND, which provides the largest single financial contribution.

4 Cohort participants

4.1 Definition of Cohort participants

The Austrian HIV Cohort Study has gained approval of the ethical committees of the HIV treatment centres. With this the Austrian HIV Cohort Study has been ready to join the international network of cohorts like ART-CC, CASCADE, COHERE and RESPOND.

Inclusion criteria:

- Patients living with HIV infection

Exclusion criteria:

- Physician's decision
- Patient withholds consent

Frequency of the monitoring („Follow-up“):

Cohort participants will be examined and findings/ results documented at regular visits (at least semiannually), therefore no additional costs will arise.

Minimal dataset:

- Last negative, first positive HIV test, seroconversion illness, AIDS diagnoses, all cases of death
- First contact with the HIV centre
- Age, sex, mode of transmission of HIV
- CD4 count, HIV RNA, co-infections and co-morbidities
- Resistances to antiretroviral drugs
- Antiretroviral therapies (past and present)
- Co-morbidities
- Co-medication

Merger of data:

- Only indirectly personal data according to the data protection act
- Semiannual (March and September)

4.2 Recruitment and follow-up of cohort participants

So far, 11490 HIV infected patients providing 133774.26 years of follow-up have been recruited into the cohort study. We assume that there were more than 2966 deaths, but data entry from patients with loss of follow-up or last contact a long time ago is incomplete. Most centres do not have enough resources to enter data retrospectively.

Cumulative number of all cohort participants

	Penzing Vienna	AKH Vienna	Favoriten Vienna	Linz	Salz- burg	Inns- bruck	Feld- kirch	Graz	Klagen- furt	Total
01.09.2024	2821	3456	319	1323	605	1556	173	884	353	11490

Last contact with HIV treatment centre and alive or not known to be dead					
	Follow-up within the last 12 months	Living/moved to care abroad	Lost to follow-up	Total	
Penzing Vienna	822	101	711	1634	
AKH Vienna	1419	428	926	2773	
Favoriten Vienna	218	10	78	306	
Linz	721	70	119	910	
Salzburg	345	54	154	553	
Innsbruck	762	269	89	1120	
Feldkirch	136	18	10	164	
Graz	493	34	221	748	
Klagenfurt	256	11	49	316	
Total	5172	995	2357	8524	

Death			
	Death within the last 12 months	Death since more than 12 months	Total
Penzing Vienna	21	1166	1187
AKH Vienna	12	671	683
Favoriten Vienna	0	13	13
Linz	3	410	413
Salzburg	0	52	52
Innsbruck	10	426	436
Feldkirch	0	9	9
Graz	7	129	136
Klagenfurt	2	35	37
Total	55	2911	2966

Risk factors for no follow-up within the last 12 months

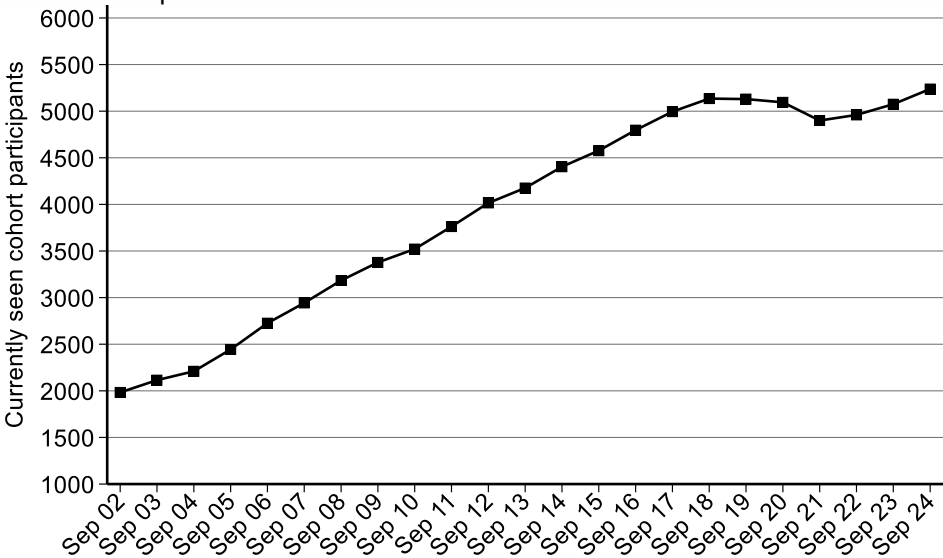
Persons with residency abroad were excluded from this analysis.

All centres	Frequencies		%	Univariable logistic Regression			Multivariable logistic Regression		
Variable	2357	7529	31.31%	OR	(95%CI)	p-value	OR	(95%CI)	p-value
Demographic characteristics									
<i>Age at last contact</i>									
< 30	414	612	67.65%	10.80	[8.89,13.12]	<0.001	9.43	[7.65,11.64]	<0.001
30-50	1450	3878	37.39%	3.08	[2.75,3.46]	<0.001	2.82	[2.49,3.20]	<0.001
> 50	493	3039	16.22%	1.00		.	1.00		.
<i>HIV transmission category</i>									
Male IDU	234	656	35.67%	1.09	[0.91,1.29]	0.348	0.95	[0.78,1.14]	0.573
Female IDU	107	298	35.91%	1.10	[0.86,1.41]	0.456	1.05	[0.80,1.37]	0.721
Male hetero	311	1271	24.47%	0.63	[0.55,0.73]	<0.001	0.80	[0.68,0.94]	0.008
Female hetero	342	1379	24.80%	0.65	[0.56,0.74]	<0.001	0.68	[0.58,0.80]	<0.001
Other	211	516	40.89%	1.36	[1.12,1.64]	0.001	1.12	[0.90,1.40]	0.304
MSM	1152	3409	33.79%	1.00		.	1.00		.
<i>Population size of residence area</i>									
Vienna	1476	3393	43.50%	2.99	[2.70,3.31]	<0.001	2.84	[2.55,3.17]	<0.001
Missing	45	52	86.54%	24.98	[11.22,55.58]	<0.001	11.02	[4.68,26.10]	<0.001
Outside Vienna	836	4084	20.47%	1.00		.	1.00		.
<i>Nationality</i>									
High prevalence	257	693	37.09%	1.38	[1.17,1.63]	<0.001	1.32	[1.09,1.61]	0.006
Low prevalence	491	1603	30.63%	1.04	[0.92,1.17]	0.565	0.79	[0.69,0.91]	0.001
Missing	71	85	83.53%	11.90	[6.69,21.18]	<0.001	6.40	[3.42,12.06]	<0.001
Austria	1538	5148	29.88%	1.00		.	1.00		.
Stage of disease									
<i>AIDS</i>									
Yes	368	1526	24.12%	0.64	[0.56,0.73]	<0.001	0.85	[0.74,0.98]	0.026
No	1989	6003	33.13%	1.00		.	1.00		.

4.3 Patients currently in care

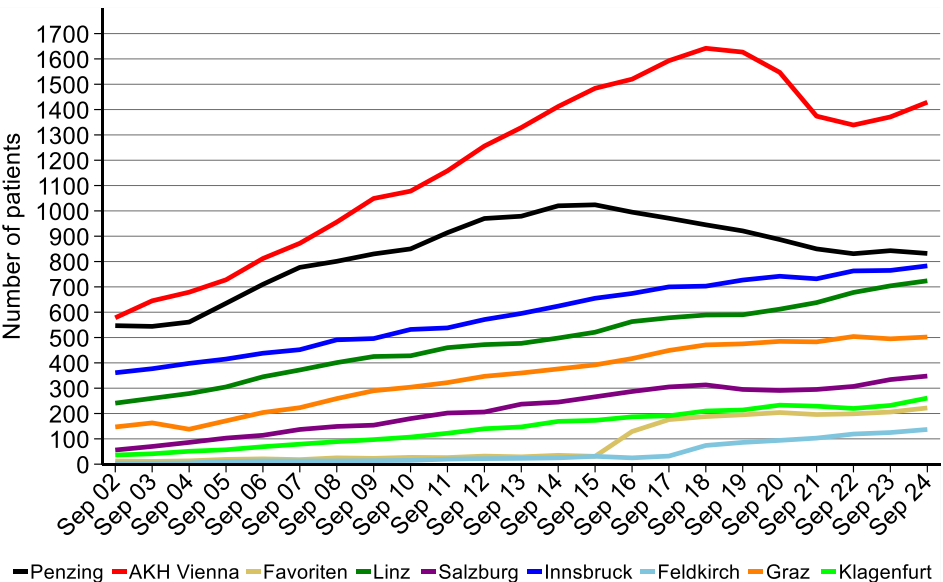
4.3.1 Overall (12 months)

Patients were seen as currently in care when they had at least one contact to an HIV centre within the previous 12 months.



Number of patients currently in care

	Penzing Vienna	AKH Vienna	Favoriten Vienna	Linz	Salz- burg	Inns- bruck	Feld- kirch	Graz	Klagen- furt	Total
01.09.2024	832	1429	222	724	348	783	137	502	261	5238

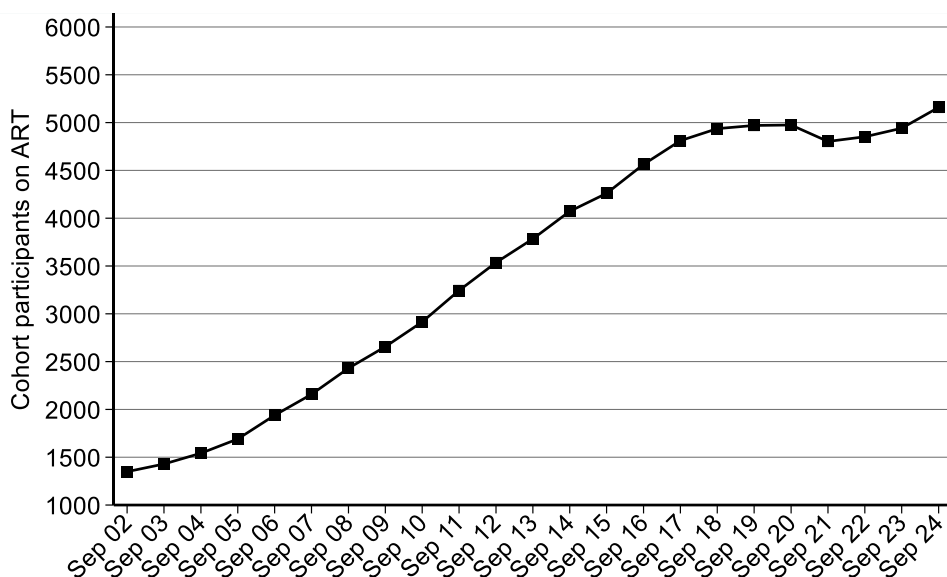


Number of currently seen patients by residence

	HIV-centre									Total
	Penzing Vienna	AKH Vienna	Favoriten Vienna	Linz	Salz- burg	Inns- bruck	Feld- kirch	Graz	Klagen- furt	
Burgenland	21	32	8	0	0	3	0	23	0	87
Carinthia	0	0	0	3	6	7	0	14	251	281
Lower Austria	182	277	24	48	1	2	0	3	0	537
Upper Austria	2	5	0	647	33	3	0	1	0	691
Salzburg	1	1	1	6	263	32	0	1	0	305
Styria	3	8	2	6	8	3	0	452	5	487
Tyrol	0	0	0	1	3	593	0	1	0	598
Vorarlberg	0	0	0	1	0	111	136	0	0	248
Vienna	620	1098	183	10	1	9	0	4	2	1927
Foreign/missing	3	8	4	2	33	20	1	3	3	77
Total	832	1429	222	724	348	783	137	502	261	5238

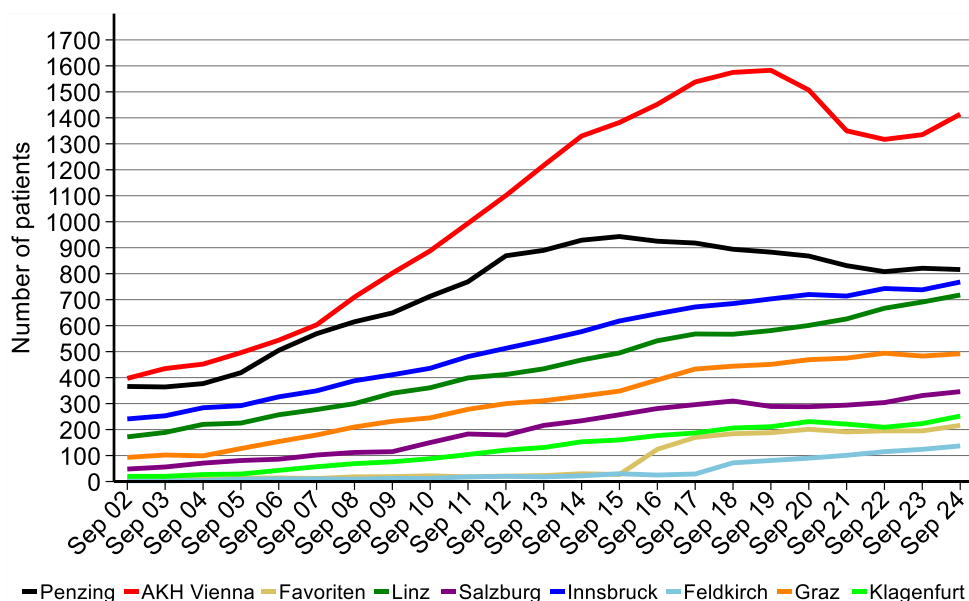
4.3.2 Number of patients currently on antiretroviral therapy

5159 patients (98.5%) were on antiretroviral therapy in the 9 HIV treatment centres. Of the 79 patients not on treatment 45 had received antiretroviral treatment at an earlier point in time (women who were on ART to prevent mother-to-child transmission, patients who received transient ART during/ after the acute HIV infection, etc.).



Number of participants currently on antiretroviral therapy

	Penzing Vienna	AKH Vienna	Favoriten Vienna	Linz	Salz- burg	Inns- bruck	Feld- kirch	Graz	Klagen- furt	Total
01.09.2024	816	1414	216	718	346	768	137	492	252	5159



Number of participants currently on antiretroviral therapy by area of residence

	HIV-centre										Total
	Penzing Vienna	AKH Vienna	Favoriten Vienna	Linz	Salz- burg	Inns- bruck	Feld- kirch	Graz	Klagen- furt		
Burgenland	21	32	7	0	0	3	0	23	0	86	
Carinthia	0	0	0	3	6	7	0	14	243	273	
Lower Austria	179	275	24	48	1	2	0	3	0	532	
Upper Austria	2	5	0	641	33	3	0	1	0	685	
Salzburg	1	1	1	6	263	31	0	1	0	304	
Styria	3	8	2	6	8	3	0	442	4	476	
Tyrol	0	0	0	1	3	582	0	1	0	587	
Vorarlberg	0	0	0	1	0	109	136	0	0	246	
Vienna	607	1088	178	10	1	9	0	4	2	1899	
Foreign/missing	3	5	4	2	31	19	1	3	3	71	
Total	816	1414	216	718	346	768	137	492	252	5159	

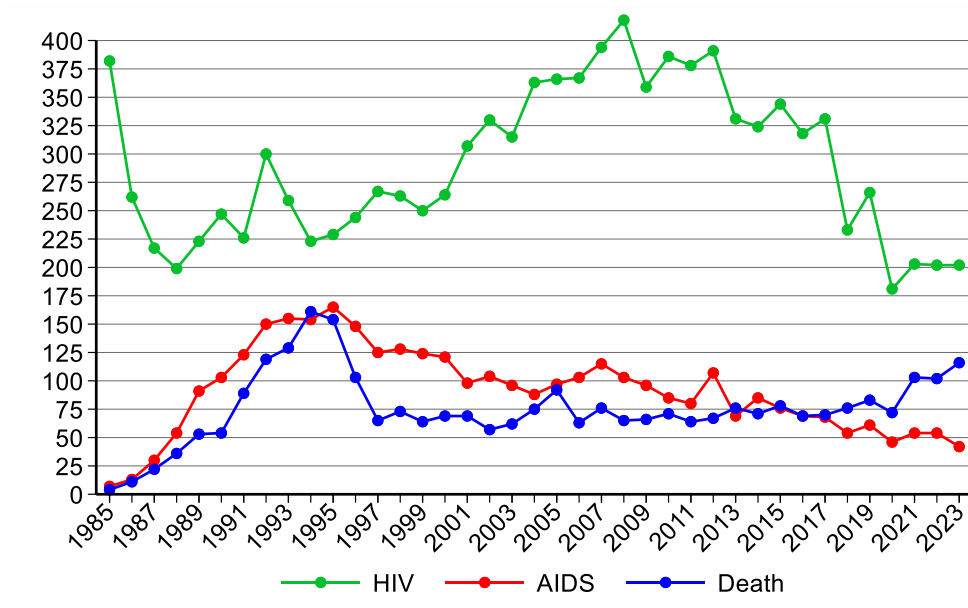
4.3.3 How many persons living with HIV (PLHIV) are there in Austria?

The Dachverband der Sozialversicherungsträger recorded 7768 persons in Austria receiving ART in 2022. According to the ECDC modelling tool 8 (chapter 10.4.2) the proportion of PLHIV on ART in 2022 is estimated to be between 86.5% and 92.2%. Thus, the estimate for PLHIV in Austria ranges from 8400 to 9000 for end of 2022.

The number of PLHIV analysed completely by the modelling tool of ECDC reveals 7596 PLHIV within AHIVCOS for the end of 2022 (a delay of one year for the estimate is caused by the ascertainment of deaths). AHIVCOS captures 64% of all PLHIV receiving ART. Assuming that AHIVCOS is representative for Austria, the overall estimate for PLHIV therefore sums up to 11 860, which is an overestimate, since the ascertainment of out-migration, persons who left the country is very incomplete (e.g. migrant workers from other European countries mainly in the tourism industry, rejection of asylum application or voluntary return to home country).

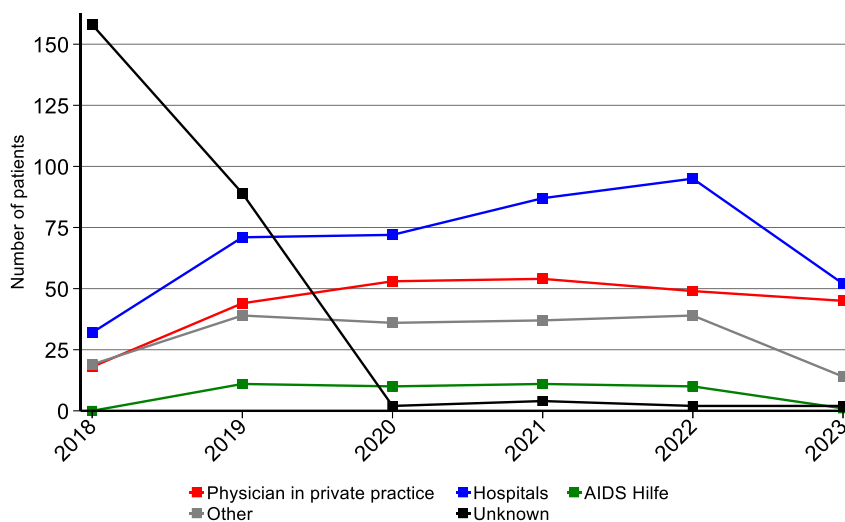
5 HIV/AIDS Surveillance in Austria

5.1 HIV, AIDS and Death in AHIVCOS per calendar year

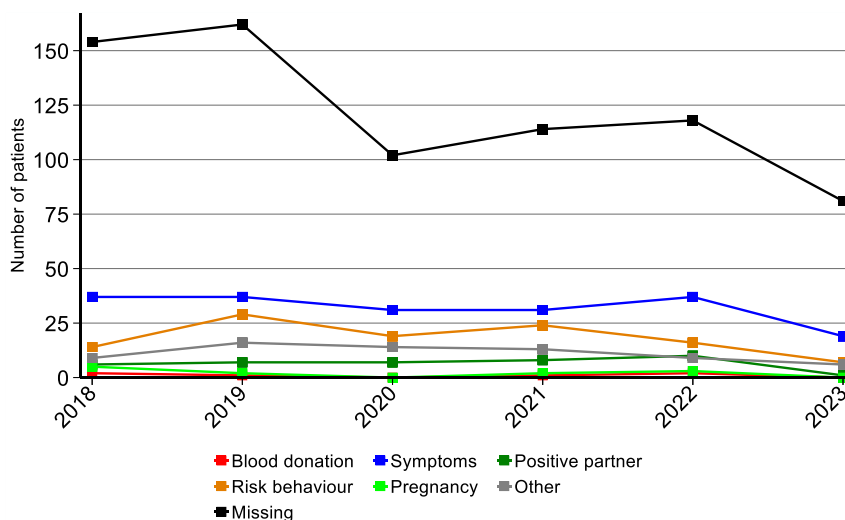


5.1.1 Who initiated, offered and performed the HIV test?

Who initiated, offered and performed the HIV test for HIV-positive individuals entering the Austrian HIV cohort study in recent years? Data to answer this questions is very incomplete, however the treatment centres in Linz, Salzburg, Innsbruck and Graz provide important findings.

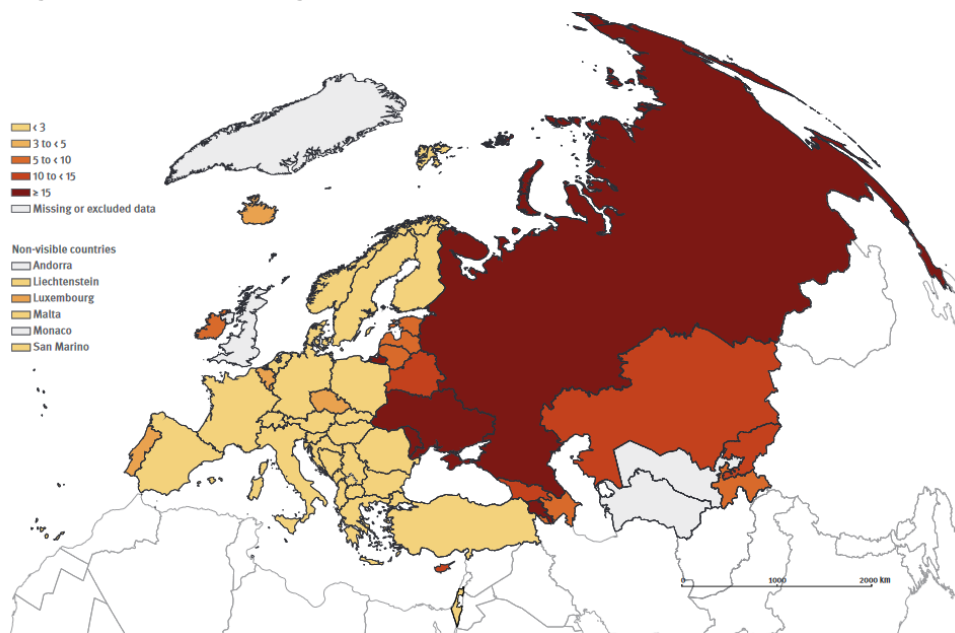


Reason for HIV test

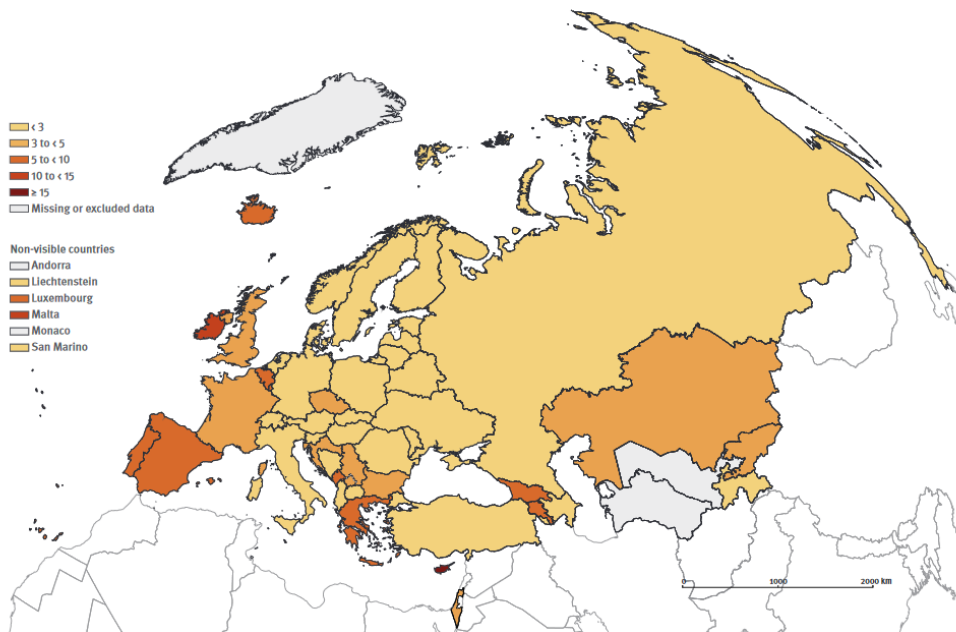


5.2 General overview (ECDC data)

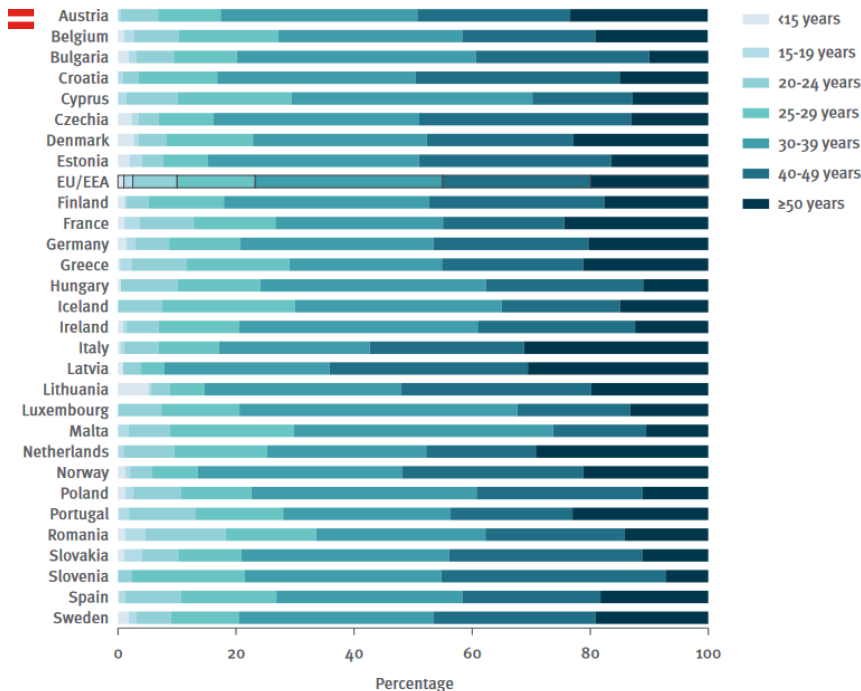
HIV diagnoses acquired through heterosexual transmission per 100 000 population, 2022



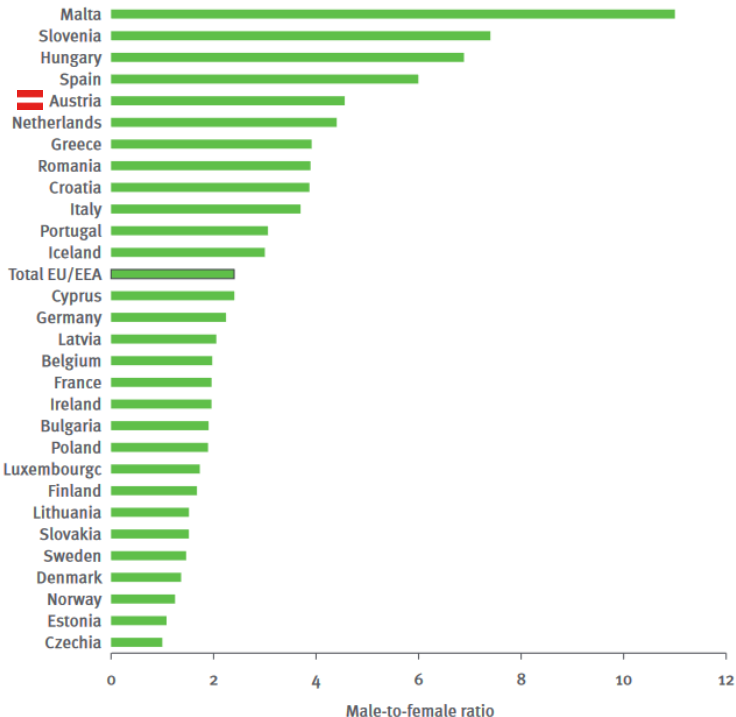
HIV diagnoses in men who have sex with men per 100 000 male population, 2022



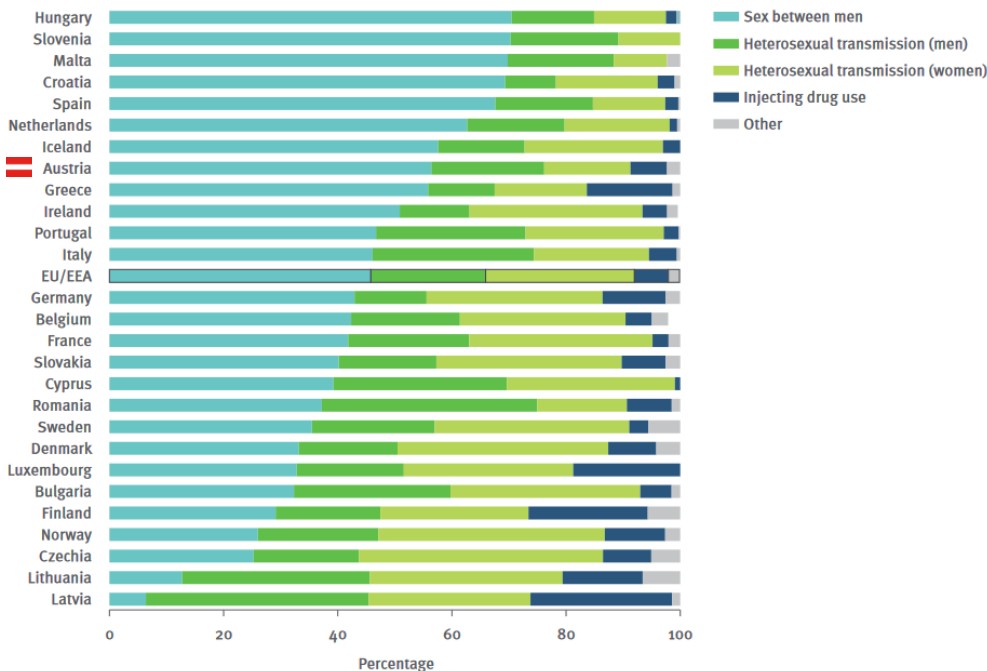
Percentage of new HIV diagnoses, by age group and country, EU/EEA, 2022 (n=22 830)



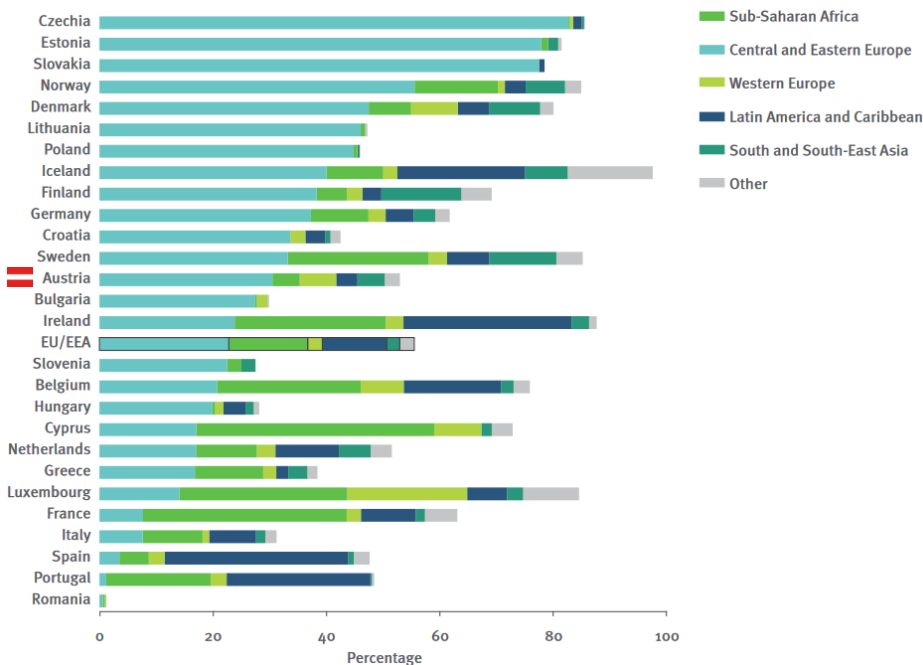
Male-to-female ratio in new HIV diagnoses, by country, EU/EEA, 2022 (n=22 790)



Percentage of new HIV diagnoses with known mode of transmission, by transmission route and country, EU/EEA, 2022 (n=16 718)



Percentage of new HIV diagnoses among migrants out of all reported cases with known information on region of origin, by country, EU/EEA, 2022 (n=20 016)



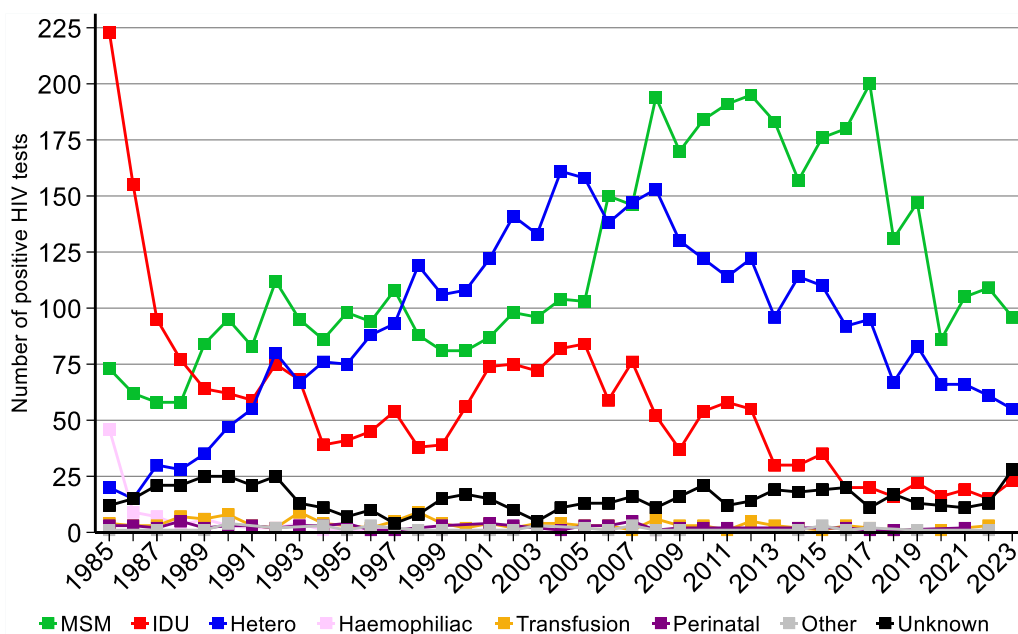
5.3 Mode of transmission

5.3.1 Transgender

There are 20 transgender women in the Austrian HIV Cohort Study. Two of them died and median age at diagnosis is 30.7. Fifteen are Austrian nationality. Fifteen had a visit in the last 12 months. Median age of those with a follow up in the last 12 months is 47.1 (mean 47.0).

If gender and transmission are combined, transgender persons are put in the group Other or *excluded* from the analyses.

5.3.2 All modes of transmission

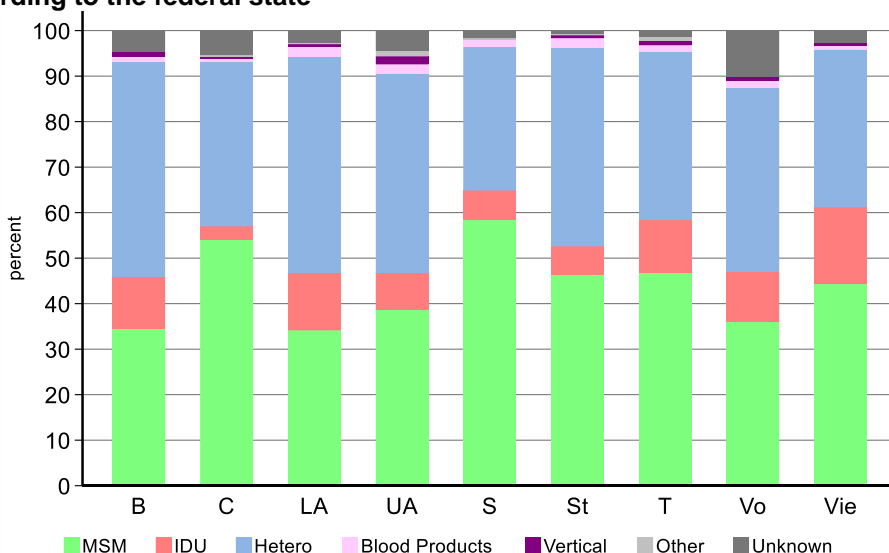


The abbreviation MSM is used for „Men who have sex with men“. IDU means „Injecting Drug Use“. The category IDU also includes men who are both MSM and IDU. The category „blood products“ includes cohort participants who have received coagulation compounds or blood transfusions. Among the patients with a follow-up in the last 12 months, 38.65% have been infected through heterosexual contacts, 43.87% through homosexual contacts and 11.85% through the injection of drugs.

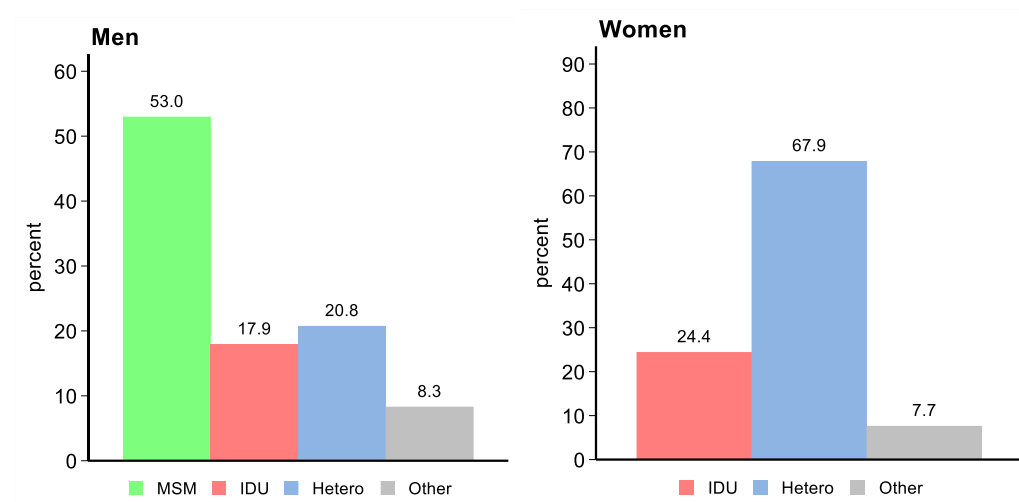
	BMSGPK	AHIVCOS									
		Heterosexually									
Year	Total	MSM		IDU		infected		Others		Total	Women
1998	313	88	33.46%	38	14.45%	119	45.25%	18	6.84%	263	60 22.81%
1999	339	81	32.40%	39	15.60%	106	42.40%	24	9.60%	250	69 27.60%
2000	428	81	30.68%	56	21.21%	108	40.91%	19	7.20%	264	77 29.17%
2001	402	87	28.34%	74	24.10%	122	39.74%	24	7.82%	307	74 24.10%
2002	442	98	29.70%	75	22.73%	141	42.73%	16	4.85%	330	92 27.88%
2003	423	96	30.48%	72	22.86%	133	42.22%	14	4.44%	315	96 30.48%
2004	470	104	28.65%	82	22.59%	161	44.35%	16	4.41%	363	110 30.30%
2005	453	103	28.14%	84	22.95%	158	43.17%	21	5.74%	366	100 27.32%
2006	435	150	40.87%	59	16.08%	138	37.60%	20	5.45%	367	89 24.25%
2007	515	146	37.06%	76	19.29%	147	37.31%	25	6.35%	394	92 23.35%
2008	505	194	46.41%	52	12.44%	153	36.60%	19	4.55%	418	98 23.44%
2009	507	170	47.35%	37	10.31%	130	36.21%	22	6.13%	359	79 22.01%
2010	487	184	47.67%	54	13.99%	122	31.61%	26	6.74%	386	76 19.69%
2011	525	191	50.53%	58	15.34%	114	30.16%	15	3.97%	378	79 20.90%
2012	523	195	49.87%	55	14.07%	122	31.20%	19	4.86%	391	80 20.46%
2013	481	183	55.29%	30	9.06%	96	29.00%	22	6.65%	331	53 16.01%
2014	403	157	48.46%	30	9.26%	114	35.19%	23	7.10%	324	73 22.53%
2015	428	176	51.16%	35	10.17%	110	31.98%	23	6.69%	344	48 13.95%
2016	447	180	56.60%	20	6.29%	92	28.93%	26	8.18%	318	55 17.30%
2017	510	200	60.42%	20	6.04%	95	28.70%	16	4.83%	331	56 16.92%
2018	323 / 74*	131	56.22%	16	6.87%	67	28.76%	19	8.15%	233	40 17.17%
2019	336 / 94*	147	55.26%	22	8.27%	83	31.20%	14	5.26%	266	41 15.41%
2020	283 / 49*	86	47.51%	16	8.84%	66	36.46%	13	7.18%	181	32 17.68%
2021	310 / 66*	105	51.72%	19	9.36%	66	32.51%	13	6.40%	203	33 16.26%
2022	395 / 78*	109	53.96%	15	7.43%	61	30.20%	17	8.42%	202	36 17.82%
2023	341 / 60*	96	47.52%	23	11.39%	55	27.23%	28	13.86%	202	38 18.81%
2024		49	38.89%	13	10.32%	44	34.92%	20	15.87%	126	27 21.43%

*second number tested anonymously since 2018

Transmission category in participants with follow-up within the last 12 months according to the federal state

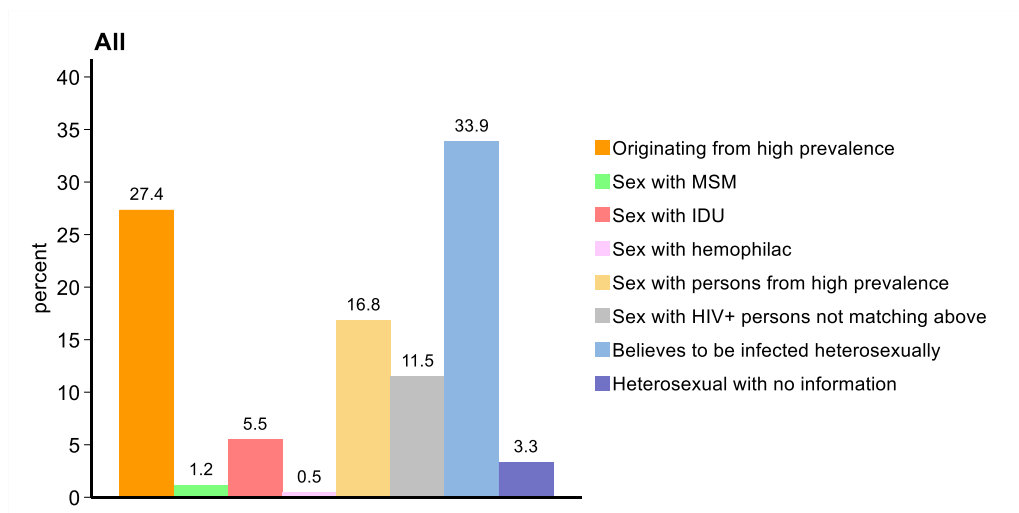


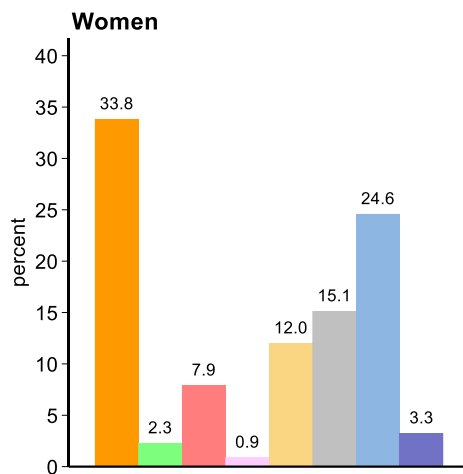
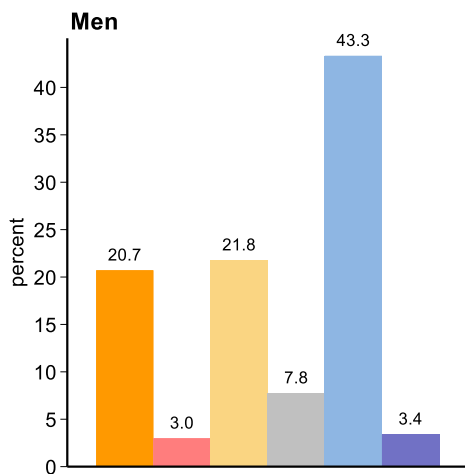
5.3.3 Categories of transmission



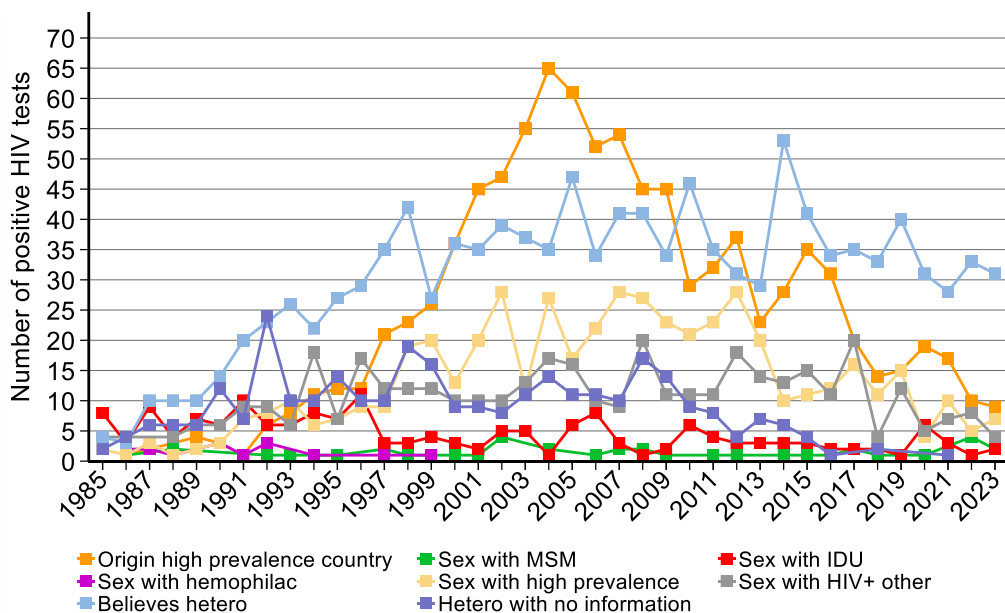
5.3.3.1 Categories of heterosexually acquired infections

Transgender persons are excluded from the following analysis. Because of missing data, the HIV treatment centre Penzing Vienna has also been excluded from some analyses.





Sub-categories of heterosexually acquired infections

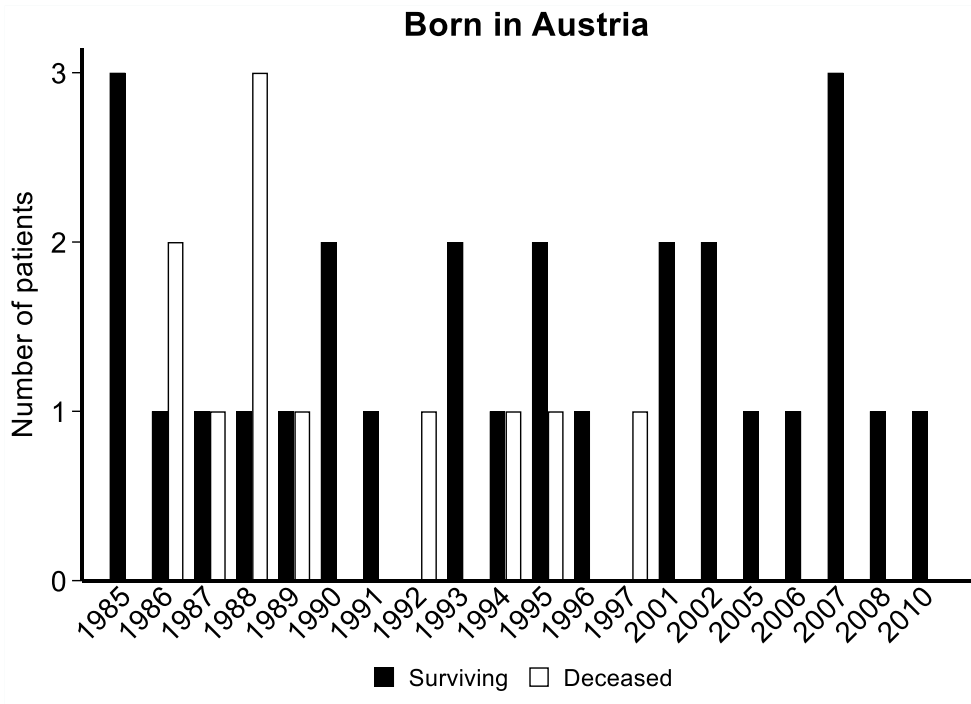
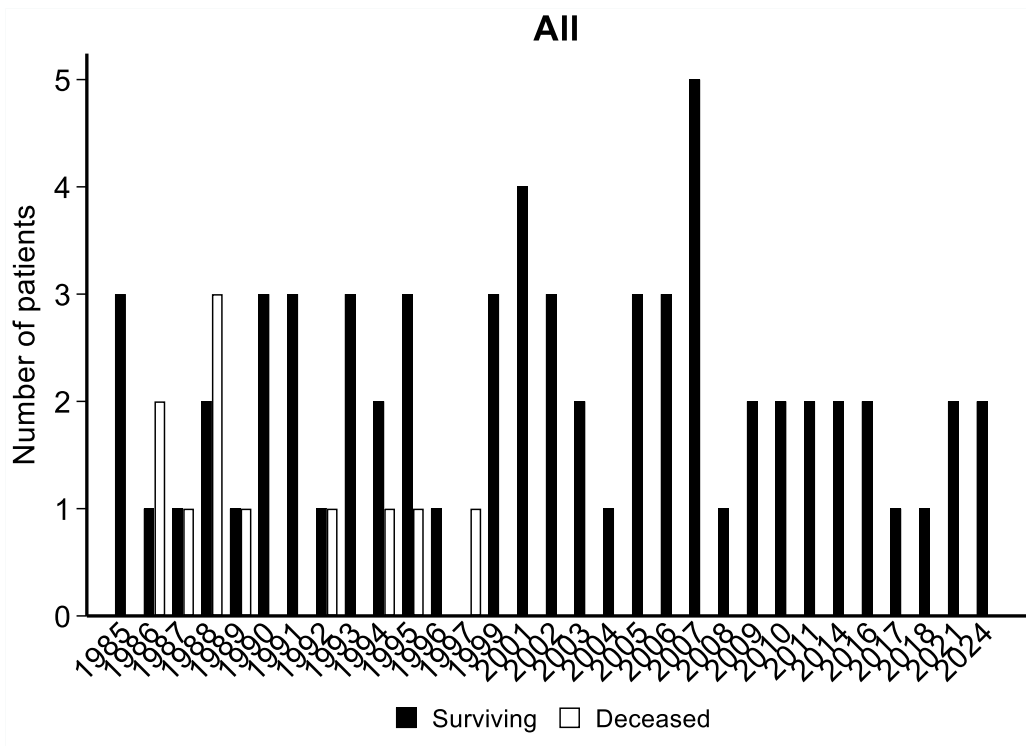


5.3.4 Mother-to-child-transmission

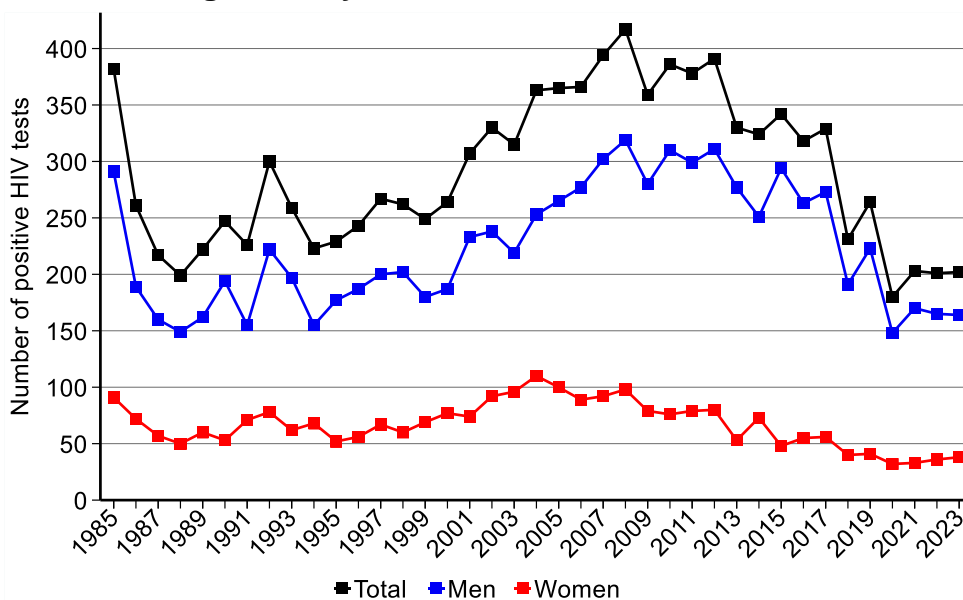
Nowadays, mother-to-child-transmission is the only route of HIV transmission amongst children. All HIV infected children in Austria are followed in paediatric HIV treatment centres, therefore the data presented here are related to patients who have also been in care by the adult HIV treatment centres. Obviously, these data are incomplete.

	Living participants		Deceased participants	Total
	<18 years	>18 years		
Burgenland	0	2	0	2
Carinthia	0	1	0	1
Lower Austria	1	5	0	6
Upper Austria	1	11	1	13
Salzburg	1	0	0	1
Styria	0	4	0	4
Tyrol	2	4	4	10
Vorarlberg	1	1	3	5
Vienna	5	17	3	25
Missing residency	0	1	0	1
Foreign	3	5	0	8
Total	14	51	11	76

In January 2010, routine HIV testing in pregnancy was introduced in Austria. The HIV test is part of the mother-child booklet (*Mutter-Kind-Pass*). In order to be eligible for childcare allowance (*Kinderbetreuungsgeld*) you must have the first ten examinations stipulated in the mother-child booklet done correctly and obtain proof of it. Recently, at least two transmissions of mother-to-child in Austria have been linked to counselling with HIV denialists.

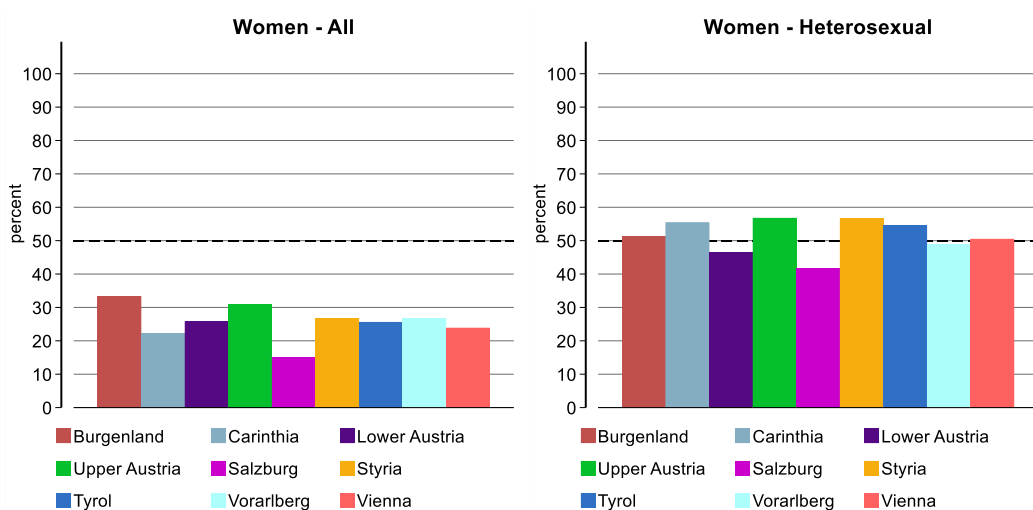


5.4 HIV diagnoses by sex



25.1% of the patients with a follow-up within the last 12 months are female. The rate is highest in Burgenland (33.4%) and Upper Austria (31.0%). In the subgroup of heterosexually acquired infections, the rate of the women is 51.9%. It is highest in Upper Austria (56.8%), Styria (56.7%) and Carinthia (55.5%).

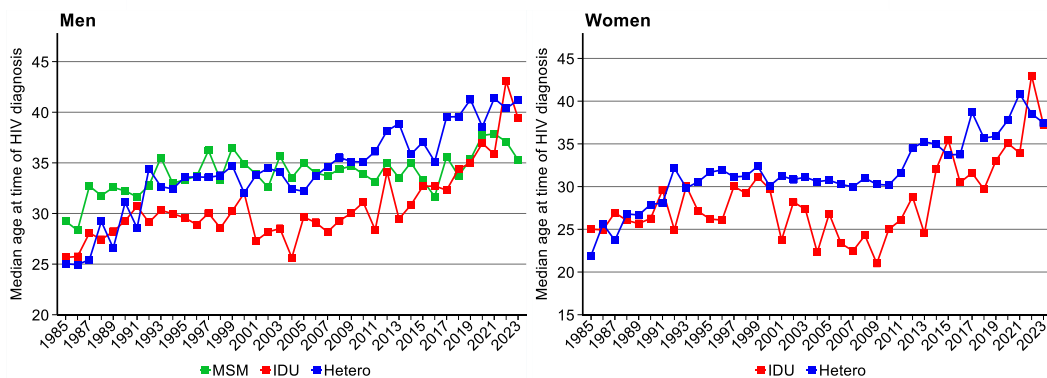
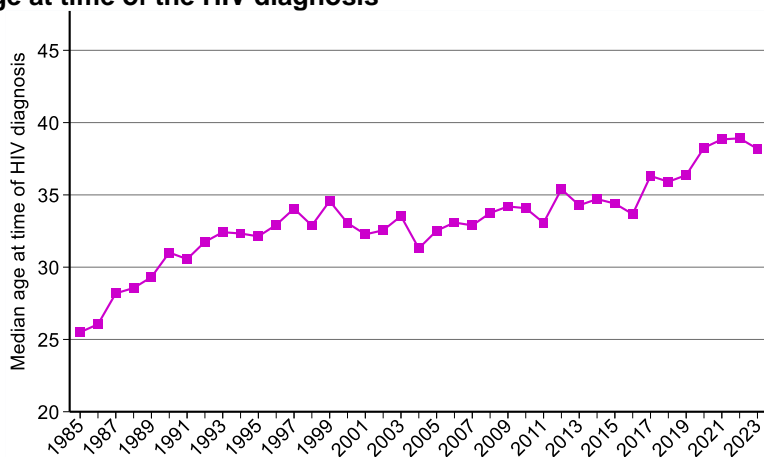
Proportion of women in participants with a follow-up in the last 12 months according to federal states



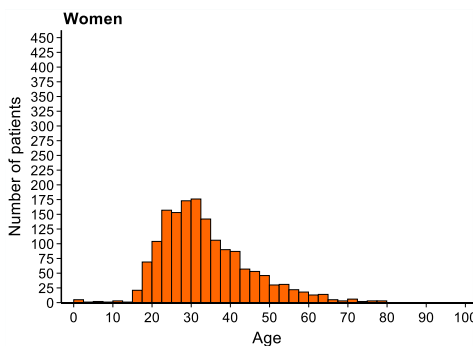
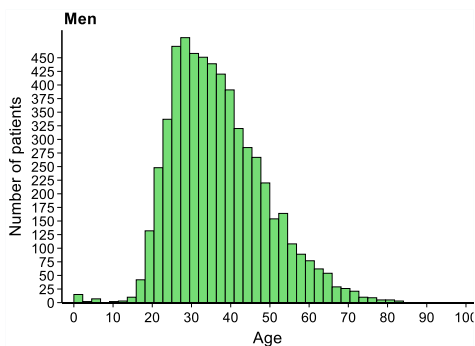
5.5 Age

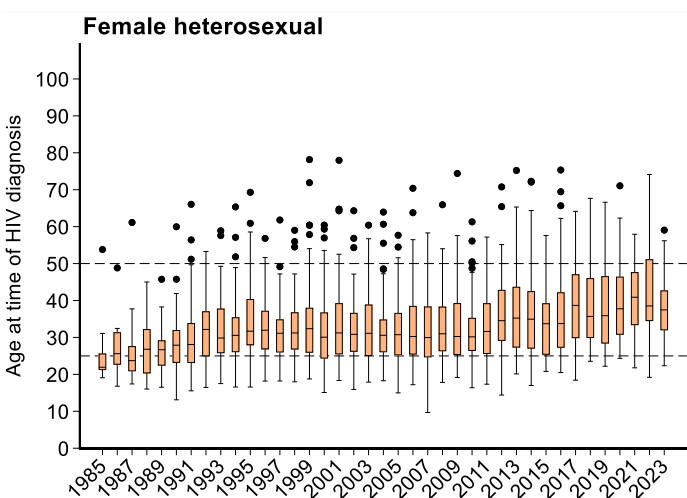
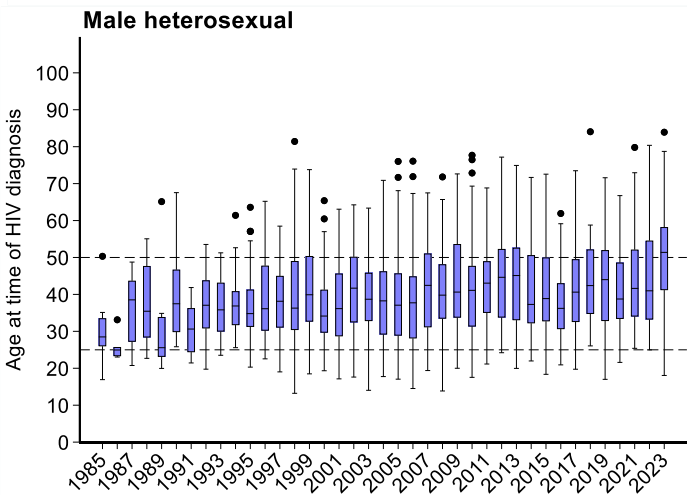
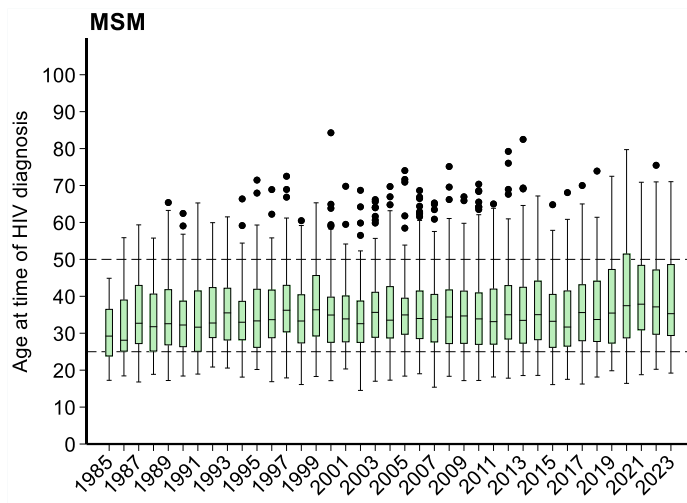
5.5.1 Age at time of HIV diagnosis

Median age at time of the HIV diagnosis



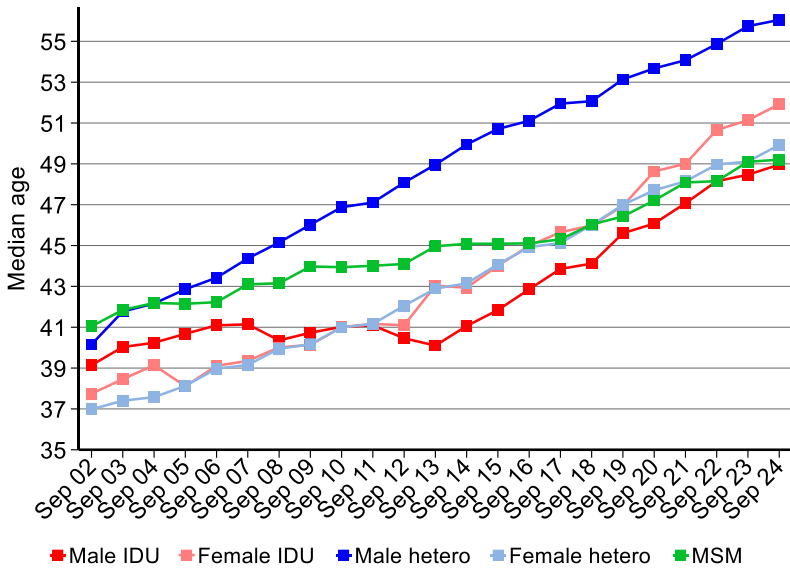
Age at time of the HIV diagnosis



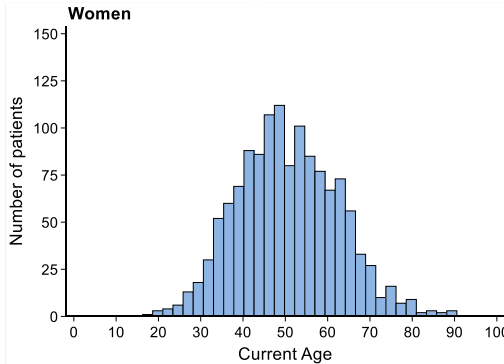
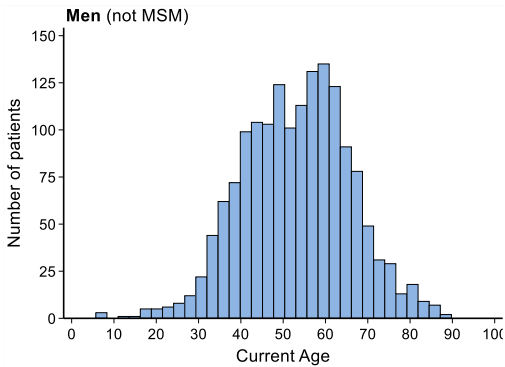
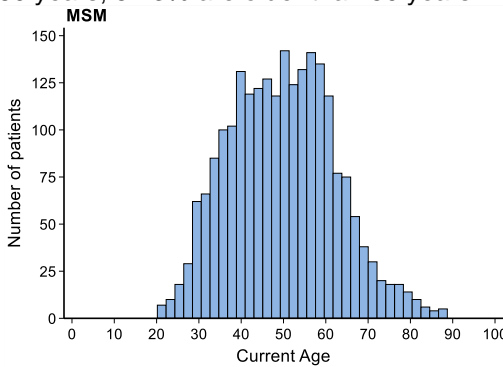


5.5.2 Age of patients currently in care

Overall, median age increased from 39.2 in September 2002 to 50.8 in September 2024. In MSM, median age increased from 41.0 in September 2002 to 49.2 in September 2024, in men (not MSM) from 39.9 to 53.2 and in women from 37.1 to 49.8.



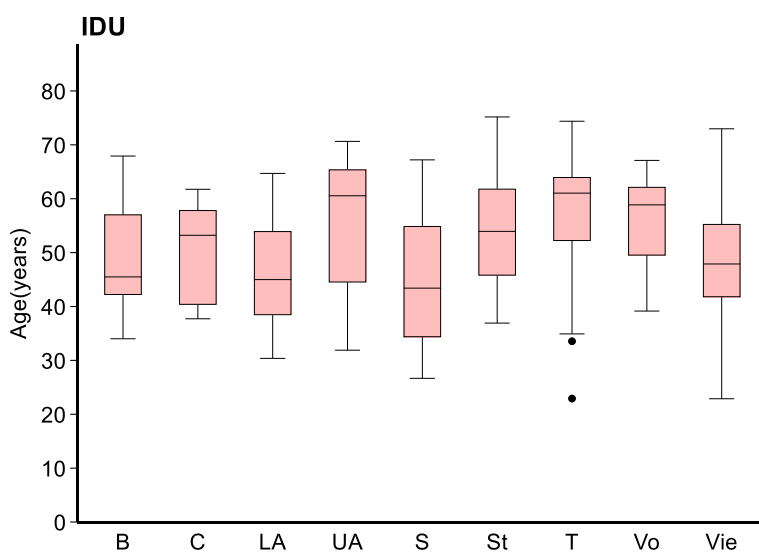
Median and average age are 50.8 and 51.0 years, respectively. 24.6% are older than 60 years, 52.3% are older than 50 years.



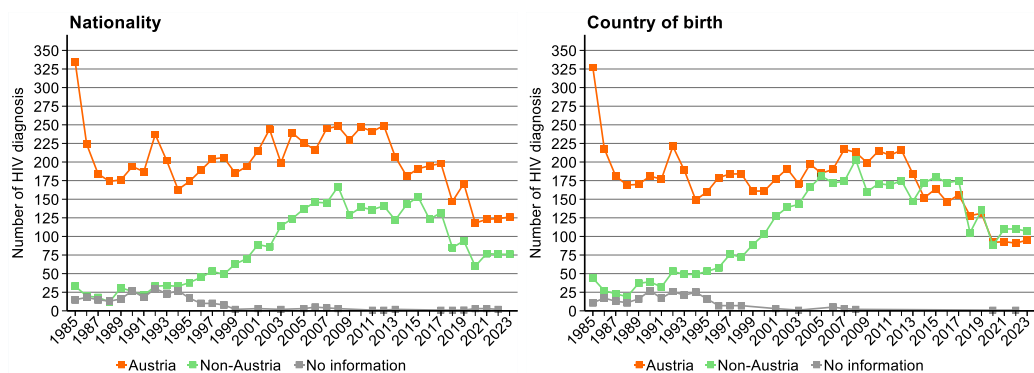
Age across the federal states: follow-up in the last 12 months

Federal state	Median Age years	≥50 years	≥60 years	≥75 years
Burgenland	52.2	58.6	29.9	3.4
Carinthia	51.4	55.6	23.7	1.8
Lower Austria	53.6	59.3	30.2	5.8
Upper Austria	50.4	50.7	27.5	3.6
Salzburg	50.0	50.2	22.6	3.0
Styria	50.4	50.5	22.0	2.7
Tyrol	53.5	58.2	27.6	3.6
Vorarlberg	52.0	54.3	25.1	4.9
Vienna	49.5	48.7	22.0	2.9
Total	50.8	52.3	24.6	3.4

Age in Injecting Drug Users according to federal states



5.6 Nationality and country of birth

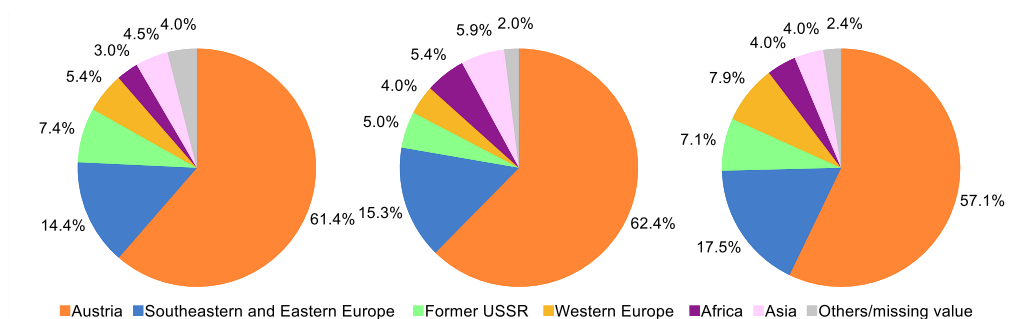


5.6.1 Overview

	BMSGPK	AHIVCOS								
Year	Total	Austria		Low prevalence countries		High prevalence countries		Missing value		Total
1998	313	206	78.33%	31	11.79%	18	6.84%	8	3.04%	263
1999	339	185	74.00%	43	17.20%	20	8.00%	2	0.80%	250
2000	428	194	73.48%	38	14.39%	32	12.12%	0	0.00%	264
2001	402	215	70.03%	50	16.29%	39	12.70%	3	0.98%	307
2002	442	244	73.94%	51	15.45%	35	10.61%	0	0.00%	330
2003	423	199	63.17%	62	19.68%	52	16.51%	2	0.63%	315
2004	470	239	65.84%	66	18.18%	58	15.98%	0	0.00%	363
2005	453	226	61.75%	63	17.21%	74	20.22%	3	0.82%	366
2006	435	216	58.86%	84	22.89%	62	16.89%	5	1.36%	367
2007	515	245	62.18%	82	20.81%	63	15.99%	4	1.02%	394
2008	505	248	59.33%	112	26.79%	55	13.16%	3	0.72%	418
2009	507	230	64.07%	81	22.56%	48	13.37%	0	0.00%	359
2010	487	247	63.99%	106	27.46%	33	8.55%	0	0.00%	386
2011	525	241	63.76%	106	28.04%	30	7.94%	1	0.26%	378
2012	523	249	63.68%	104	26.60%	37	9.46%	1	0.26%	391
2013	481	207	62.54%	99	29.91%	23	6.95%	2	0.60%	331
2014	403	181	55.86%	107	33.02%	36	11.11%	0	0.00%	324
2015	428	191	55.52%	115	33.43%	38	11.05%	0	0.00%	344
2016	447	195	61.32%	95	29.87%	28	8.81%	0	0.00%	318
2017	510	198	59.82%	114	34.44%	18	5.44%	1	0.30%	331
2018	323 / 74*	147	63.09%	75	32.19%	10	4.29%	1	0.43%	233
2019	336 / 94*	171	64.29%	79	29.70%	15	5.64%	1	0.38%	266
2020	283 / 49*	118	65.19%	52	28.73%	8	4.42%	3	1.66%	181
2021	310 / 66*	123	60.59%	67	33.00%	10	4.93%	3	1.48%	203
2022	395 / 78*	124	61.39%	69	34.16%	7	3.47%	2	0.99%	202
2023	341 / 60*	126	62.38%	66	32.67%	10	4.95%	0	0.00%	202
2024		72	57.14%	46	36.51%	7	5.56%	1	0.79%	126

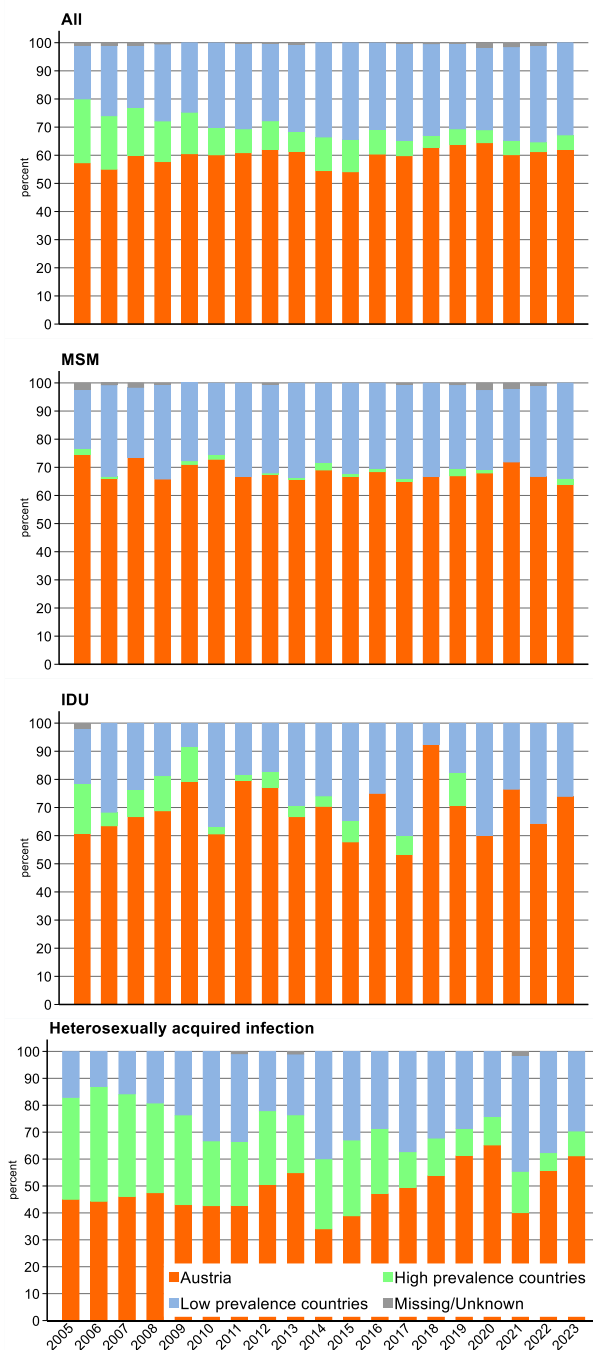
* second number tested anonymously since 2018

5.6.2 Nationality: HIV diagnoses between 2022 and 2024



HIV diagnosis 2022 N=202		HIV diagnosis 2023 N=202		HIV diagnosis 2024 N=126	
Afghanistan	3	Afghanistan	4	Afghanistan	2
Austria	124	Azerbaijan	1	Austria	72
Bosnia and Herzegovina	2	Argentina	1	Bosnia and Herzegovina	1
Brazil	4	Austria	126	Brazil	2
Bulgaria	1	Bosnia and Herzegovina	5	Croatia	2
Cameroon	2	Bulgaria	2	Czech Republic	1
Canada	1	Cameroon	2	France	1
Colombia	1	China	2	Germany	6
Croatia	3	Colombia	1	Greece	1
Czech Republic	1	Cote d'Ivoire	2	Hungary	3
Egypt	1	Democratic Republic of the Congo	1	India	1
France	1	Dominican Republic	1	Italy	1
Georgia	1	Ethiopia	1	Kenya	1
Occupied Palestinian Territory	1	France	1	Nigeria	2
Greece	2	Germany	4	Poland	1
Hungary	3	Ghana	1	Romania	7
Iran	3	Indonesia	2	Russian Federation	2
Italy	4	Italy	1	Serbia	1
Kenya	1	Republic of Moldova	1	Slovakia	2
Poland	3	Nigeria	2	Slovenia	1
Portugal	1	Pakistan	1	Spain	1
Romania	6	Poland	2	Syrian Arab Republic	1
Russian Federation	2	Portugal	1	Thailand	1
Serbia	4	Romania	9	Tunisia	1
Slovakia	3	Russian Federation	1	Turkey	3
Slovenia	1	Serbia	1	Ukraine	7
Somalia	1	Slovakia	1	United Republic of Tanzania	1
South Africa	1	Slovenia	1	Unknown	1
Spain	1	Somalia	2		
Switzerland	2	Switzerland	1		
Syrian Arab Republic	1	Syrian Arab Republic	3		
Thailand	1	Turkey	8		
Turkey	2	Ukraine	7		
Ukraine	12	The former Yugoslav Republic of Macedonia	2		
Unknown	2	Venezuela	1		

5.6.3 Nationality



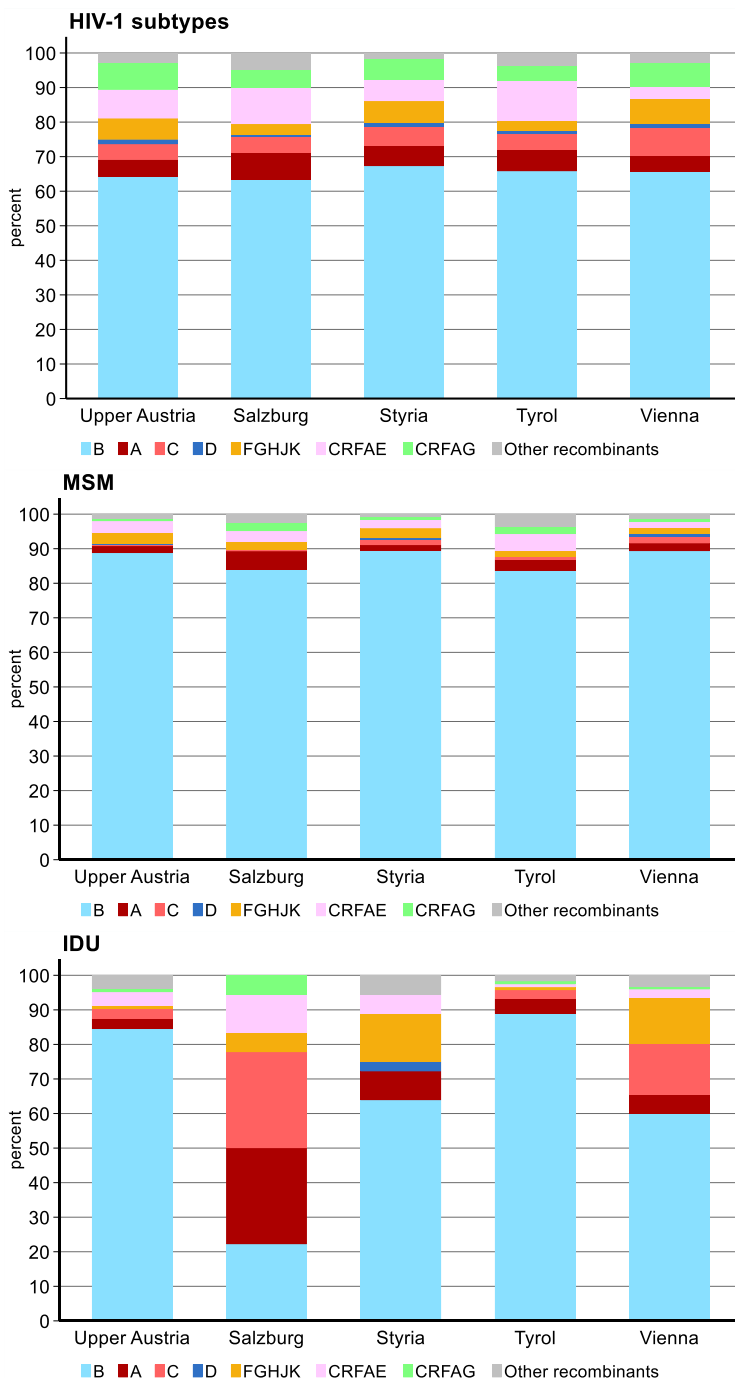
Low prevalence countries are countries with an HIV infection rate of adults <1%, high prevalence countries are countries with an HIV infection rate of adults $\geq 1\%$.

5.6.4 Refugees from Ukraine (after March 1st 2022)

Center	Men	Women	Children	ART	Total
Penzing	7	11	0	17	18
AKH Vienna	14	22	1	35	37
Favoriten	6	5	0	10	11
Linz	7	18	2	26	27
Salzburg	3	4	0	7	7
Innsbruck	4	8	3	15	15
Feldkirch	2	3	0	5	5
Graz	4	14	0	17	18
Klagenfurt	1	4	0	5	5
Total	48	89	6	137	143

5.7 HIV-1 subtypes

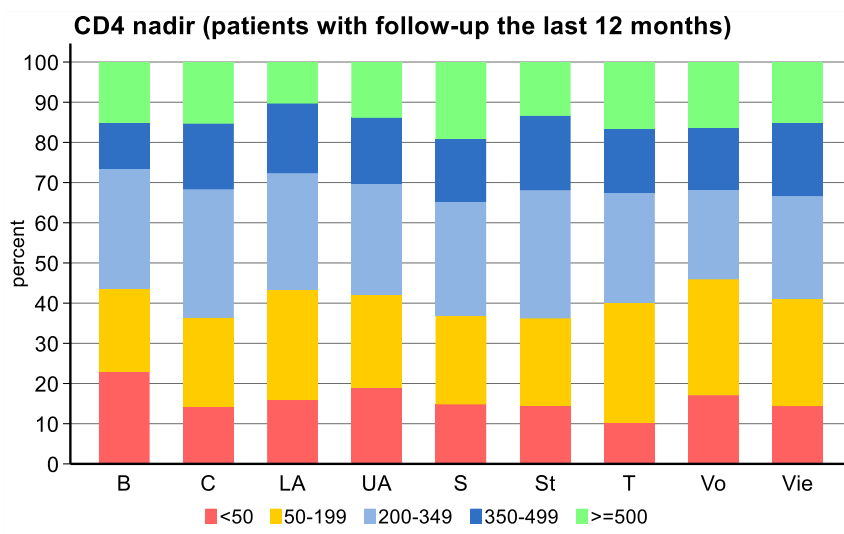
Subtypes were determined by genotypic resistance testing of Reverse Transcriptase and Protease according to Stanford database. Overall 3995 subtypes were available.



5.8 Stage of HIV disease

5.8.1 Lowest ever measured CD4 cell count

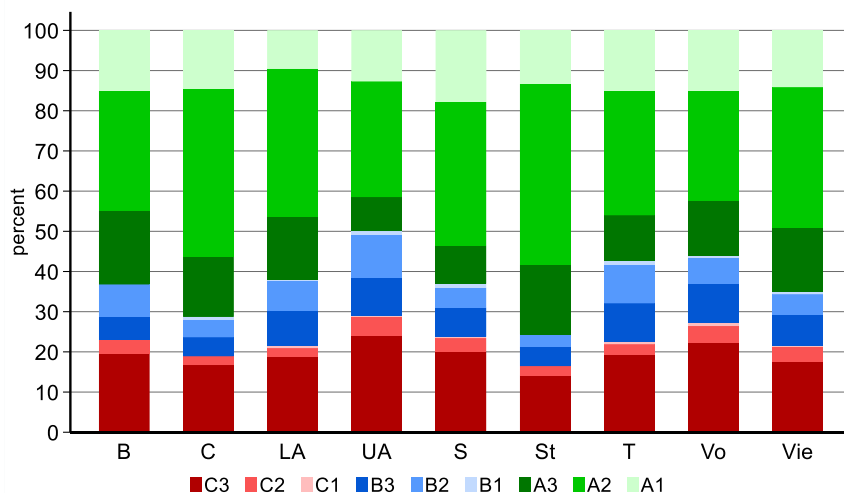
The median of the lowest CD4 cell count ever measured („CD4 nadir“) in the patients with follow-up in the last 12 months is 246/ μ l.



5.8.2 Proportion of Patients with AIDS

The classification of the HIV infection according to CDC puts patients in one of three clinical categories (A, B, C) and one of three CD4 cell count categories (1, 2, 3).

CD4 count	A Asymptomatic	B Non-AIDS defining conditions	C AIDS
1 $\geq 500/\mu$ l	A1	B1	C1
2 200-499/ μ l	A2	B2	C2
3 $< 200/\mu$ l	A3	B3	C3



5.9 „Elite-controllers“ and „viremia-controllers“

Median time from HIV-1 infection to death in untreated patients is estimated to be approximately 10-12 years. However, there is considerable variation in survival time between patients. A small number of patients remain asymptomatic for many years and maintain high CD4 cell counts or low plasma HIV RNA levels, or both, without antiretroviral therapy. Patients able to maintain high CD4 counts have been called “long-term non-progressors”, whilst those with low viral loads have been called “HIV controllers” or “elite controllers”. Viremic controllers have low but readily measurable virus loads. Elite controllers suppress HIV to extremely low levels, measurable only by sensitive laboratory techniques.

Being ART naïve	HIV-infected up to 10 years N=1751		HIV-infected for over 10 years N=3421	
	N	%	N	%
HIV RNA ≤ 50 copies/ml	11	0.63%	7	0.20%
HIV RNA < 400 copies/ml	11	0.63%	8	0.23%
CD4 > 500 cells/μl	2	0.11%	7	0.20%
CD4 > 500 cells/μl and HIV RNA ≤ 50 copies/ml	2	0.11%	2	0.06%
CD4 > 500 cells/μl and HIV RNA < 400 copies/ml	2	0.11%	3	0.09%

6 Diagnosis of HIV and presentation to an HIV centre

6.1 Presentation to an HIV centre

Austria has one of the highest rates of HIV tests in Europe (more than 75 tests per year per 1000 population). Nevertheless, a substantial portion of the patients (>40%) are diagnosed late (CD4 cell count <350/ μ l).

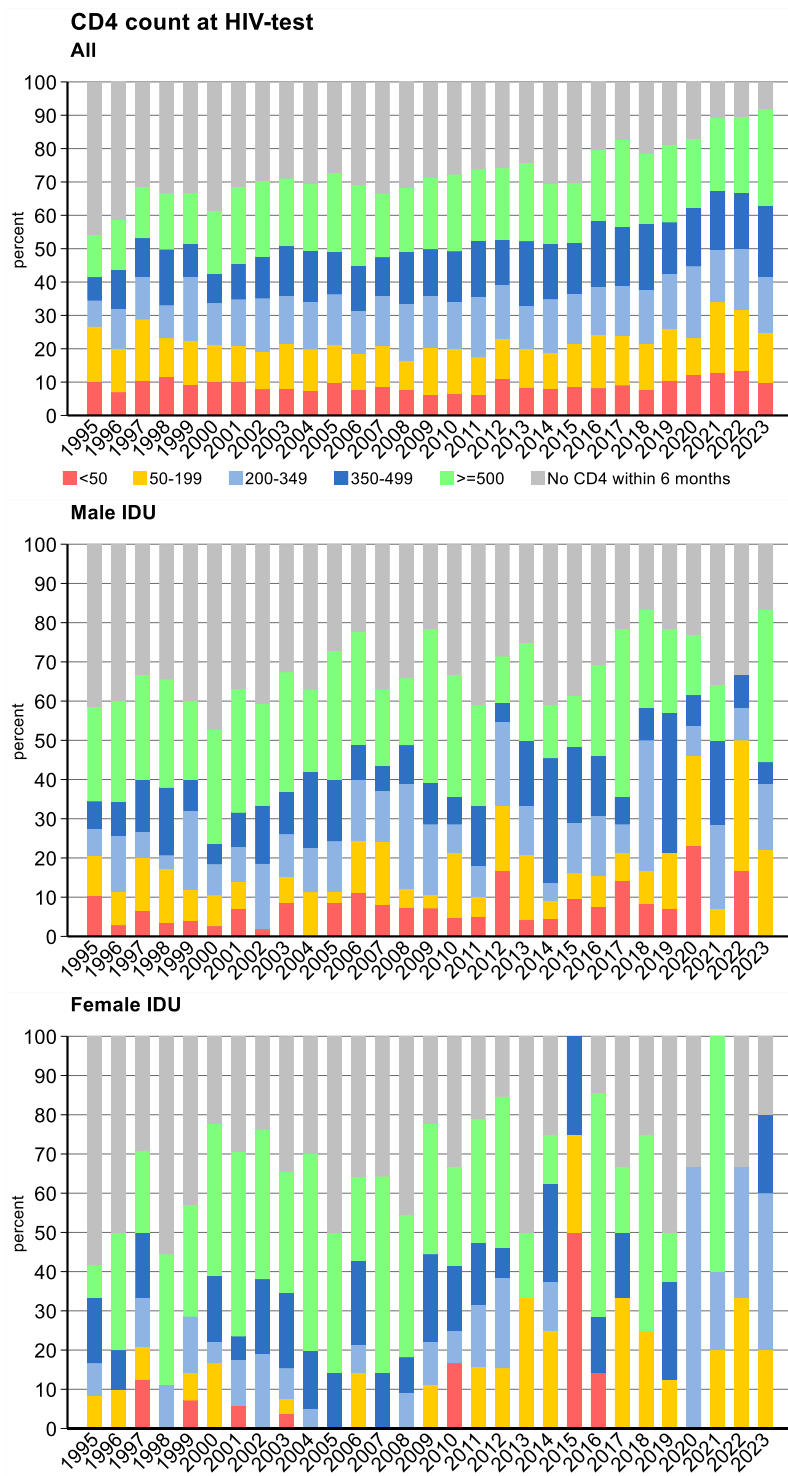
Year of HIV diagnosis	Time between HIV test and first CD4 cell count measurement in months						First CD4 cell count (all patients, 475 missing)		
	All Patients			IDU			Median	Quartiles	
	N	Median	90 Per	N	Median	90 Per			
1985	342	64.5	181.1	199	50.1	133.4	313.5	119.0	545.0
1990	228	18.6	107.3	59	5.3	62.2	255.0	50.0	529.0
1995	219	2.6	101.2	39	4.2	101.4	240.0	88.0	480.0
2000	257	1.1	135.8	56	2.3	92.0	361.0	158.0	566.0
2005	359	0.7	104.1	84	1.2	71.4	354.0	165.0	538.0
2006	356	0.8	77.4	59	1.1	51.1	371.5	195.5	581.5
2007	383	0.7	82.9	75	2.0	82.9	332.0	160.0	575.0
2008	407	0.8	84.9	52	1.6	84.9	398.0	228.0	570.0
2009	347	0.6	78.2	37	0.7	38.1	344.0	197.0	565.0
2010	376	0.6	72.0	54	0.7	69.5	392.5	199.5	632.0
2011	367	0.6	57.7	56	1.5	38.8	380.0	221.0	570.0
2012	385	0.6	48.0	55	1.0	45.9	365.0	169.0	578.0
2013	321	0.5	43.6	29	1.5	40.9	404.0	210.0	629.0
2014	313	0.7	48.0	30	1.8	51.8	384.0	203.0	586.0
2015	327	0.5	36.0	35	1.6	38.5	382.0	178.0	571.0
2016	306	0.5	17.3	19	0.7	70.3	373.5	164.0	583.0
2017	321	0.4	30.2	20	1.3	30.6	391.0	196.0	582.0
2018	228	0.4	42.0	15	0.6	38.9	386.5	216.0	625.0
2019	263	0.4	27.2	22	1.9	36.0	369.0	169.0	588.0
2020	178	0.4	15.1	16	2.0	33.4	358.0	198.0	555.0
2021	201	0.4	5.5	18	0.6	34.9	306.0	108.0	515.0
2022	199	0.4	5.3	15	0.8	12.0	322.0	126.0	530.0
2023	197	0.4	3.3	22	0.7	8.3	376.0	186.0	563.0
2024	111	0.3	1.0	12	0.3	1.0	293.0	140.0	529.0

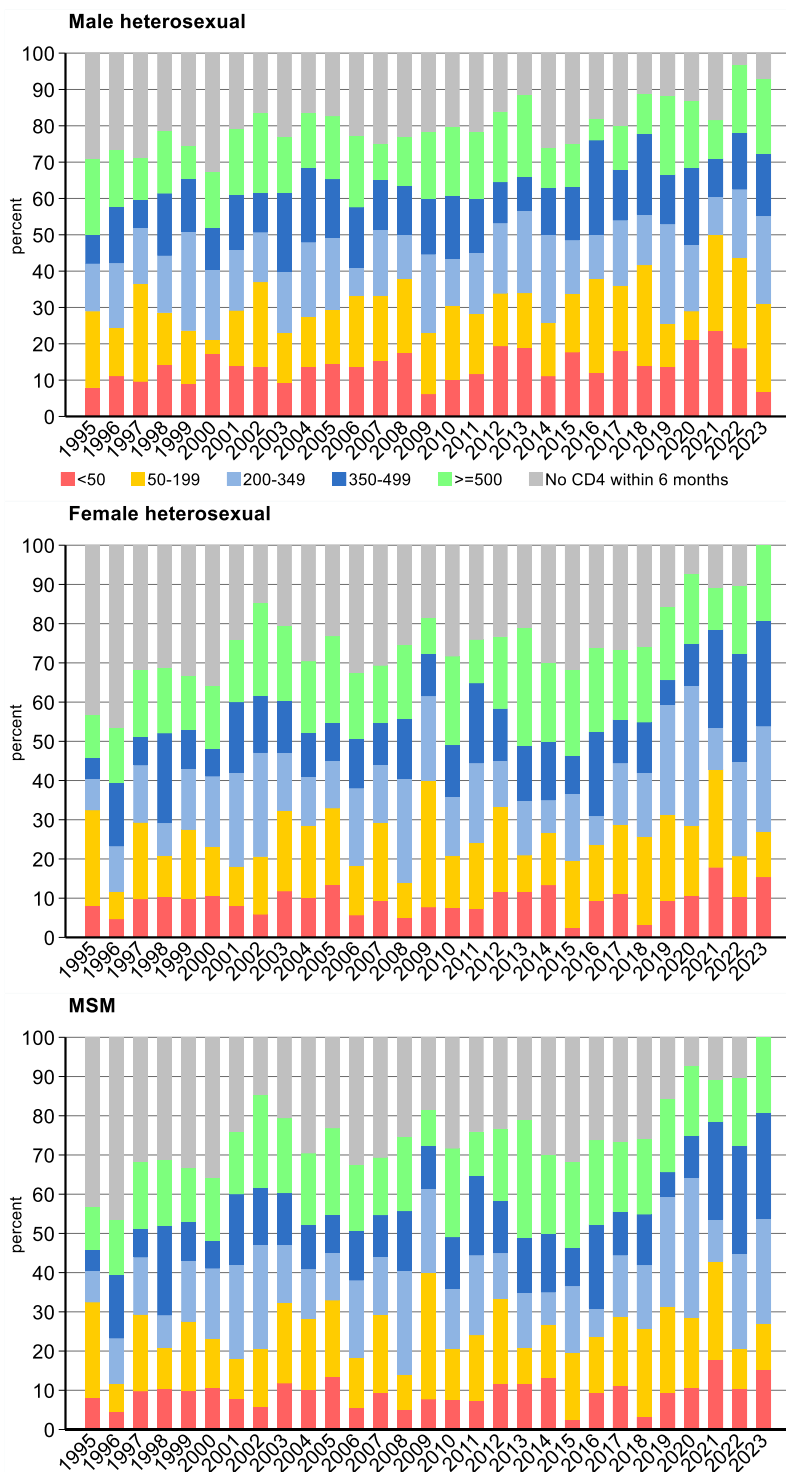
6.1.1 Definitions

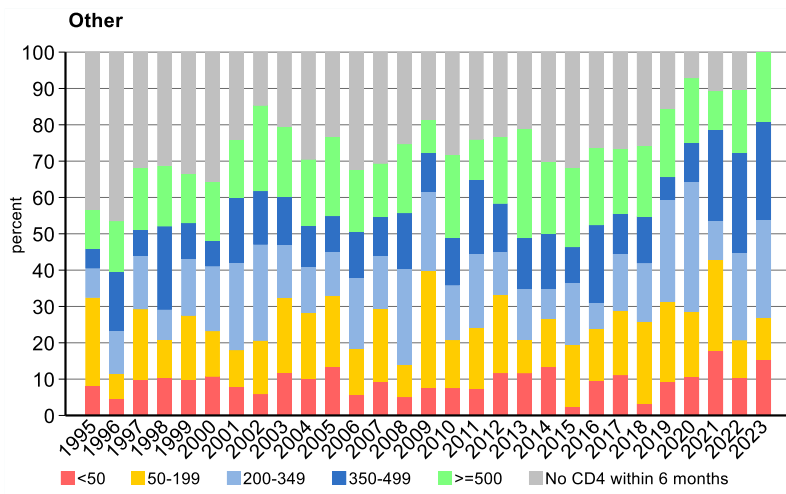
“Early” diagnosis or **„recent“ infection** is defined as: acute HIV infection (westernblot pattern or antigen/HIV RNA combined with clinical presentation) or documented seroconversion with negative HIV test not more than 3 years before the first positive test.

“Late” diagnosis is defined as: CD4 cell count below 350 at time of HIV diagnosis and/or AIDS within 3 months of HIV diagnosis

“Advanced” diagnosis is defined as: CD4 cell count below 200 at time of HIV diagnosis and/or AIDS within 3 months of HIV diagnosis







6.1.2 Factors associated with an „early“ diagnosis in patients diagnosed since 2001

“Early” diagnosis or „recent“ infection is defined as: acute HIV infection (westernblot pattern or antigen/HIV RNA combined with clinical presentation) or documented seroconversion with negative HIV test not more than 3 years before the first positive test.

All centres	1213	7435	16.31%	Univariable logistic Regression			Multivariable logistic Regression		
	Frequencies		%	OR	[95% CI]	P value	OR	[95% CI]	P value
Demographic characteristics									
<i>Age at time of HIV diagnosis</i>									
< 30 years	491	2549	19.26%	1.84	[1.47,2.29]	<0.001	1.81	[1.43,2.30]	<0.001
30-50 years	611	3921	15.58%	1.42	[1.14,1.76]	0.001	1.35	[1.08,1.69]	0.010
≥ 50	111	965	11.50%	1.00		.	1.00		.
<i>HIV transmission category</i>									
Male IDU	145	785	18.47%	0.79	[0.65,0.96]	0.019	0.77	[0.62,0.95]	0.013
Female IDU	67	252	26.59%	1.26	[0.94,1.69]	0.119	1.06	[0.78,1.43]	0.721
Male heterosexual	126	1350	9.33%	0.36	[0.29,0.44]	<0.001	0.41	[0.33,0.50]	<0.001
Female heterosexual	114	1237	9.22%	0.35	[0.29,0.44]	<0.001	0.41	[0.33,0.51]	<0.001
Other	19	486	3.91%	0.14	[0.09,0.23]	<0.001	0.17	[0.10,0.27]	<0.001
MSM	742	3325	22.32%	1.00		.	1.00		.
<i>Federal state</i>									
Carinthia	29	319	9.09%	0.58	[0.39,0.86]	0.006			
Upper Austria	125	672	18.60%	1.32	[1.06,1.64]	0.012			
Salzburg	92	413	22.28%	1.66	[1.29,2.13]	0.000			
Styria	93	649	14.33%	0.97	[0.76,1.23]	0.785			
Tyrol	147	499	29.46%	2.41	[1.94,3.00]	<0.001			
Other federal states	189	1036	18.24%	1.29	[1.07,1.55]	0.007			
Missing	0	6	0.00%	1.00	[1.00,1.00]	.			
Foreign countries	86	776	11.08%	0.72	[0.56,0.92]	0.009			
Vienna	452	3065	14.75%	1.00		.			
<i>Population size of area of residence</i>									
Missing value									
< 100 000	544	2999	18.14%	1.33	[1.17,1.53]	<0.001	1.65	[1.43,1.90]	<0.001
≥ 100 000	189	1006	18.79%	1.39	[1.16,1.68]	<0.001	1.76	[1.44,2.14]	<0.001
> 1 million	473	3321	14.24%	1.00		.	1.00		.
<i>Nationality</i>									
Missing value	3	36	8.33%	0.36	[0.11,1.17]	0.090	0.43	[0.13,1.43]	0.167
Low prevalence countries	227	1951	11.64%	0.52	[0.44,0.61]	<0.001	0.52	[0.45,0.62]	<0.001
High prevalence countries	42	796	5.28%	0.22	[0.16,0.30]	<0.001	0.32	[0.23,0.45]	<0.001
Austria	941	4652	20.23%	1.00		.	1.00		.
<i>Calendar period of HIV test</i>									
2005-2008	261	1545	16.89%	0.98	[0.81,1.20]	0.878	0.96	[0.79,1.18]	0.722
2009-2012	301	1514	19.88%	1.20	[0.99,1.46]	0.059	1.09	[0.89,1.33]	0.397
2013-2016	201	1317	15.26%	0.87	[0.71,1.07]	0.198	0.78	[0.63,0.98]	0.030
≥ 2017	225	1744	12.90%	0.72	[0.59,0.88]	0.001	0.65	[0.52,0.80]	<0.001
2001-2004	225	1315	17.11%	1.00		.	1.00		.

6.1.3 Factors associated with a „late“ diagnosis in patients diagnosed since 2001

“Late” diagnosis is defined as: CD4 cell count below 350 at time of HIV diagnosis and/or AIDS within 3 months of HIV diagnosis

All centres	3132	7435	42.13%	Univariable logistic Regression			Multivariable logistic Regression		
	Frequencies		%	OR	[95% CI]	p value	OR	[95% CI]	p value
Demographic characteristics									
<i>Age at time of HIV diagnosis</i>									
< 30 years	781	2549	30.64%	0.31	[0.27,0.36]	<0.001	0.32	[0.27,0.38]	<0.001
30-50 years	1784	3921	45.50%	0.59	[0.51,0.68]	<0.001	0.61	[0.53,0.71]	<0.001
≥ 50	567	965	58.76%	1.00		.	1.00		.
<i>HIV transmission category</i>									
Male IDU	327	785	41.66%	1.42	[1.21,1.66]	<0.001	1.55	[1.32,1.83]	<0.001
Female IDU	66	252	26.19%	0.70	[0.53,0.94]	0.017	0.87	[0.65,1.18]	0.378
Male heterosexual	755	1350	55.93%	2.52	[2.21,2.86]	<0.001	2.01	[1.75,2.31]	<0.001
Female heterosexual	629	1237	50.85%	2.05	[1.80,2.34]	<0.001	1.88	[1.63,2.18]	<0.001
Other	240	486	49.38%	1.93	[1.60,2.34]	<0.001	1.76	[1.44,2.15]	<0.001
MSM	1115	3325	33.53%	1.00		.	1.00		.
<i>Federal state</i>									
Carinthia	149	319	46.71%	1.27	[1.00,1.60]	0.046			
Upper Austria	304	672	45.24%	1.19	[1.01,1.41]	0.040			
Salzburg	164	413	39.71%	0.95	[0.77,1.17]	0.640			
Styria	289	649	44.53%	1.16	[0.98,1.38]	0.090			
Tyrol	190	499	38.08%	0.89	[0.73,1.08]	0.231			
Other federal states	470	1036	45.37%	1.20	[1.04,1.38]	0.012			
Missing	1	6	16.67%	0.29	[0.03,2.48]	0.257			
Foreign countries	311	776	40.08%	0.97	[0.82,1.13]	0.672			
Vienna	1254	3065	40.91%	1.00		.			
<i>Population size of area of residence</i>									
Missing value									
< 100 000	1325	2999	44.18%	1.14	[1.03,1.26]	0.010	1.00	[0.90,1.11]	0.964
≥ 100 000	414	1006	41.15%	1.01	[0.87,1.16]	0.909	0.90	[0.78,1.05]	0.191
> 1 million	1360	3321	40.95%	1.00		.	1.00		.
<i>Nationality</i>									
Missing/Unknown	9	36	25.00%	0.48	[0.22,1.02]	0.056	0.50	[0.23,1.08]	0.079
Low prevalence countries	764	1951	39.16%	0.92	[0.83,1.03]	0.147	1.01	[0.90,1.13]	0.877
High prevalence countries	448	796	56.28%	1.85	[1.59,2.15]	<0.001	1.61	[1.35,1.91]	<0.001
Austria	1911	4652	41.08%	1.00		.	1.00		.
<i>Calendar period of HIV test</i>									
2005-2008	664	1545	42.98%	1.01	[0.87,1.17]	0.897	1.02	[0.88,1.19]	0.780
2009-2012	620	1514	40.95%	0.93	[0.80,1.08]	0.337	0.98	[0.84,1.15]	0.796
2013-2016	526	1317	39.94%	0.89	[0.76,1.04]	0.145	0.93	[0.79,1.10]	0.389
≥ 2017	760	1744	43.58%	1.03	[0.90,1.20]	0.642	1.03	[0.88,1.20]	0.703
2001-2004	562	1315	42.74%	1.00		.	1.00		.

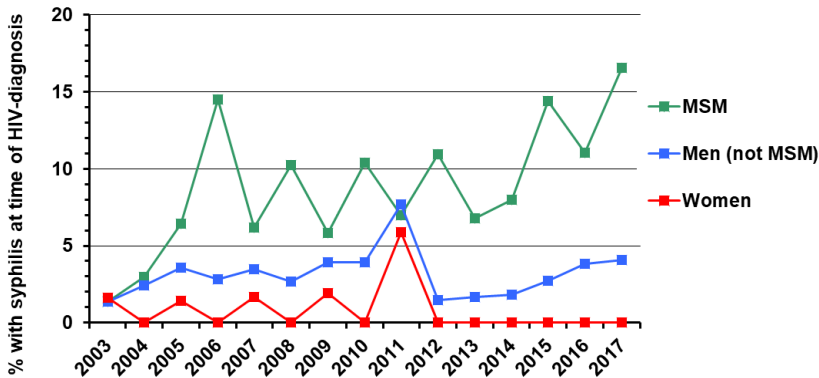
7 Co-infections

7.1 Syphilis

Syphilis can persist for several years when it is not treated, and reinfection with syphilis is possible because there is no protective immunity.

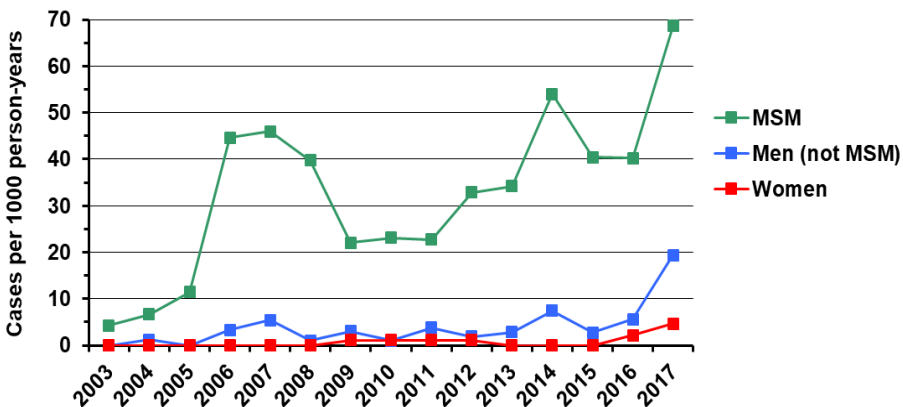
Until 2018 distinct diagnoses of syphilis have been used to define prevalence and incidence of syphilis. However, this approach has shortcomings (heterogenous use of definitions of diagnosis, e.g. also documentation of several bouts as one diagnosis) so that future analysis has to be based on serology. Repeated syphilis episodes as a reported positive nontreponemal and treponemal test following a syphilis episode and subsequent ≥ 4 -fold titer reduction or negativity in nontreponemal testing and a consecutive ≥ 4 -fold titer increase with a titer value of at least 8 in nontreponemal testing. This transformation will be introduced in summer 2024.

7.1.1 Syphilis at time of HIV diagnosis

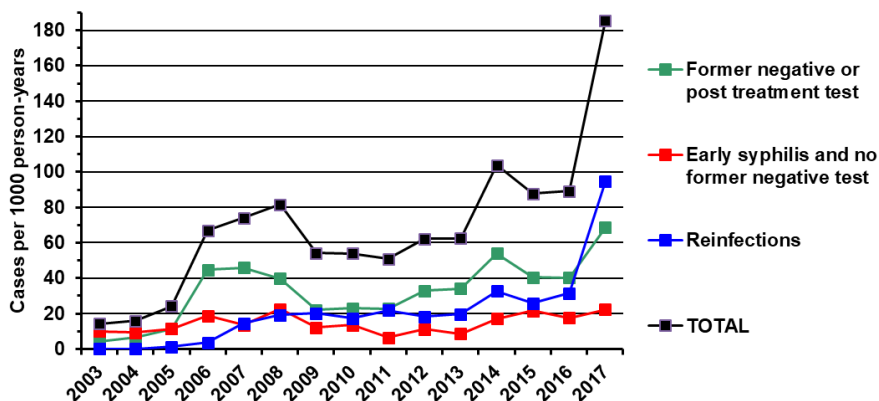


7.1.2 „Recent“ syphilis infections: Incidence

This analysis only includes new “recent” syphilis infections defined as follows: patients with a former syphilis result that was either negative or a status post treatment and who now presented with active syphilis (= new „recent“ syphilis infections).

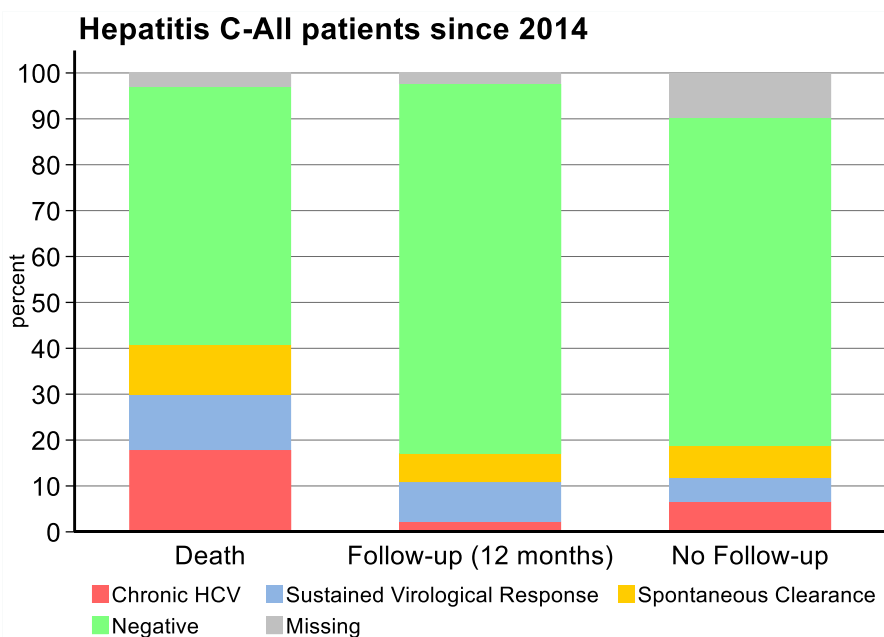


7.1.3 Incident cases of syphilis among HIV-infected MSM



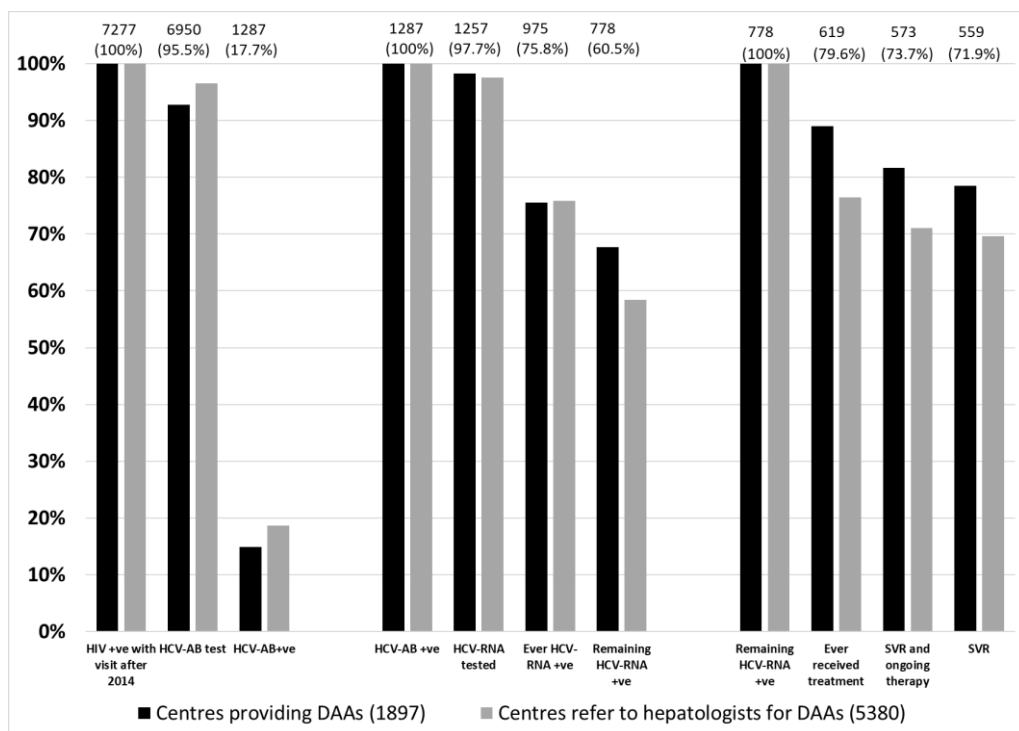
7.2 Hepatitis C

HCV co-infection was defined by a positive result on a qualitative or quantitative RNA test result.



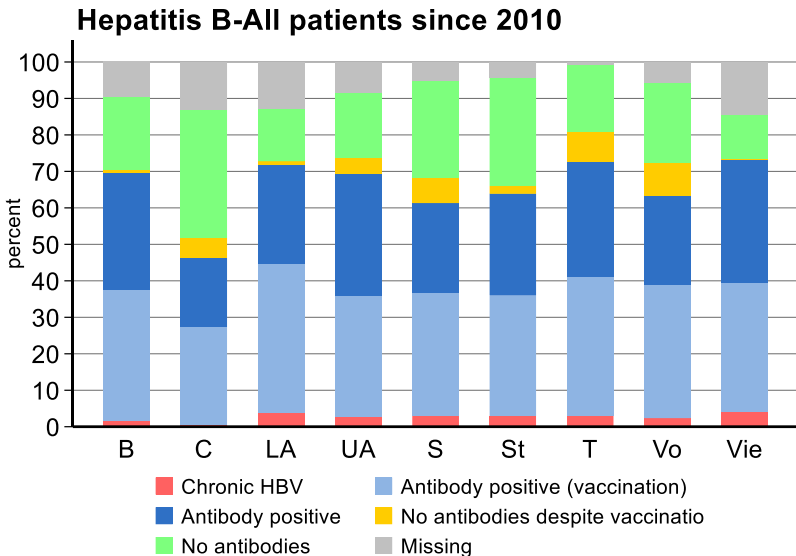
7.2.1 Cascade of Care in patients seen since January 1st 2014 and alive after January 1st 2023

Stage	Definition
Stage 1: anti-HCV +ve	Either anti-HCV positive test, HCV-RNA positive test, HCV genotyped or received HCV treatment before index date
Stage 2: HCV-RNA tested	Either HCV-RNA tested, HCV genotyped or received HCV treatment before index date
Stage 3: Ever HCV-RNA +ve	Either HCV-RNA positive test, received HCV treatment or HCV genotyped before index date
Stage 4: Remaining HCV-RNA +ve	HCV-RNA ever positive and no spontaneous clearance
Stage 5: Ever received treatment	Started HCV treatment on or before index date
Stage 6: Cured (SVR) and ongoing therapy	HCV-RNA test after completing treatment (HCV-RNA test data included for duration of FU to allow for assessment of SVR); Ongoing therapy if still on treatment or end of therapy less than 12 weeks before 01.09.2023
Stage 8: Cured (SVR)	HCV-RNA negative test at least 12 or 24 weeks post-treatment (for IFN-free and IFN-based therapy, respectively)



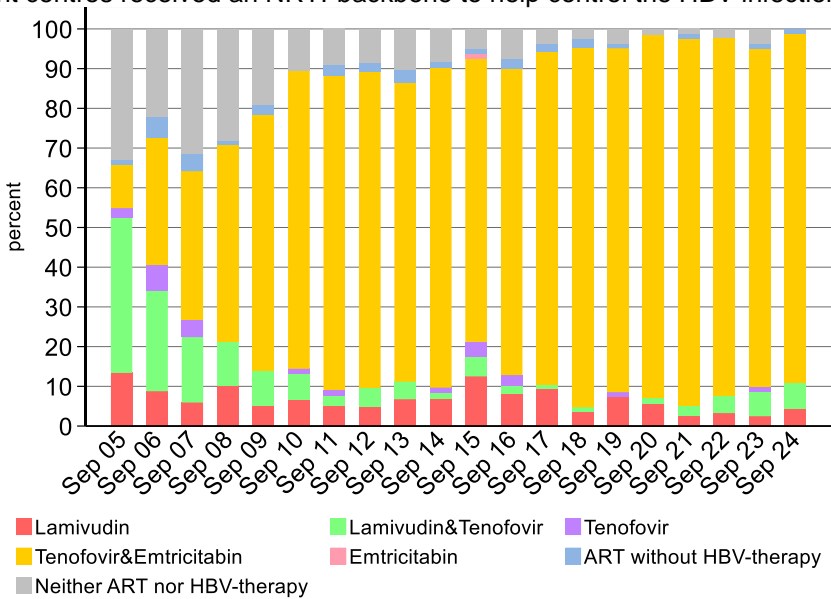
7.3 Hepatitis B in patients seen since January 1st 2010

Chronic HBV was defined by a positive result on a hepatitis B surface antigen (HBsAg) test or by a positive HBV DNA test result.



Therapy for hepatitis B (patients currently in care)

Current guidelines recommend the use of tenofovir and emtricitabine or tenofovir and lamivudine as the NRTI-backbones in cART combinations for HBV-HIV co-infected patients. Most of the HBV-HIV co-infected patients in care at one of the Austrian HIV treatment centres received an NRTI-backbone to help control the HBV infection.



8 Transmission of drug resistant HIV (data: 03/2024)

8.1 Abstract

Prevalence of Transmitted Drug Resistance is Stabilising at a Low Rate in Austria

Objective: To determine the prevalence of transmitted drug resistance (TDR), temporal trends in resistance, and predictors for TDR.

Method: Newly diagnosed patients from 2003 to December 2023 from nine centres were analyzed. Mutations were judged as resistant according to Bennett et al. (WHO 2009 mutation list). For patients with acute or recent infection the year of infection was obtained by the date of primary HIV infection or the median point in time between negative and positive HIV test. For patients with chronic infection the rate of resistance was plotted against the year of the HIV diagnosis.

Results: Overall 3998 of 6606 patients had an amplifiable resistance test. The overall prevalence of TDR was 7.0 (282 of 3998 patients; 95% CI: 6.3%-7.9%). The prevalence of NRTI resistance was 2.9% (2.5%-3.5%), the prevalence of NNRTI resistance was 3.0% (2.5%-3.5%), and the prevalence of PI resistance was 1.7% (1.3%-2.2%). The relative risk of TDR in men who have sex with men compared to heterosexual contacts was 1.5 (95% CI: 1.1-1.9). The prevalence rate of TDR in the 1159 patients with acute/recent infection was 7.6% (65 of 860 patients; 6.0%-9.5%). One patient (0.1%) showed TDR against 3 drug classes (K70R; K103N; L90M). The prevalence rate of TDR in the 5423 patients with chronic infection was 6.4% (217 of 3381 patients; 5.6%-7.3%).

Conclusions: The prevalence of TDR among newly diagnosed patients was found to be stabilizing. No difficult to treat cases of TDR has been observed.

8.2 Introduction

Number of cohort participants:

Only patients with HIV diagnosis between 2003-2023 have been analyzed because extensive documentation of resistance testing started at this time.

HIV test	OVS Vienna	AKH Vienna	KFJ Vienna	Linz	Salz- burg	Inns- bruck	Feld- kirch	Graz	Klagen- furt	Total
until 2003	1578	1194	38	612	124	824	14	238	66	4688
2003-2023	1227	2190	263	690	458	720	149	636	273	6606

The rate of transmission of drug resistant HIV („percent with resistance“) corresponds to the number of patients with resistance mutations in relation to the number of patients with a genotypic resistance test before antiretroviral therapy. For this, the genomes of the reverse transcriptase (RT) and the protease (P) were sequenced. The resistance mutations have been classified according to Bennett DE et al. Drug resistance mutations for surveillance of transmitted HIV-1 drug-resistance: 2009 update. PLoS One 2009;4(3):e4724.

Patients were either analysed according to the time of the infection („recent infection“), or, if this was not known, patients were analysed according to the year of the HIV diagnosis

The following codons and amino acids were classified as resistance:

Reverse Transcriptase				Protease	
NRTI		NNRTI			
M41	L	L100	I	L23	I
K65	R	K101	E, P	L24	I
D67	N, G, E	K103	N, S	D30	N
T69	D, ins	V106	M, A	V32	I
K70	R, E	V179	F	M46	I, L
L74	V, I	Y181	C, I, V	I47	V, A
V75	T, M, A, S	Y188	L, H, C	G48	V, M
F77	L	G190	A, S, E	I50	V, L
Y115	F	P225	H	F53	L, Y
F116	Y	M230	L	I54	V, L, M, A, T, S
Q151	M			G73	S, T, C, A
M184	V, I			L76	V
L210	W			V82	A, T, F, S, C, M, L
T215	Y, F, I, S, C, D, V, E			N83	D
K219	Q, E, N, R			I84	V, A, C
				I85	V
				N88	D, S
				L90	M

8.3 Number of patients with “recent” or chronic HIV infection

Year	Number of HIV diagnoses	"Recent" infections	Unknown time of infection
	Year of HIV diagnosis	Year of HIV infection	Year of HIV diagnosis
2001	-	2	-
2002	-	22	-
2003	313	61	261
2004	359	64	287
2005	364	77	295
2006	364	57	302
2007	391	83	318
2008	415	66	337
2009	358	68	292
2010	386	97	300
2011	376	98	274
2012	386	63	314
2013	331	66	257
2014	321	46	268
2015	340	48	303
2016	312	54	261
2017	330	52	262
2018	231	44	193
2019	261	31	226
2020	177	27	155
2021	200	19	175
2022	197	23	172
2023	194	15	171
Total	6606	1183	5423

8.4 „Recent” infection (time of infection known or estimated)

„Recent” infection means:

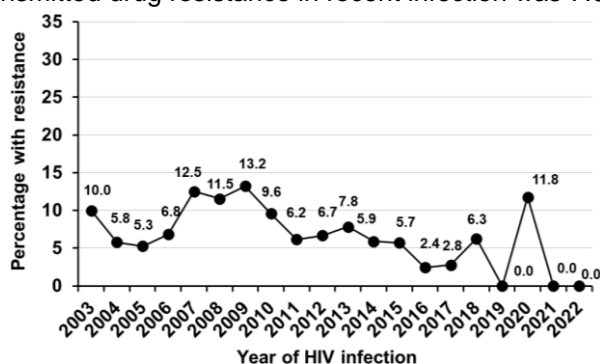
- Acute HIV infection (westernblot pattern or antigen/HIV RNA with clinical symptoms)
- Documented seroconversion with a negative HIV test not more than 3 years before the first positive test

Calculation of the time of infection (year of the HIV infection):

- Time point of the acute HIV infection or
- Midpoint between last negative and first positive HIV test

	Number of "recent" HIV infections	Available resistance tests before ART	Any resistance
Year of "recent" HIV infection			
2003	61	50	5
2004	64	52	3
2005	77	57	3
2006	57	44	3
2007	83	64	8
2008	66	52	6
2009	68	53	7
2010	97	73	7
2011	98	81	5
2012	63	45	3
2013	66	51	4
2014	46	34	2
2015	48	35	2
2016	54	41	1
2017	52	36	1
2018	44	32	2
2019	31	16	-
2020	27	17	2
2021	19	11	-
2022	23	11	-
2023	15	5	1
Sex/ mode of transmission			
MSM	752	564	50
Male IDU	116	82	3
Female IDU	48	30	3
Male heterosexual	115	90	6
Female heterosexual	104	84	3
Other	24	10	-
Total	1159	860	65

Overall rate of transmitted drug resistance in recent infection was 7.6% (65 of 860).



The year 2023 is not shown in the graph, as because of the definition of recent infection only a limited number of patients can be defined.

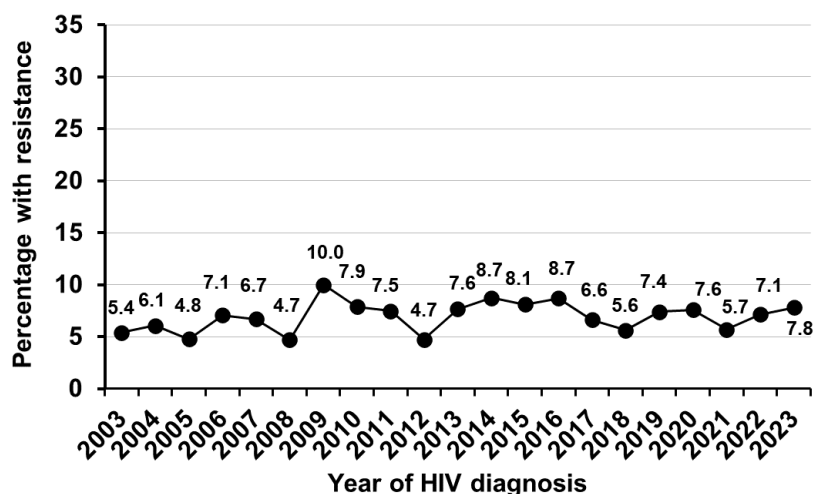
Transmission of drug resistant HIV according to the time of the "recent" HIV infection, residence, mode of transmission, sex, age
"Recent" infections

	Number of HIV infections	Available resistance tests	Wild type	Any resistance	Resistance to					3-class-resistance
					NRTI	NNRTI	PI	NRTI and PI	NNRTI and PI	
Year of HIV infection										
2003	61	50	45	5	4	1	-	-	-	-
2004	64	52	49	3	-	3	-	-	-	-
2005	77	57	54	3	1	2	-	-	-	-
2006	57	44	41	3	1	2	-	-	-	-
2007	83	64	56	8	4	4	3	1	2	1
2008	66	52	46	6	3	1	3	1	-	-
2009	68	53	46	7	2	3	4	1	-	-
2010	97	73	66	7	1	5	1	-	-	-
2011	98	81	76	5	1	4	1	-	-	-
2012	63	45	42	3	3	-	-	-	-	-
2013	66	51	47	4	1	2	1	-	-	-
2014	46	34	32	2	2	-	-	-	-	-
2015	48	35	33	2	1	-	-	-	-	-
2016	54	41	40	1	-	1	-	-	-	-
2017	52	36	35	1	-	-	1	-	-	-
2018	44	32	30	2	-	1	1	-	-	-
2019	31	16	16	-	-	-	-	-	-	-
2020	27	17	15	2	-	2	-	-	-	-
2021	19	11	11	-	-	-	-	-	-	-
2022	23	11	11	-	-	-	-	-	-	-
2023	15	5	4	1	-	1	-	-	-	-
Population size of area of residence										
Rural areas	511	393	365	28	10	16	6	1	1	3
Capital cities	186	145	132	13	3	5	6	1	-	-
Vienna	456	320	296	24	11	12	3	1	1	-
Missing value	6	2	2	-	-	-	-	-	-	-
Sex/ mode of transmission										
MSM	752	564	514	50	18	25	14	3	2	3
Male IDU	116	82	79	3	2	1	-	-	-	-
Female IDU	48	30	27	3	-	3	-	-	-	-
Male heterosexual	115	90	84	6	2	3	1	-	-	-
Female heterosexual	104	84	81	3	2	1	-	-	-	-
Others	24	10	10	-	-	-	-	-	-	-
Age at time of HIV-test										
< 35 years	666	482	436	46	16	25	8	1	1	-
≥ 35 years	493	378	359	19	8	8	7	2	1	2
Total	1159	860	795	65	24	33	15	3	2	3

Younger patients (<35 years) had a higher risk for transmitted resistance (OR=2.1, 95% CI: 1.2-3.8).

8.5 Unknown time of infection (not “recent”)

	Number of HIV diagnoses	Available resistance tests before ART	Any resistance
Year of HIV diagnosis			
2003	261	148	8
2004	287	181	11
2005	295	188	9
2006	302	184	13
2007	318	194	13
2008	337	191	9
2009	292	190	19
2010	300	190	15
2011	274	174	13
2012	314	190	9
2013	257	157	12
2014	268	149	13
2015	303	173	14
2016	261	161	14
2017	262	151	10
2018	193	107	6
2019	226	108	8
2020	155	66	5
2021	175	88	5
2022	172	84	6
2023	171	64	5
Mode of transmission			
MSM	2309	1383	113
Male IDU	535	318	12
Female IDU	152	86	7
Male heterosexual	1057	642	30
Female heterosexual	983	574	43
Other	387	135	12
Total	5423	3138	217



Transmission of drug resistant HIV according to the time of the HIV diagnosis, residence, mode of transmission, gender and age
Not "recent" infections

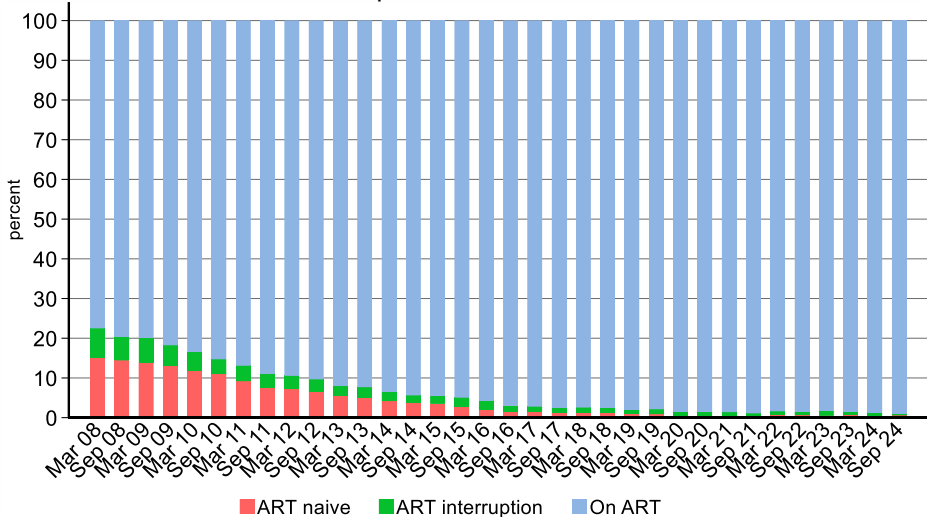
	Number of HIV diagnoses	Available resistance tests	Wild type	Any resistance	Resistance to						3-class-resistance
					NRTI	PI	PI	PI	NRTI and PI	NRTI and PI	
Year of HIV diagnosis											
2003	261	148	140	8	4	3	1	1	-	-	-
2004	287	181	170	11	6	2	4	1	-	-	-
2005	295	188	179	9	7	1	4	3	-	-	-
2006	302	184	171	13	6	2	5	-	-	-	-
2007	318	194	181	13	8	2	3	-	-	-	-
2008	337	191	182	9	4	2	3	-	-	-	-
2009	292	190	171	19	7	4	9	-	1	-	-
2010	300	190	175	15	4	8	4	1	-	-	-
2011	274	174	161	13	3	6	4	-	-	-	-
2012	314	190	181	9	7	1	2	1	-	-	-
2013	257	157	145	12	7	5	-	-	-	-	-
2014	268	149	136	13	3	6	4	-	-	-	-
2015	303	173	159	14	5	6	4	-	-	1	-
2016	261	161	147	14	3	10	1	-	-	-	-
2017	262	151	141	10	4	6	-	-	-	-	-
2018	193	107	101	6	4	1	2	1	-	-	-
2019	226	108	100	8	2	5	1	-	-	-	-
2020	155	66	61	5	2	4	-	-	1	-	-
2021	175	88	83	5	2	3	-	-	-	-	-
2022	172	84	78	6	1	3	2	-	-	-	-
2023	171	64	59	5	4	4	1	1	3	1	1
Population size of area of residence											
Rural areas	2178	1305	1210	95	42	33	21	-	1	-	-
Capital cities	717	498	461	37	12	20	9	-	4	-	-
Vienna	2451	1317	1235	82	38	31	22	7	1	2	1
Missing value	77	18	15	3	1	1	1	-	-	-	-
Sex/ mode of transmission											
MSM	2309	1383	1270	113	44	45	29	3	-	2	1
Male IDU	535	318	306	12	4	8	1	-	1	-	-
Female IDU	152	86	79	7	2	4	1	-	1	-	-
Male heterosexual	1057	642	612	30	14	8	10	1	1	-	-
Female heterosexual	983	574	531	43	25	14	10	3	14	3	-
Others	387	135	123	12	4	6	2	-	-	-	-
Age at time of HIV-test											
< 35 years	2711	1469	1355	114	49	49	26	7	3	1	1
≥ 35 years	2712	1669	1566	103	44	36	27	-	3	1	-
Total	5423	3138	2921	217	93	85	53	7	6	2	1

Men who had been infected through intravenous drug use (OR=0.4, 95% CI: 0.2-0.8) or heterosexually (OR=0.6, 95% CI: 0.4-0.9) had a lower risk of transmitted resistance, younger patients (<35 years) had a slightly higher risk (OR=1.4, 95 %-CI: 1.03–1.8).

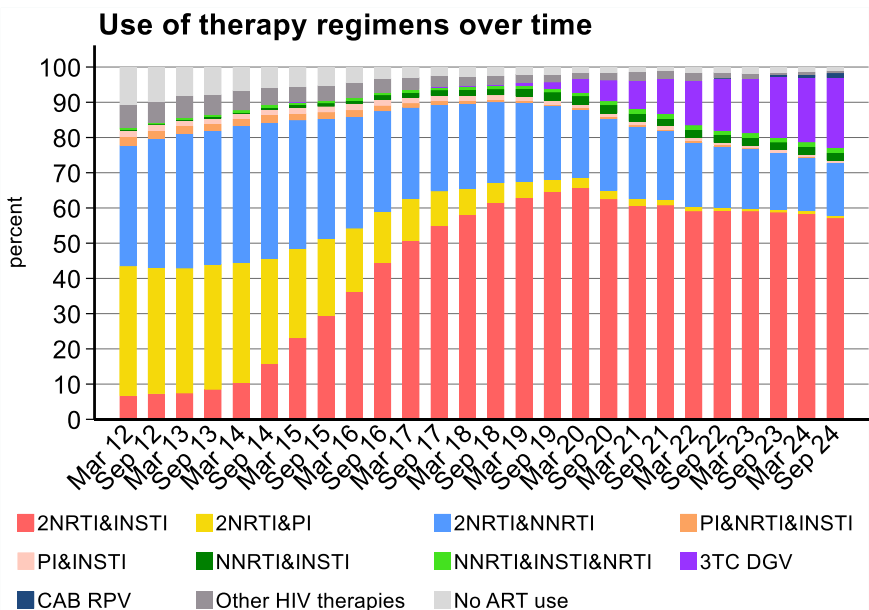
9 Antiretroviral therapy (ART)

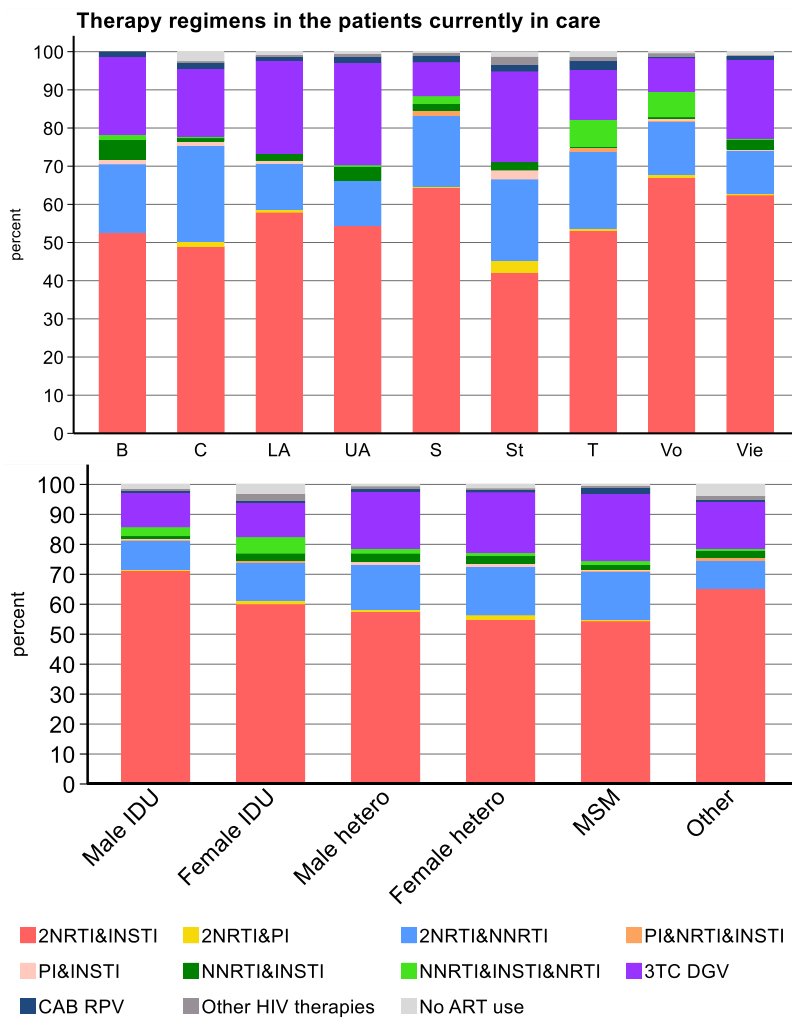
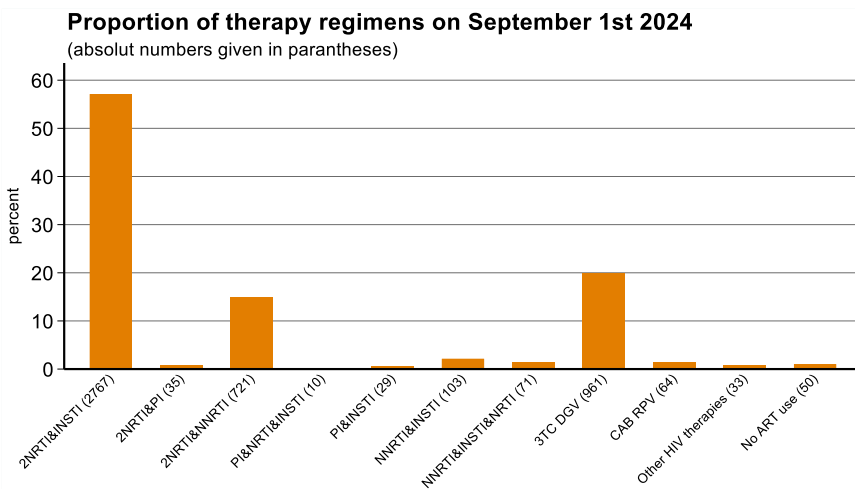
9.1 Patients currently in care regarding treatment status

Overall, 4844 persons were currently in care at a hospital-based HIV treatment centre (currently in care, those who had a visit within the last 6 months). On September 1st, 2024, 4794 (99.0%) patients were on antiretroviral therapy in the 9 HIV treatment centres. Of the 50 patients not on treatment on September 1st, 2024, 21 had received antiretroviral treatment at an earlier point in time.



9.2 Regimens of antiretroviral therapy





9.3 Administered antiretroviral drugs – July

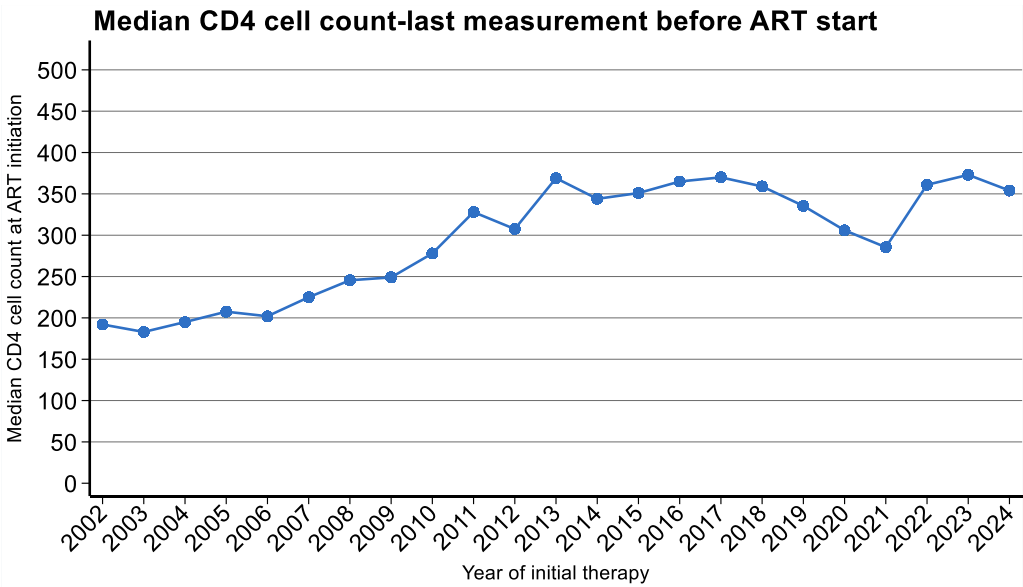
	Jul 1 st 2020	Jan 1 st 2021	Jul 1 st 2021	Jan 1 st 2022	Jul 1 st 2022	Jan 1 st 2023	Jul 1 st 2023	Jan 1 st 2024	Jul 1 st 2024
EPIVIR/ZEFFIX	50	39	36	34	30	27	20	19	15
Lamivudine	45	26	17	11	8	12	8	6	8
ZIAGEN	8	9	6	6	8	6	6	5	4
VIREAD	3	4	3	3	2	5	2	1	4
VEMLIDY	5	4	3	3	4	3	2	4	4
EMTRIVA	28	27	26	26	18	18	18	17	18
KIVEXA	130	104	32	21	17	16	13	7	7
Abacavir/Lamivudine	108	122	185	185	171	162	156	146	139
TRUVADA	15	15	9	13	7	10	8	10	7
Emtricitabin/Tenofovir	175	220	220	247	250	237	200	185	164
DESCOVY 10	74	54	39	22	14	10	9	11	11
DESCOVY 25	945	740	658	411	144	134	126	126	115
ISENTRESS 400	160	142	137	103	84	86	71	66	57
ISENTRESS 600	167	152	151	130	115	117	109	103	97
TIVICAY	991	846	757	608	376	351	321	322	295
CABOTEGRAVIR			3	3	9	9	21	37	58
JULUCA	40	40	39	38	30	25	25	24	22
STRIBILD	7	4	2	2	3	1	3	2	3
BIKTARVY	905	967	1112	1308	1646	1800	1947	2063	2184
GENVOYA	363	287	254	191	180	141	111	92	75
TRIUMEQ	734	621	571	512	474	433	368	319	259
DOVATO	189	319	428	507	658	705	787	875	976
VIRAMUNE/Nevirapine	198	170	160	136	117	104	101	90	83
Efavirenz	25	20	17	17	11	11	10	8	8
INTELENCE	36	26	27	20	11	10	9	7	7
EDURANT	93	87	81	69	77	69	77	96	108
PIFELTRO	52	58	59	67	81	90	110	117	119
ATRIPLA	6	5	4	4	1	2	2	2	4
Efavirenz/FTC/TDF	59	48	48	35	39	33	32	27	26
EVIPLERA	41	49	47	48	42	42	37	37	36
ODEFSEY	537	476	443	404	381	355	343	313	277
DELSTRIGO	72	128	152	179	206	222	235	248	272
TELZIR	5	3	3	3	2	2	1	1	
REYATAZ	38	33	29	20	15	11	10	9	11
PREZISTA 800	124	107	93	70	58	50	41	48	42
Darunavir 800	26	26	24	22	23	22	16	20	22
PREZISTA 1200	13	14	12	13	9	9	10	6	6
KALETRA	4	5	4	3	2	2	3	2	2
NORVIR	198	175	154	123	102	89	75	81	79
CELSENTRI	26	26	24	22	24	20	17	16	16
GESAMT	4673	4488	4491	4385	4484	4552	4620	4702	4793

9.4 Administered antiretroviral drugs – September

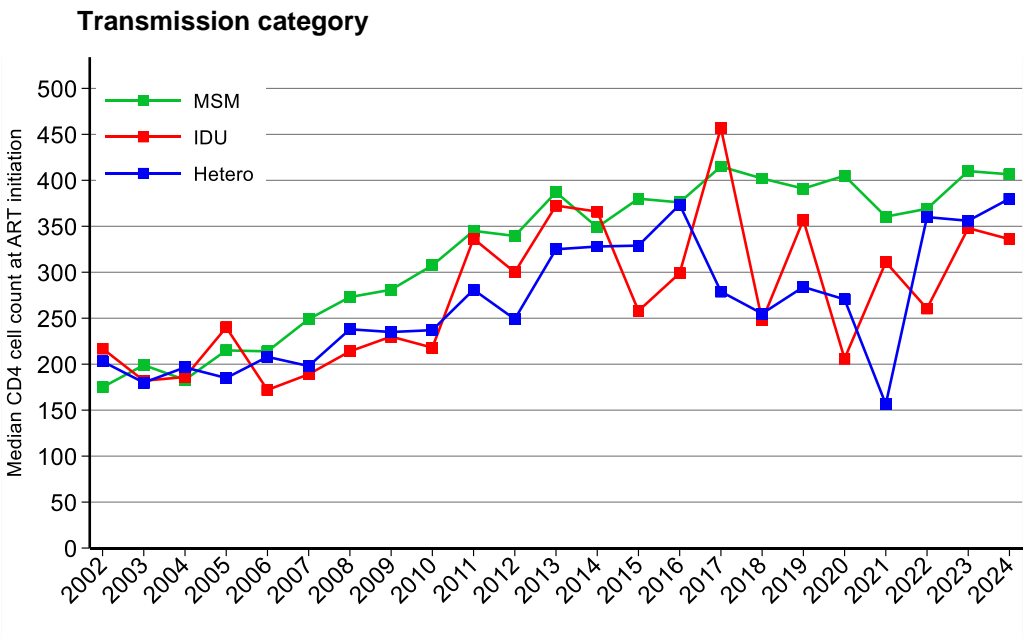
	Sep 1 st 2020	Mar 1 st 2021	Sep 1 st 2021	Mar 1 st 2022	Sep 1 st 2022	Mar 1 st 2023	Sep 1 st 2023	Mar 1 st 2024	Sep 1 st 2024
EPIVIR/ZEFFIX	39	38	37	33	33	23	20	18	15
Lamivudine	33	24	13	10	8	12	9	8	6
ZIAGEN	9	9	7	6	7	7	7	5	4
VIREAD	3	4	3	2	4	4	3	5	3
VEMLIDY	5	4	3	4	3	3	4	4	4
EMTRIVA	27	27	25	22	18	18	18	18	17
KIVEXA	124	71	28	21	15	14	11	6	8
Abacavir/Lamivudine	107	146	178	183	164	158	155	144	131
TRUVADA	15	11	10	11	8	6	10	8	5
Emtricitabin/Tenofovir	184	226	218	256	245	228	199	184	159
DESCOVY 10	71	46	32	19	13	9	9	11	11
DESCOVY 25	863	673	610	267	138	133	123	126	107
ISENTRESS 400	153	138	127	102	87	82	72	70	54
ISENTRESS 600	163	148	142	132	113	112	107	102	90
TIVICAY	910	783	724	491	363	352	322	316	288
CABOTEGRAVIR			3	3	9	11	26	40	65
JULUCA	40	40	38	34	28	28	25	23	24
STRIBILD	6	2	1	3	2	2	3	2	3
BIKTARVY	929	1003	1191	1437	1687	1828	1991	2105	2204
GENVOYA	333	272	224	188	165	129	108	87	76
TRIUMEQ	699	600	560	498	466	419	346	311	231
DOVATO	242	347	444	572	671	722	830	910	988
VIRAMUNE/Nevirapine	188	170	154	124	108	101	98	88	78
Efavirenz	24	20	18	15	11	10	10	8	9
INTELENCE	32	24	24	17	12	11	8	6	7
EDURANT	91	81	77	72	74	72	81	95	114
PIFELTRO	53	59	63	69	81	99	107	118	124
ATRIPLA	6	5	3	3	1	2	2	3	2
Efavirenz/FTC/TDF	56	48	40	40	32	35	28	27	23
EVIPLERA	45	47	47	47	43	38	36	36	33
ODEFSEY	513	455	425	396	367	348	327	293	271
DELSTRIGO	93	146	172	182	214	230	242	258	288
TELZIR	5	2	3	3	2	1	1	1	
REYATAZ	37	26	23	17	13	11	10	11	10
PREZISTA 800	121	100	82	69	58	45	47	44	44
Darunavir 800	24	26	24	23	22	19	18	21	19
PREZISTA 1200	13	14	12	12	9	9	8	6	7
KALETRA	4	4	4	3	2	2	3	2	2
NORVIR	192	163	139	118	99	81	81	80	78
CELSENTRI	26	26	24	23	21	18	17	16	14
GESAMT	4617	4398	4467	4382	4470	4542	4642	4745	4794

9.5 CD4 cell counts at initiation of ART

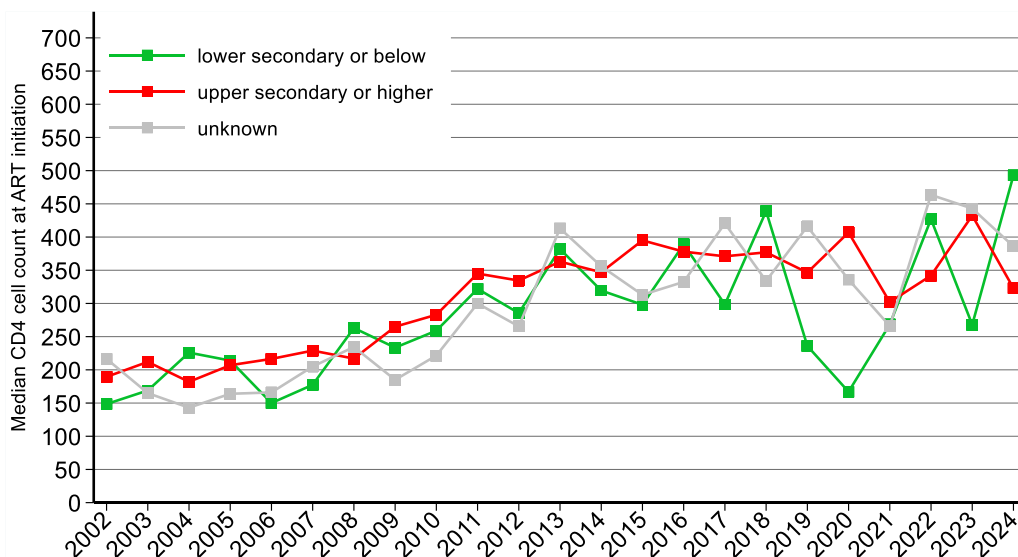
9.5.1 CD4 cell counts at initiation of ART



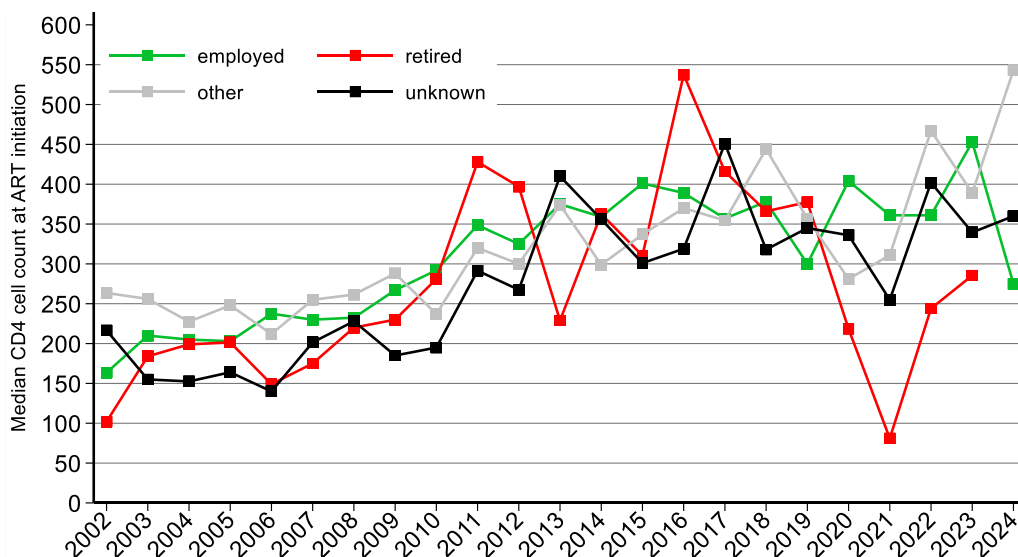
9.5.2 Median CD4 count at ART initiation



Level of education

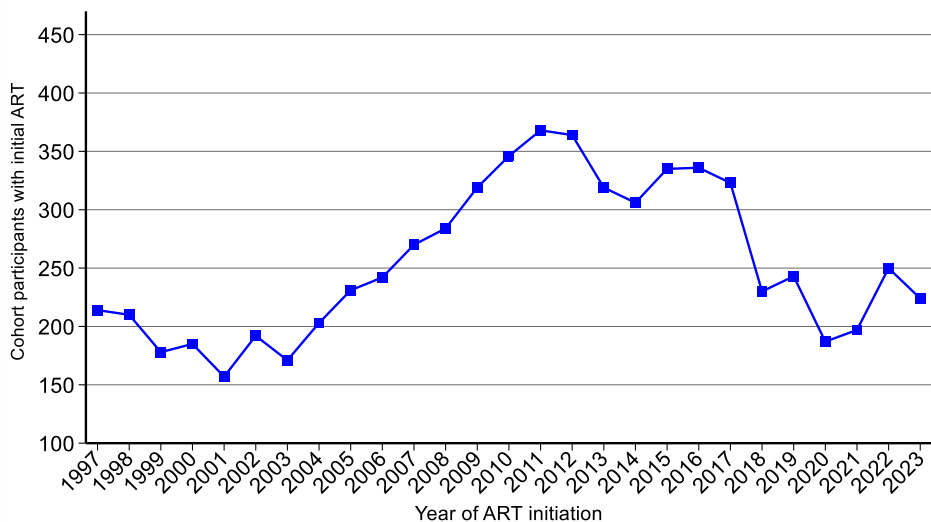


Status of employment



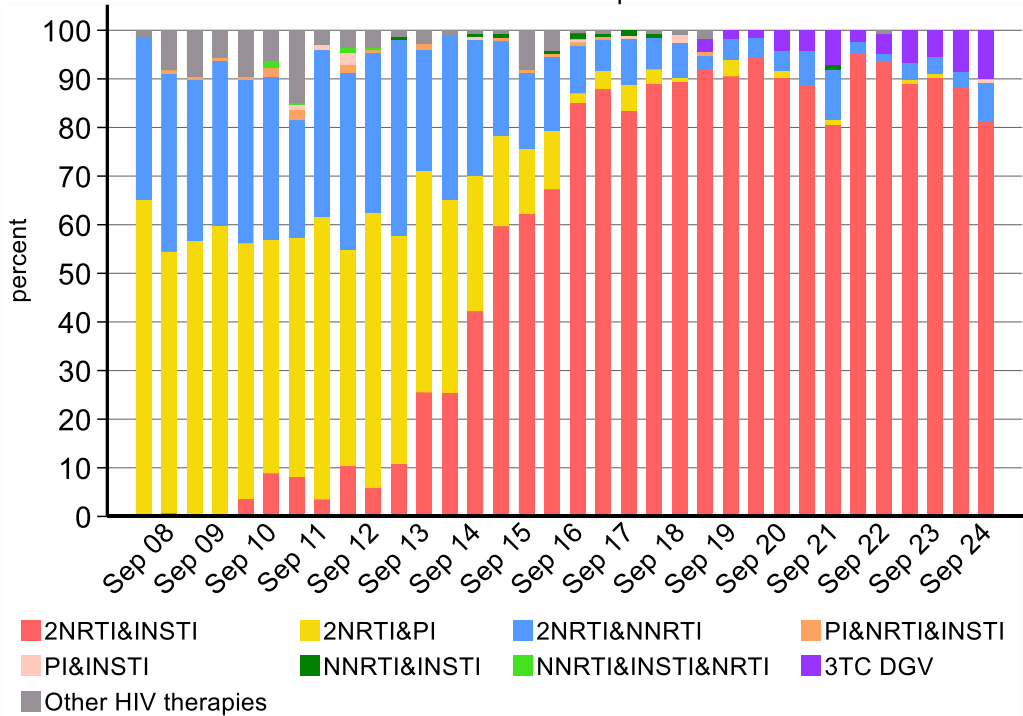
9.6 Initial therapy

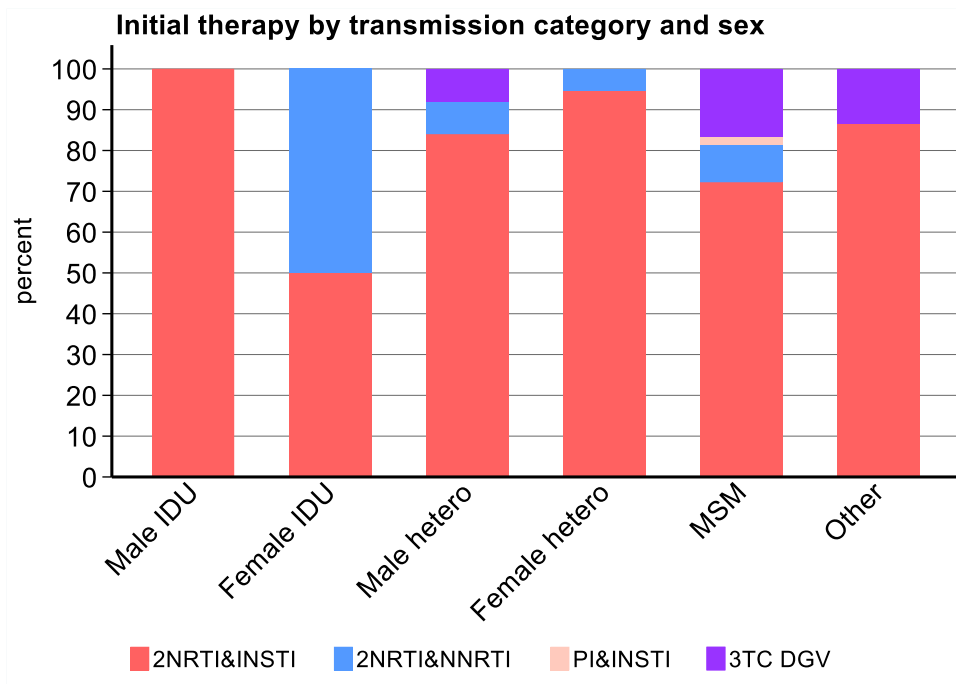
9.6.1 Number of persons who started ART in the respective year



9.6.2 Regimens of the initial therapy

After March 1st, 2024, 129 patients started antiretroviral therapy. 111 of them also had their first measurement of CD4 cell count within this period.





9.6.3 Antiretroviral drugs in the initial therapy

	Sep 1 st 2020	Mar 1 st 2021	Sep 1 st 2021	Mar 1 st 2022	Sep 1 st 2022	Mar 1 st 2023	Sep 1 st 2023	Mar 1 st 2024	Sep 1 st 2024
EPIVIR									
Lamivudine		1			1		1	1	
ZIAGEN									
VIREAD		1			2		1	2	
VEMLIDY									
EMTRIVA								1	
KIVEXA									
Abacavir/Lamivudine							1	1	
TRUVADA			1						
Emtricitabin/Tenofovir	7	8	4	3	14	10	7	7	7
DESCOVY 10						1			
DESCOVY 25	11	3	3	2		1		1	
ISENTRESS 400	2	5	1	1	3	2	3	4	1
ISENTRESS 600	7				1		1		1
TIVICAY	8	7	8	4	11	9	4	6	6
CABOTEGRAVIR									
JULUCA									
STRIBILD									
BIKTARVY	43	68	60	77	100	92	87	92	98
GENVOYA	1	2	1			1			
TRIUMEQ	4	3	10		4	2	6	2	
DOVATO	3	4	7	2	6	8	6	10	13
VIRAMUNE/Nevirapine									
Efavirenz								1	
INTELENCE									
EDURANT			1						
PIFELTRO									
ATRIPLA									
Efavirenz/FTC/TDF			1					1	
EVIPLERA	1		1	1					
ODEFSEY		1				1			1
DELSTRIGO	2	6	8	1	2	3	4	2	9
TELZIR									
REYATAZ									
PREZISTA 800									
Darunavir 800	1					1	1		
PREZISTA 1200									
KALETRA									
NORVIR	1					1	1		
CELSENTRI									
GESAMT	72	96	98	86	128	119	112	118	129

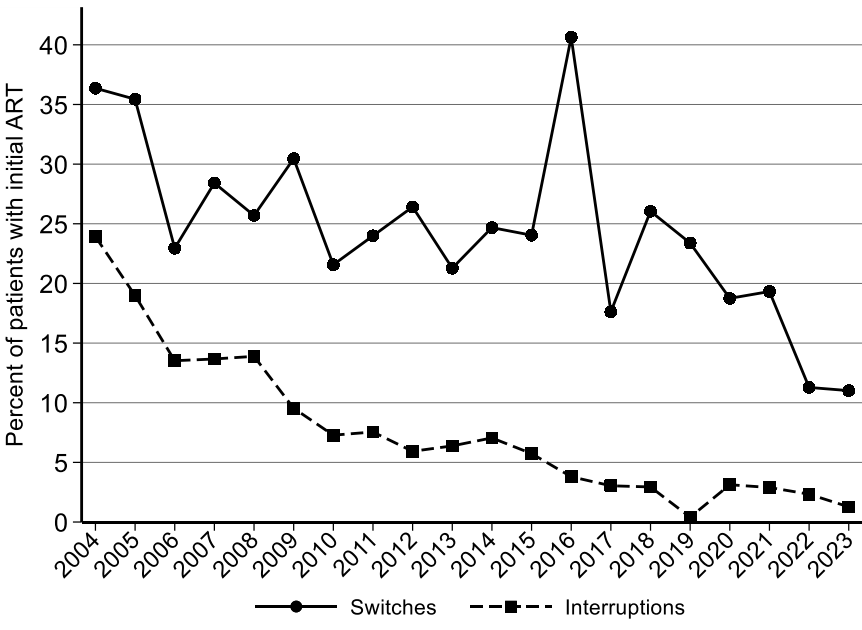
9.7 ART switches and interruptions

9.7.1 Switches and interruptions of ART during the first year of treatment

9.7.1.1 All switches, including switches from TDF to TAF containing regimens

Percentage of patients with ART switches and interruptions during the first year of treatment

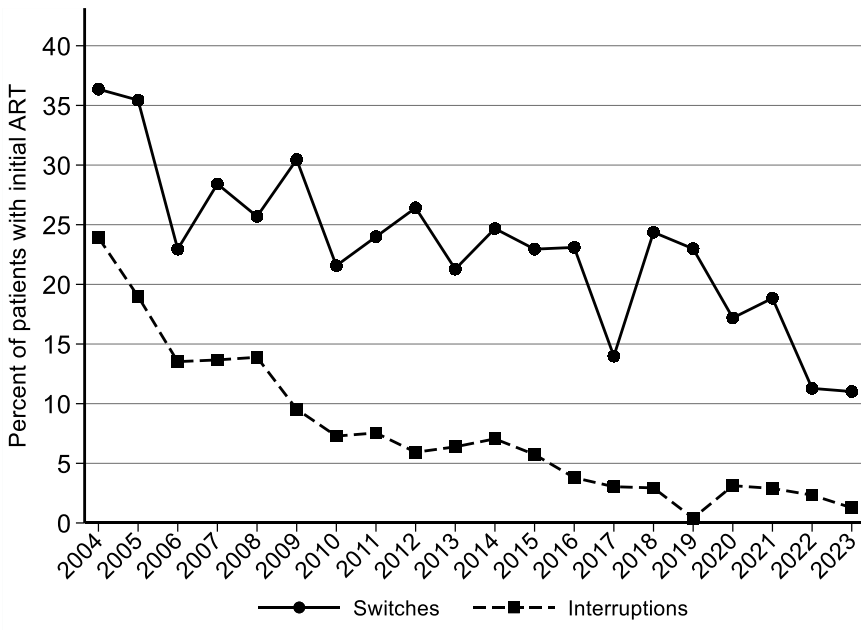
Year of ART initiation	% of patients with ART switches	% of patients with ART interruptions
2004	36.4	23.9
2005	35.4	19.0
2006	23.0	13.5
2007	28.4	13.7
2008	25.7	13.9
2009	30.5	9.5
2010	21.6	7.3
2011	24.0	7.5
2012	26.4	5.9
2013	21.3	6.4
2014	24.7	7.1
2015	24.0	5.7
2016	40.6	3.8
2017	17.6	3.0
2018	26.1	2.9
2019	23.4	0.4
2020	18.8	3.1
2021	19.3	2.9
2022	11.3	2.3
2023	11.0	1.3



9.7.1.2 All switches, excluding switches from TDF to TAF containing regimens

Percentage of patients with ART switches and interruptions during the first year of treatment

Year of ART initiation	% of patients with ART switches	% of patients with ART interruptions
2004	36.4	23.9
2005	35.4	19.0
2006	23.0	13.5
2007	28.4	13.7
2008	25.7	13.9
2009	30.5	9.5
2010	21.6	7.3
2011	24.0	7.5
2012	26.4	5.9
2013	21.3	6.4
2014	24.7	7.1
2015	23.0	5.7
2016	23.1	3.8
2017	14.0	3.0
2018	24.4	2.9
2019	23.0	0.4
2020	17.2	3.1
2021	18.8	2.9
2022	11.3	2.3
2023	11.0	1.3

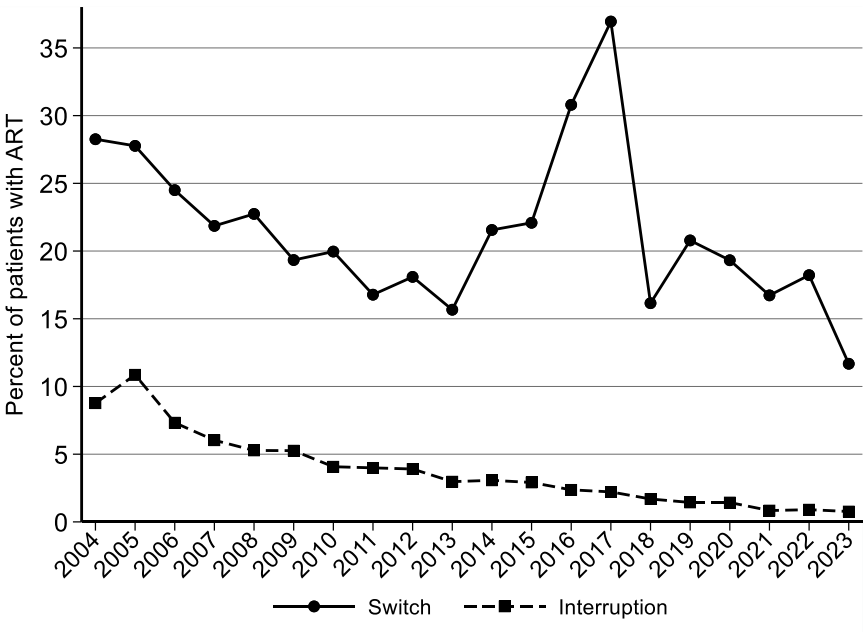


9.7.2 ART switches and interruptions per calendar year

9.7.2.1 All switches, including switches from TDF to TAF containing regimens

Percentage of patients with ART switches and interruptions in the respective year

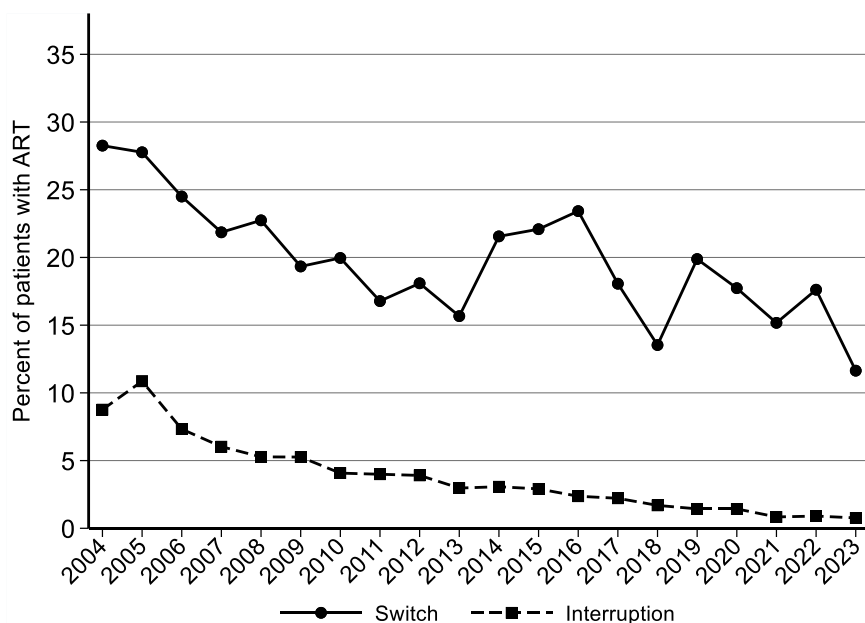
Year of ART initiation	% of patients with ART switches	% of patients with ART interruptions
2004	28.3	8.8
2005	27.8	10.9
2006	24.5	7.3
2007	21.9	6.0
2008	22.7	5.3
2009	19.3	5.3
2010	20.0	4.1
2011	16.8	4.0
2012	18.1	3.9
2013	15.7	3.0
2014	21.6	3.1
2015	22.1	2.9
2016	30.8	2.4
2017	36.9	2.2
2018	16.2	1.7
2019	20.8	1.4
2020	19.3	1.4
2021	16.7	0.8
2022	18.2	0.9
2023	11.7	0.8



9.7.2.2 All switches, excluding switches from TDF to TAF containing regimens

Percentage of patients with ART switches and interruptions in the respective year

Year of ART initiation	% of patients with ART switches	% of patients with ART interruptions
2004	28.3	8.8
2005	27.8	10.9
2006	24.5	7.3
2007	21.9	6.0
2008	22.7	5.3
2009	19.3	5.3
2010	20.0	4.1
2011	16.8	4.0
2012	18.1	3.9
2013	15.7	3.0
2014	21.6	3.1
2015	22.1	2.9
2016	23.4	2.4
2017	18.1	2.2
2018	13.5	1.7
2019	19.9	1.4
2020	17.7	1.4
2021	15.2	0.8
2022	17.6	0.9
2023	11.6	0.8



9.7.3 Risk factors for treatment switches during the first year of treatment, including switches from TDF to TAF containing regimens

10 Transgender persons were excluded from these analyses

	Switch	All		Univariable logistic regression			Multivariable logistic regression		
	1412	5726	24.66%	OR	[95% CI]	p value	OR	[95% CI]	p value
HIV transmission category									
Male IDU	135	617	21.88%	0.95	[0.77,1.18]	0.667	0.91	[0.73,1.13]	0.386
Female IDU	44	216	20.37%	0.87	[0.62,1.23]	0.434	0.86	[0.60,1.21]	0.382
Male heterosexual	249	1044	23.85%	1.07	[0.90,1.26]	0.450	0.95	[0.79,1.13]	0.539
Female heterosexual	312	961	32.47%	1.64	[1.39,1.93]	<0.001	1.55	[1.31,1.83]	<0.001
Other	84	296	28.38%	1.35	[1.03,1.77]	0.029	1.20	[0.91,1.58]	0.192
MSM	588	2592	22.69%	1.00		.	1.00		.
Age at baseline									
< 30 years	330	1401	23.55%	0.84	[0.70,1.02]	0.076	0.93	[0.76,1.13]	0.441
30-50 years	825	3365	24.52%	0.89	[0.75,1.05]	0.155	0.91	[0.77,1.08]	0.288
≥ 50	257	960	26.77%	1.00		.	1.00		.
AIDS at baseline									
Yes	309	862	35.85%	1.91	[1.63,2.22]	<0.001			
No	1103	4864	22.68%	1.00		.			.
CD4 count at baseline									
< 50	224	647	34.62%	2.13	[1.75,2.59]	<0.001	2.14	[1.75,2.61]	<0.001
50-199	324	1099	29.48%	1.68	[1.42,1.99]	<0.001	1.70	[1.42,2.02]	<0.001
200-349	323	1446	22.34%	1.16	[0.98,1.36]	0.082	1.17	[0.99,1.38]	0.072
Missing	135	494	27.33%	1.51	[1.21,1.90]	<0.001	1.58	[1.26,1.99]	<0.001
≥ 350	406	2040	19.90%	1.00		.	1.00		.
HIV-RNA at baseline									
10.000-99.999	398	1961	20.30%	0.82	[0.68,0.99]	0.035			
≥ 100.000	571	2037	28.03%	1.26	[1.05,1.50]	0.011			
Missing	207	731	28.32%	1.27	[1.03,1.58]	0.029			
≤ 9.999	236	997	23.67%	1.00		.			.
Nationality									
High prevalence countries	215	716	30.03%	1.37	[1.15,1.62]	<0.001			
Low prevalence countries	1197	5010	23.89%	1.00		.			.
Population size of area of residence									
Rural areas	565	2319	24.36%	1.06	[0.93,1.21]	0.377	1.02	[0.89,1.17]	0.738
Capital cities	237	788	30.08%	1.42	[1.19,1.69]	0.000	1.43	[1.19,1.71]	<0.001
Vienna	610	2619	23.29%	1.00		.	1.00		.
Year of ART Initiation									
2004-2007	295	967	30.51%	2.55	[2.02,3.21]	<0.001			
2008-2011	339	1339	25.32%	1.97	[1.57,2.46]	<0.001			
2012-2015	332	1377	24.11%	1.84	[1.48,2.30]	<0.001			
2016-2019	315	1152	27.34%	2.18	[1.74,2.74]	<0.001			
2020-2023	131	891	14.70%	1.00		.			.

9.7.4 Risk factors for treatment switches during the first year of treatment, excluding switches from TDF to TAF containing regimens

10 Transgender persons were excluded from these analyses

	Switch ch 1327	All 5726 23.17%		Univariable logistic regression			Multivariable logistic regression		
				OR	[95% CI]	p value	OR	[95% CI]	p value
HIV transmission category									
Male IDU	131	617	21.23%	1.03	[0.83,1.28]	0.777	0.92	[0.74,1.15]	0.456
Female IDU	42	216	19.44%	0.92	[0.65,1.31]	0.657	0.84	[0.59,1.21]	0.346
Male heterosexual	235	1044	22.51%	1.11	[0.93,1.32]	0.232	0.93	[0.78,1.12]	0.449
Female heterosexual	303	961	31.53%	1.76	[1.49,2.08]	<0.001	1.61	[1.35,1.90]	<0.001
Other	79	296	26.69%	1.39	[1.06,1.83]	0.018	1.32	[0.99,1.75]	0.056
MSM	537	2592	20.72%	1.00		.	1.00		.
Age at baseline									
< 30 years	306	1401	21.84%	0.81	[0.67,0.98]	0.029	0.81	[0.66,1.00]	0.045
30-50 years	774	3365	23.00%	0.86	[0.73,1.02]	0.079	0.84	[0.71,1.00]	0.044
≥ 50	247	960	25.73%	1.00		.	1.00		.
AIDS at baseline									
Yes	293	862	33.99%	1.91	[1.63,2.23]	<0.001			
No	1034	4864	21.26%	1.00		.			
CD4 count at baseline									
< 50	210	647	32.46%	2.12	[1.74,2.59]	<0.001	1.95	[1.59,2.40]	<0.001
50-199	302	1099	27.48%	1.67	[1.41,1.99]	<0.001	1.49	[1.24,1.79]	<0.001
200-349	311	1446	21.51%	1.21	[1.02,1.43]	0.027	1.07	[0.90,1.28]	0.420
Missing	127	494	25.71%	1.53	[1.21,1.92]	<0.001	1.59	[1.26,2.02]	<0.001
≥ 350	377	2040	18.48%	1.00		.	1.00		.
HIV-RNA at baseline									
10.000-99.999	384	1961	19.58%	0.87	[0.72,1.04]	0.128			
≥ 100.000	534	2037	26.22%	1.26	[1.05,1.51]	0.011			
Missing	190	731	25.99%	1.25	[1.00,1.56]	0.052			
≤ 9.999	219	997	21.97%	1.00		.			
Nationality									
High prevalence countries	203	716	28.35%	1.37	[1.15,1.63]	<0.001			
Low prevalence countries	1124	5010	22.44%	1.00		.			
Population size of area of residence									
Rural areas	538	2319	23.20%	1.08	[0.95,1.24]	0.240	1.10	[0.96,1.26]	0.184
Capital cities	218	788	27.66%	1.37	[1.14,1.64]	0.001	1.44	[1.19,1.74]	<0.001
Vienna	571	2619	21.80%	1.00		.	1.00		.
Year of ART Initiation									
2004-2007	295	967	30.51%	2.64	[2.09,3.33]	<0.001	2.62	[2.06,3.34]	<0.001
2008-2011	339	1339	25.32%	2.04	[1.63,2.55]	<0.001	2.22	[1.76,2.80]	<0.001
2012-2015	328	1377	23.82%	1.88	[1.50,2.36]	<0.001	2.06	[1.64,2.60]	<0.001
2016-2019	238	1152	20.66%	1.57	[1.24,1.98]	<0.001	1.70	[1.34,2.16]	<0.001
2020-2023	127	891	14.25%	1.00		.	1.00		.

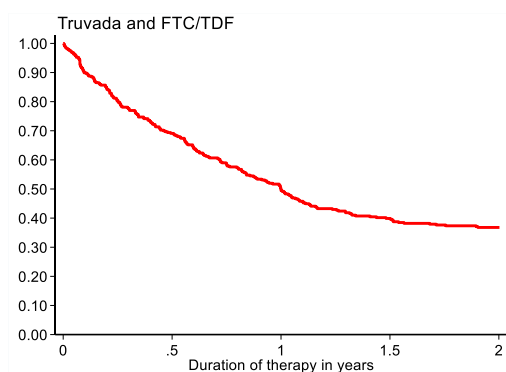
9.7.5 Risk factors for treatment interruptions (TI) during the first year of treatment

10 Transgender persons were excluded from these analyses

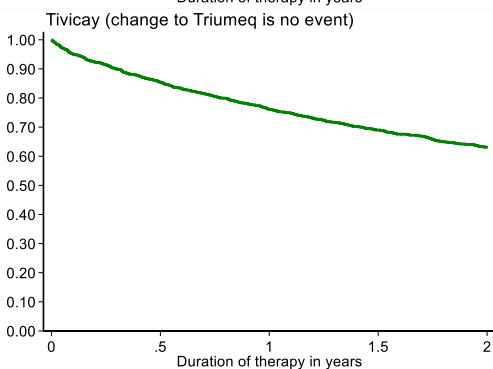
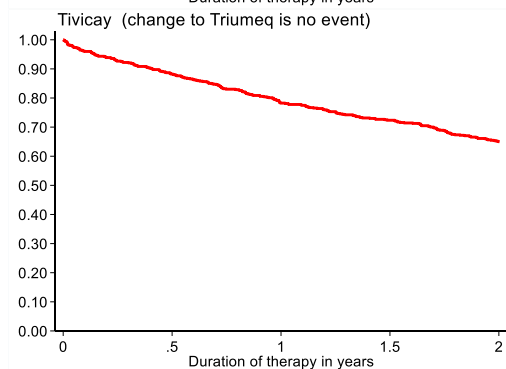
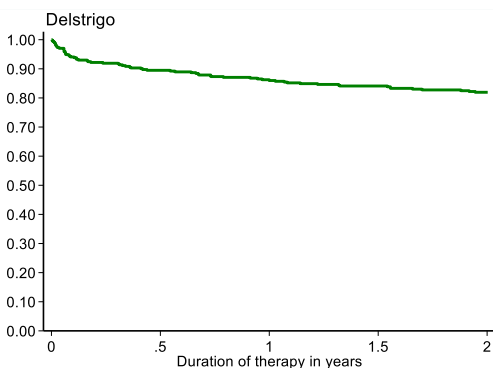
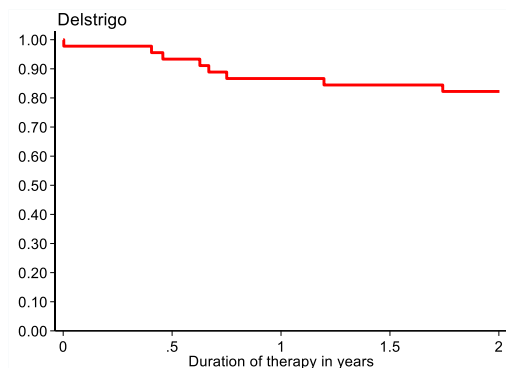
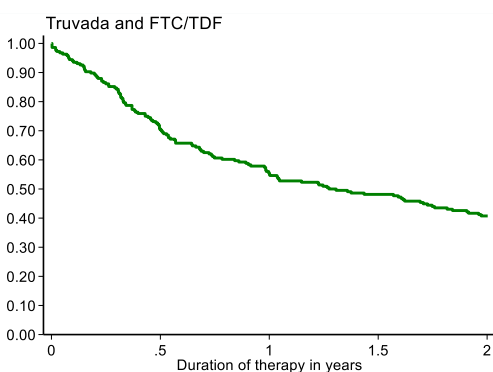
	TI 428	All 5726	7.47%	Univariable logistic regression			Multivariable logistic regression		
				OR	[95% CI]	p value	OR	[95% CI]	p value
HIV transmission category									
Male IDU	90	617	14.59%	4.64	[3.42,6.30]	<0.001	3.35	[2.43,4.61]	<0.001
Female IDU	53	216	24.54%	8.84	[6.08,12.83]	<0.001	6.22	[4.19,9.23]	<0.001
Male heterosexual	73	1044	6.99%	2.04	[1.49,2.80]	<0.001	1.67	[1.19,2.35]	0.003
Female heterosexual	106	961	11.03%	3.37	[2.52,4.50]	<0.001	2.32	[1.67,3.22]	<0.001
Other	14	296	4.73%	1.35	[0.76,2.40]	0.308	1.35	[0.74,2.44]	0.327
MSM	92	2592	3.55%	1.00		.	1.00		.
Age at baseline									
< 30 years	169	1401	12.06%	2.61	[1.87,3.63]	<0.001	1.78	[1.24,2.55]	0.002
30-50 years	211	3365	6.27%	1.27	[0.92,1.75]	0.144	0.96	[0.68,1.35]	0.810
≥ 50	48	960	5.00%	1.00		.	1.00		.
AIDS at baseline									
Yes	69	862	8.00%	1.09	[0.83,1.43]	0.521			
No	359	4864	7.38%	1.00		.			.
CD4 count at baseline									
< 50	49	647	7.57%	1.10	[0.78,1.53]	0.597			
50-199	85	1099	7.73%	1.12	[0.85,1.48]	0.425			
200-349	117	1446	8.09%	1.18	[0.91,1.52]	0.210			
Missing	35	494	7.09%	1.02	[0.69,1.50]	0.923			
≥ 350	142	2040	6.96%	1.00		.			.
HIV-RNA at baseline									
10.000-99.999	146	1961	7.45%	0.87	[0.66,1.16]	0.347			
≥ 100.000	141	2037	6.92%	0.81	[0.61,1.07]	0.138			
Missing	57	731	7.80%	0.92	[0.65,1.31]	0.638			
≤ 9.999	84	997	8.43%	1.00		.			.
Nationality									
High prevalence countries	89	716	12.43%	1.96	[1.53,2.51]	<0.001	1.37	[1.01,1.85]	0.040
Low prevalence countries	339	5010	6.77%	1.00		.	1.00		.
Population size of area of residence									
Rural areas	133	2319	5.74%	0.66	[0.53,0.82]	<0.001	0.89	[0.70,1.13]	0.335
Capital cities	73	788	9.26%	1.10	[0.84,1.45]	0.491	1.45	[1.08,1.96]	0.013
Vienna	222	2619	8.48%	1.00		.	1.00		.
Year of ART Initiation									
2004-2007	166	967	17.17%	8.59	[5.40,13.65]	<0.001	6.25	[3.90,10.02]	<0.001
2008-2011	125	1339	9.34%	4.27	[2.67,6.83]	<0.001	3.37	[2.09,5.43]	<0.001
2012-2015	85	1377	6.17%	2.73	[1.68,4.43]	<0.001	2.43	[1.49,3.97]	<0.001
2016-2019	31	1152	2.69%	1.15	[0.65,2.01]	0.635	1.14	[0.65,2.00]	0.654
2020-2023	21	891	2.36%	1.00		.	1.00		.

9.8 Drug discontinuation within 2 years of starting a drug (since 2016)

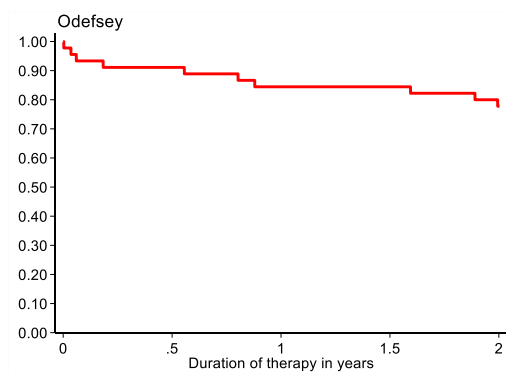
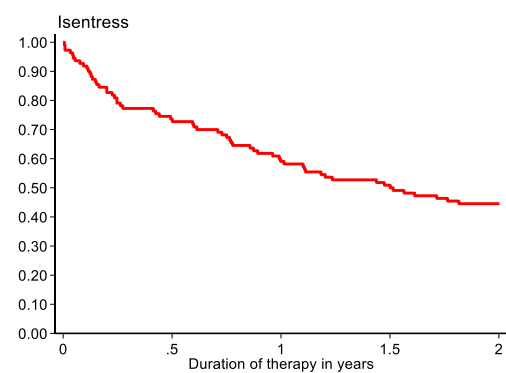
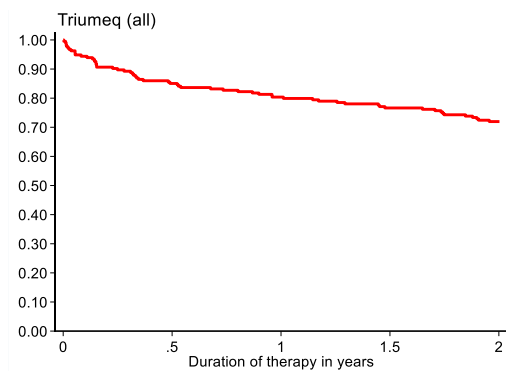
ART Naïve



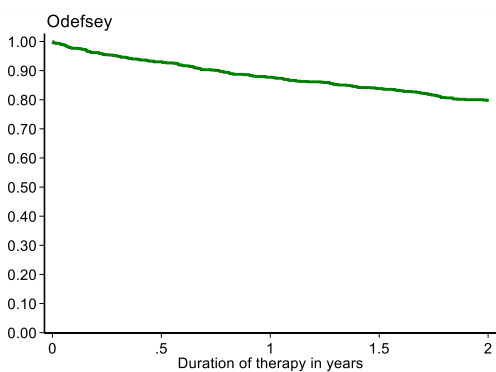
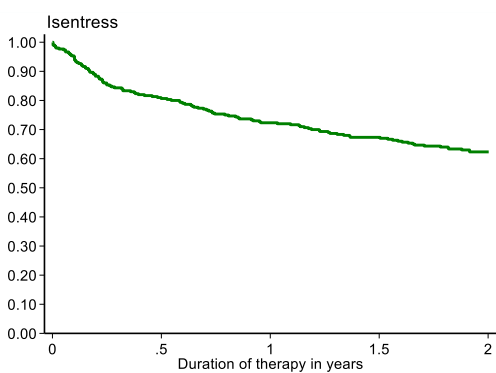
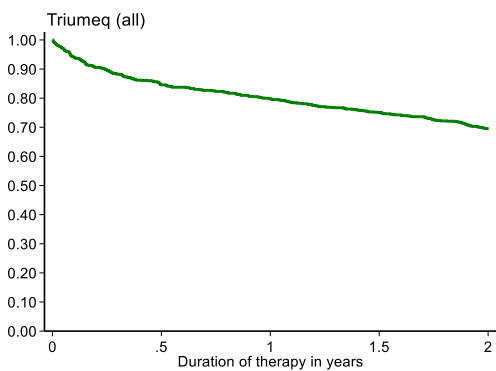
ART Experienced (first episode of drug)



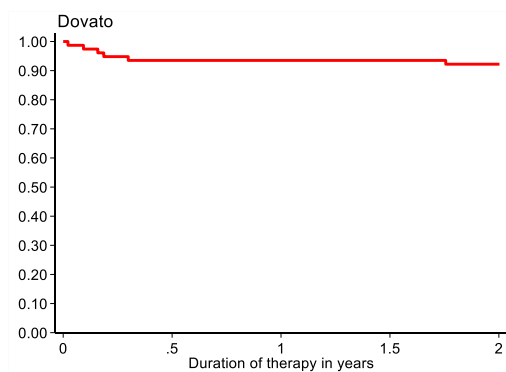
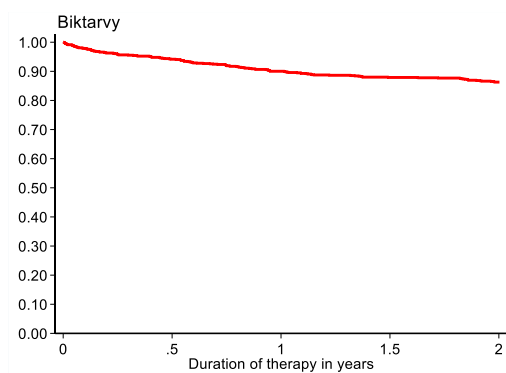
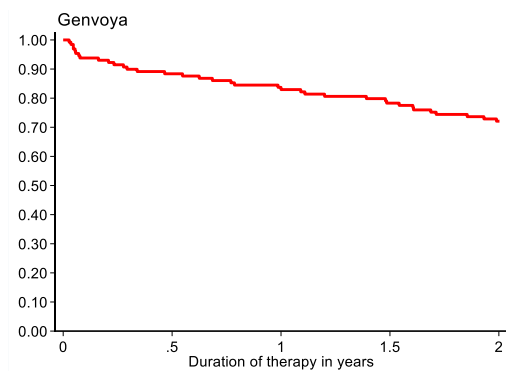
ART Naïve



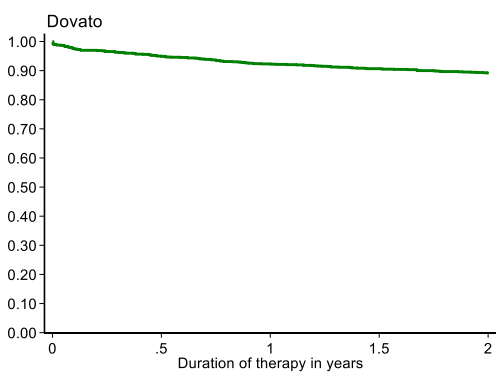
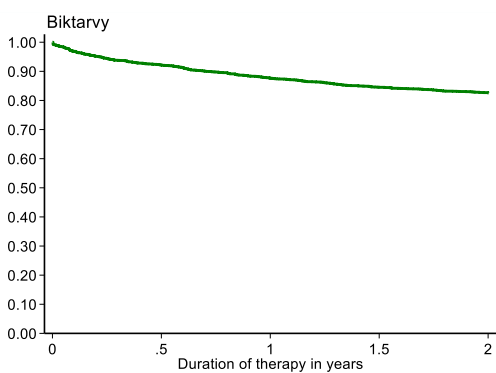
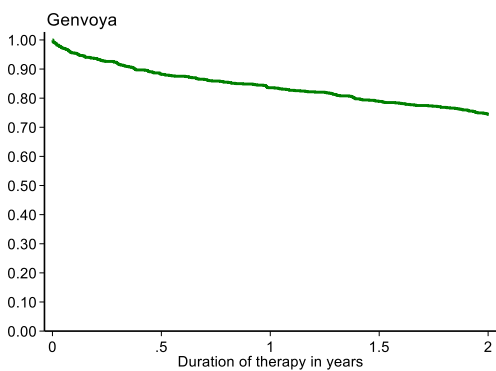
ART Experienced (first episode of drug)



ART Naive



ART Experienced (first episode of drug)



Reasons for discontinuation of drugs in the initial therapy

ART initial	Truvada	Delstrigo	Atripla	Tivicay	Triumeq	Isetress	Odefsey	Genvoya	Biktarvy	Devato	Total
	%	%	%	%	%	%	%	%	%	%	%
Treatment failure (i.e. virological, immunological, and/or clinical failure)	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.9	0.0	0.3
Virological failure	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.9	0.4
Partial virological failure	0.4	12.5	7.7	0.5	0.0	0.0	1.8	10.0	0.0	0.9	1.0
Contra-indication unspecified	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1
Unwanted weight changes	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	4.5	0.8
Abnormal fat redistribution	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1
Dyslipidaemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	0.0	0.0	0.3
Toxicity, predominantly from abdomen/G-I tract	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.7
Toxicity - GI tract	0.4	0.0	0.0	0.5	2.0	0.0	0.0	2.9	0.9	0.0	0.1
Toxicity - Liver	0.4	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.3
Toxicity, predominantly from nervous system	0.0	0.0	0.0	2.6	6.1	0.0	0.0	0.0	0.0	0.0	1.1
Toxicity - neuropsychiatric	0.4	25.0	0.0	8.2	3.5	3.5	0.0	8.6	8.0	0.0	3.5
Toxicity - headache	0.0	0.0	0.0	0.5	6.1	0.0	0.0	0.0	0.0	0.0	0.6
Toxicity, predominantly from kidneys	21.9	0.0	15.4	1.0	4.1	0.0	0.0	0.0	0.0	9.8	9.4
Toxicity, predominantly from endocrine system	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Death	0.9	0.0	0.0	0.5	0.0	1.8	0.0	0.0	0.0	0.0	0.6
Toxicity, not mentioned above	1.8	0.0	0.0	0.5	2.0	1.8	10.0	0.0	0.0	0.0	1.1
Availability of more effective treatment (not specifically failure or side effect related)	4.5	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	1.7
Structured Treatment Interruption (STI)	1.3	0.0	0.0	1.0	0.0	5.3	0.0	0.0	0.0	0.0	1.1
Patient's wish/decision, not specified above	1.8	12.5	7.7	0.0	6.1	3.5	20.0	2.9	11.6	0.0	3.8
Physician's decision, not specified above	17.9	0.0	46.2	12.3	12.2	12.3	10.0	31.4	9.8	33.3	15.2
Pregnancy	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.9	0.3
Study treatment	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Other causes, not specified above	7.1	25.0	0.0	2.1	2.0	10.5	20.0	2.9	9.8	0.0	6.1
Unknown	0.4	0.0	7.7	0.5	2.0	0.0	0.0	2.9	0.9	0.0	0.8
Bone toxicity	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.6
Pregnancy - toxicity concerns (during pregnancy)	0.0	0.0	0.0	3.1	2.0	0.0	0.0	0.0	1.8	0.0	1.3
Side effects - any of the above but unspecified	0.0	0.0	0.0	1.0	6.1	0.0	0.0	2.9	0.0	0.0	0.8
Comorbidity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.1
Toxicity, unspecified	0.4	0.0	0.0	0.5	2.0	0.0	0.0	0.0	0.0	0.0	0.4
Simplified treatment available	25.9	12.5	0.0	59.0	12.2	50.9	0.0	11.4	2.7	16.7	30.6
Treatment too complex	0.9	0.0	0.0	0.5	0.0	1.8	0.0	0.0	0.9	0.0	0.7
Drug interaction	0.4	0.0	0.0	0.5	0.0	0.0	20.0	17.1	5.4	0.0	2.3
Protocol change	0.4	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.3
Regular treatment termination (used in tbMED e.g. for DAA's against HCV, antibiotics)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.1
Change in treatment not due to side-effects, failure, poor adherence or contra-indication	0.9	0.0	0.0	0.5	2.0	0.0	0.0	0.0	0.9	0.0	0.7
Non-compliance	1.3	12.5	0.0	5.1	18.4	0.0	0.0	2.9	8.9	16.7	4.9
Defaulter	0.0	0.0	15.4	1.5	0.0	0.0	0.0	0.0	1.8	0.0	1.0
Pregnancy intended	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	3.6	0.0	0.7
Pregnancy ended	0.4	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Study treatment commenced	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.4
Drug not available	0.4	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Drug interaction - commencing TB/BCG treatment	0.0	0.0	0.0	0.0	0.0	1.8	0.0	5.7	7.1	0.0	1.6
Drug interaction - ended TB/BCG treatment	0.4	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Change to generic drugs	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5
Change to branded drugs	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Reasons for discontinuation of drugs in the not-initial therapy

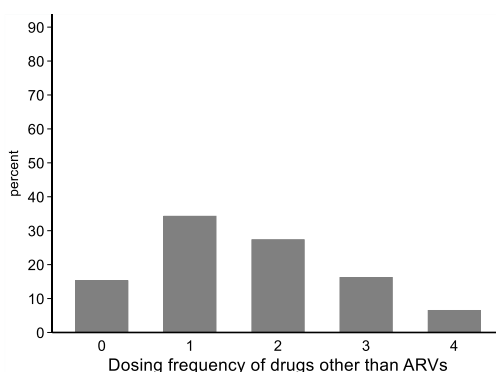
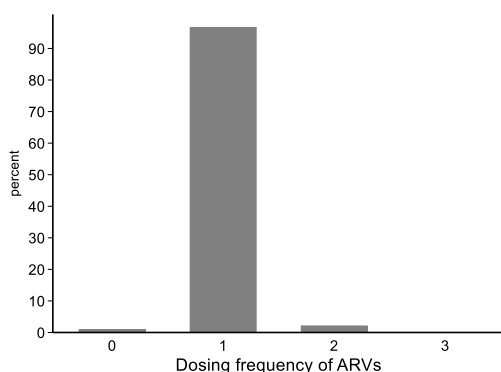
ART experienced	Truvada	Deisrigo	Atripla	Tivicay	Triumeq	Isentress	Odefsey	Genvoya	Biktarvy	Dovato	Total
%	%	%	%	%	%	%	%	%	%	%	%
Treatment failure (i.e. virological, immunological, and/or clinical failure)	0.0	0.0	0.0	0.2	0.7	0.9	1.3	0.0	0.0	0.0	1.7
Viological failure	0.0	3.1	9.1	0.3	0.7	0.9	2.5	1.0	0.6	4.3	1.0
Partial virological failure	0.0	0.0	0.0	0.5	0.0	0.0	0.0	2.1	0.0	1.7	0.7
Resistance (based on test result)	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1
Unwanted weight changes	0.0	1.6	0.0	0.2	0.4	0.0	0.0	0.0	2.5	2.6	0.7
Abnormal fat redistribution	0.0	0.0	0.0	0.7	0.0	0.9	1.9	1.0	0.6	0.0	0.6
Concern of cardiovascular disease	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.3
Dyslipidaemia	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.5	0.0	0.0	0.1
Cardiovascular disease	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Hypersensitivity reaction	0.0	0.0	0.0	0.2	1.8	0.0	0.6	0.5	0.3	0.9	0.5
Toxicity, predominantly from abdomen/G-I tract	0.0	0.0	0.0	0.7	2.5	0.0	1.9	2.1	1.1	0.0	1.1
Toxicity - GI tract	2.4	12.5	0.0	2.2	6.7	4.7	1.9	6.7	3.6	6.0	4.1
Toxicity - Liver	0.0	0.0	0.0	0.2	2.1	0.0	0.0	2.1	0.3	0.0	0.6
Toxicity - Pancreas	0.0	0.0	0.0	0.2	0.0	0.9	0.0	1.5	0.0	0.0	0.2
Toxicity, predominantly from nervous system	0.0	3.1	9.1	2.0	6.3	0.9	3.2	1.0	2.8	1.7	2.6
Toxicity - peripheral neuropathy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.2
Toxicity - neuropsychiatric	0.8	4.7	9.1	2.6	8.5	2.8	3.8	3.6	4.4	5.1	4.1
Toxicity - headache	0.0	3.1	0.0	1.5	2.8	0.0	1.3	1.0	1.7	4.3	1.7
Toxicity, predominantly from kidneys	17.7	3.1	0.0	1.2	3.9	0.0	7.6	2.6	5.0	6.0	4.1
Toxicity, predominantly from endocrine system	3.2	0.0	0.0	0.3	0.0	0.0	0.6	0.5	0.0	0.0	0.4
Diabetes	0.0	0.0	0.0	0.0	0.4	0.0	0.6	0.0	0.3	0.0	0.1
Death	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haematological toxicity (anemia etc.)	0.8	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.1
Toxicity, not mentioned above	0.0	0.0	0.0	1.3	3.2	2.8	3.2	4.6	1.4	0.9	2.0
Availability of more effective treatment (not specifically failure or side effect related)	2.4	0.0	0.0	0.0	0.0	0.9	1.3	0.5	0.3	0.9	0.4
Structured Treatment Interruption (STI)	1.6	1.6	0.0	1.0	0.7	1.9	0.0	1.5	0.0	0.0	0.8
Patient's wish/decision, not specified above	5.6	21.9	0.0	4.6	8.1	15.9	12.1	11.9	14.0	20.5	10.2
Physician's decision, not specified above	14.5	3.1	45.5	10.6	11.3	10.3	15.9	20.1	7.7	17.9	12.1
Pregnancy	0.0	1.6	0.0	0.5	0.7	0.9	0.0	0.0	1.1	1.7	0.6
Study treatment	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.8	0.0	0.2
Other causes, not specified above	8.1	3.1	0.0	3.8	2.1	4.7	6.4	5.2	4.1	8.5	4.5
Unknown	0.8	1.6	0.0	0.2	0.4	0.0	0.6	1.0	0.3	0.0	0.4
Bone toxicity	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.6	0.9	0.3
Contra-indication - other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Pregnancy - toxicity concerns (during pregnancy)	0.0	0.0	0.0	2.3	4.6	0.0	1.3	0.5	1.9	0.0	1.8
Pregnancy - switch to a more appropriate regimen for PMTCT	0.0	0.0	0.0	0.2	0.0	0.0	0.6	0.0	0.3	1.7	0.2
Side effects - any of the above but unspecified	0.0	7.8	9.1	0.8	3.9	1.9	1.9	2.6	10.2	4.3	3.7
Comorbidity	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	1.9	0.9	0.4
Toxicity, unspecified	0.0	0.0	0.0	0.3	1.1	0.0	2.5	0.5	0.8	0.0	0.6
Simplified treatment available	33.1	0.0	0.0	47.8	7.4	35.5	5.1	3.1	1.4	0.9	20.2
Treatment too complex	0.0	1.6	0.0	0.7	0.4	1.9	0.6	0.5	0.0	0.0	0.5
Drug interaction	0.0	4.7	0.0	0.2	0.4	0.0	12.1	8.8	1.4	0.0	2.3
Protocol change	0.0	0.0	0.0	0.2	0.4	0.0	0.0	0.0	0.3	0.0	0.1
Regular treatment termination (used in tbMED e.g. for DAA's against HCV, antibiotics)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
Initiation of long-acting antiretroviral therapy	0.0	3.1	0.0	0.0	0.7	0.0	0.0	0.0	0.3	0.0	0.2
Change in treatment not due to side-effects, failure, poor adherence or contra-indication	0.0	0.0	9.1	0.2	0.7	0.0	1.3	0.0	0.6	0.0	0.4
Non-compliance	3.2	12.5	0.0	8.6	13.0	7.5	3.8	7.7	12.4	1.7	8.7
Defaulter	1.6	0.0	0.0	1.3	0.4	0.0	0.0	1.5	1.1	0.0	0.9
Pregnancy intended	0.0	1.6	0.0	0.3	1.1	0.0	0.6	1.0	0.3	3.4	0.7
Pregnancy ended	1.6	0.0	0.0	0.5	0.0	2.8	0.0	0.5	0.0	0.0	0.4
Study treatment commenced	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6	0.0	2.1
Study treatment completed	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drug not available	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.7	0.1
Drug interaction - commencing TB/BCG treatment	0.8	0.0	9.1	0.0	0.0	0.0	0.0	0.5	1.1	0.0	0.3
Drug interaction - ended TB/BCG treatment	0.8	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Change to generic drugs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Change to branded drugs	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

9.9 Frequency of drug dosing

9.9.1 Overview

21 of 4844 (0.4%) patients do not take any drugs at all and 29 (0.6%) patients have no ART but take other drugs. 722 (14.9%) patients are receiving ART only.

Dosing frequency	Number of patients					Total
	0	1	2	3	4	
Antiretrovirals (ARVs)	50	4687	106	1	0	4844
Drugs other than ARVs	743	1664	1328	790	319	4844
Overall dosing frequency	21	1668	1816	973	366	4844
Overall dosing frequency in patients with once daily ARVs	0	1661	1748	926	352	4687



9.9.2 Most frequent regimen on September 1st 2024

Regimen	Frequency	Percent
BGV FTC TAF	2,186	45.60
3TC DGV	961	20.05
3TC DOR TDF	284	5.92
FTC RPV TAF	269	5.61
3TC ABC DGV	235	4.90
DGV FTC TDF	83	1.73
EVG FTC TAF	76	1.59
CAB RPV	64	1.34
3TC ABC RAL	59	1.23
DGV FTC TAF	58	1.21
DGV RPV	53	1.11
3TC ABC NVP	43	0.90
FTC RAL TDF	43	0.90
DGV DOR	41	0.86
FTC RPV TDF	35	0.73
3TC DGV DOR	34	0.71
EFV FTC TDF	27	0.56
FTC RAL TAF	20	0.42
DGV DRV RTVb	18	0.38
FTC NVP TAF	17	0.35
FTC NVP TDF	14	0.29
BGV DOR FTC TAF	12	0.25
DRV FTC RTVb TDF	10	0.21
Other	152	3.13
Total	4794	100.00

9.10 Use of antiretroviral drugs to prevent HIV infection

PEP

	Non-occupational PEP started in								
	2016	2017	2018	2019	2020	2021	2022	2023	2024
Sex									
Women	37	40	63	65	44	45	42	79	15
Men	107	134	160	263	149	180	189	210	37
Age (years)									
<30	64	97	114	164	103	126	118	150	26
30-48	72	72	102	150	83	94	107	123	22
≥50	8	5	7	14	7	5	6	16	4
Area of residence									
Vienna	74	101	126	192	108	120	129	156	24
Lower Austria	4	6	10	13	21	13	17	28	5
Burgenland	1	0	1	4	3	2	2	3	0
Upper Austria	3	15	17	25	11	32	21	25	6
Salzburg	0	7	8	11	3	3	8	3	1
Tyrol	22	11	23	29	28	29	18	34	6
Vorarlberg	2	1	2	3	3	3	9	11	0
Styria	10	6	14	17	8	10	17	19	4
Carinthia	0	0	1	1	0	0	0	1	0
Missing/Foreign	28	27	21	33	8	13	10	9	6

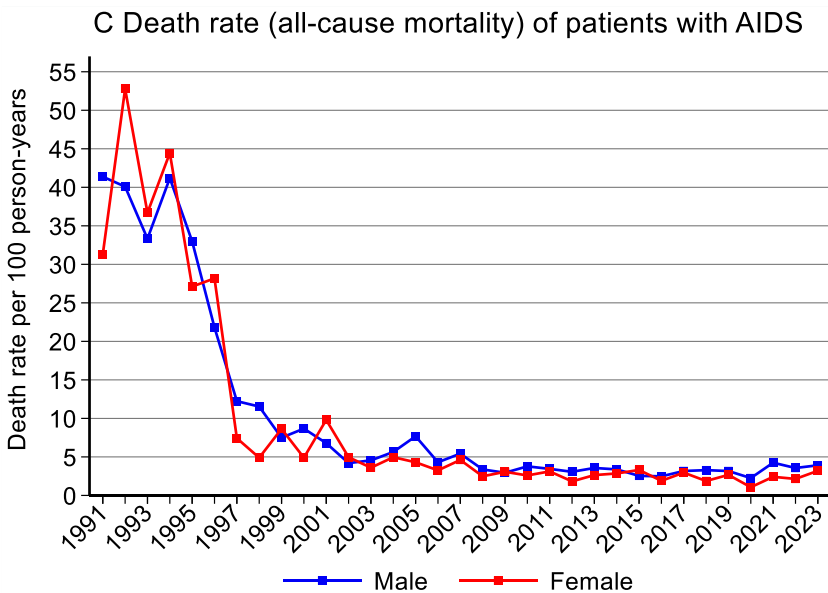
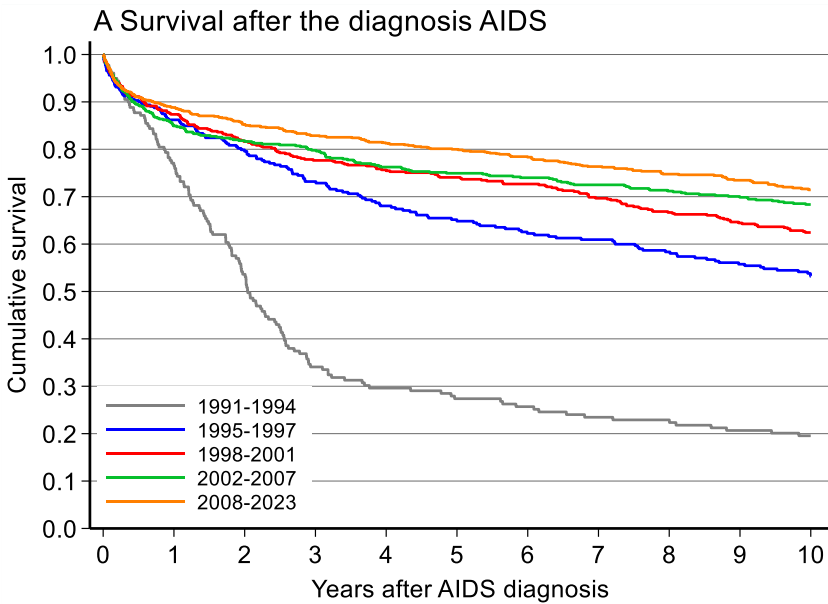
PrEP

	PrEP started in									On PrEP at 01.03.2024
	2016	2017	2018	2019	2020	2021	2022	2023	2024	
Sex										
Women	0	1	3	9	5	2	4	12	2	30
Men	6	101	199	288	211	305	423	484	73	1652
Age (years)										
<30	3	32	52	83	63	113	175	179	26	553
30-48	3	64	124	188	132	158	204	282	42	963
≥50	0	6	26	26	21	36	48	35	7	166
Area of residence										
Vienna	1	80	83	132	65	87	104	152	22	602
Lower Austria	0	6	9	12	10	9	14	26	3	81
Burgenland	0	0	0	3	1	3	2	2	0	11
Upper Austria	0	0	21	28	33	51	71	90	16	285
Salzburg	0	1	5	7	3	5	24	23	1	61
Tyrol	4	12	60	89	70	120	155	145	23	418
Vorarlberg	1	1	19	12	18	22	32	30	6	123
Styria	0	1	4	10	14	8	20	26	3	83
Carinthia	0	0	0	0	1	1	1	0	0	3
Missing/Foreign	0	1	1	4	1	1	4	2	1	15

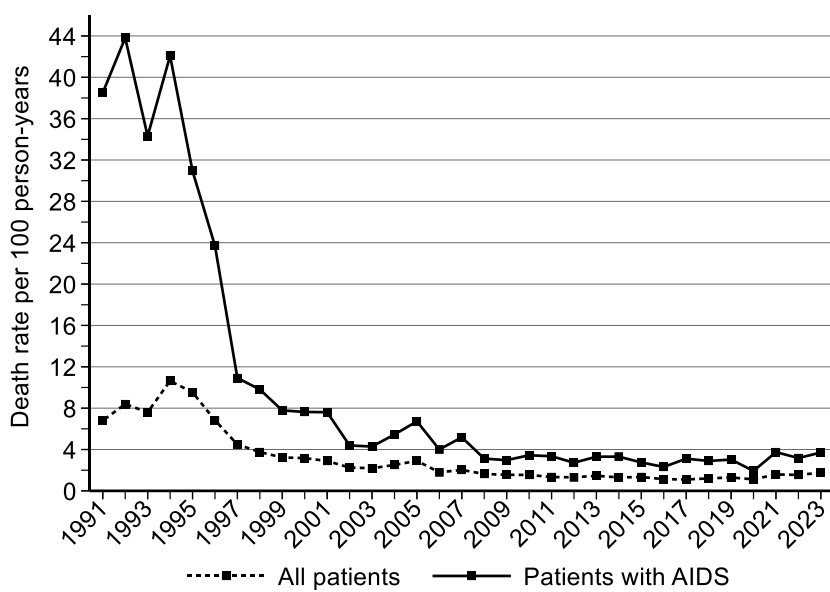
10 Disease progression and Response to ART

10.1 Mortality of patients with AIDS since 1985

The documentation of death is partially incomplete in the HIV Patient Management System (e.g. considerable proportion of patients without follow-up since 2001 are not documented dead but presumed dead, see chapter 4).



Transgender persons excluded

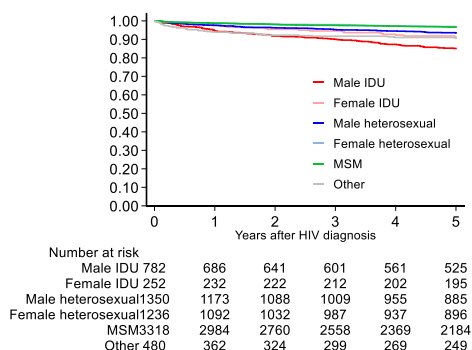
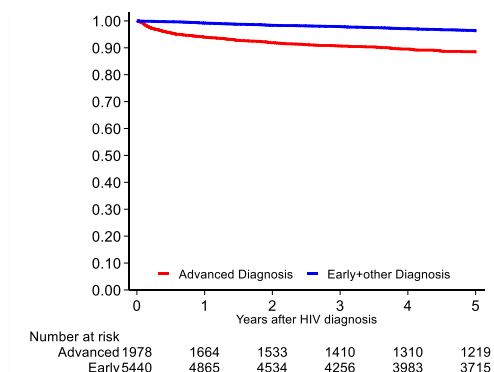


10.2 Factors associated with mortality in patients diagnosed since 2001

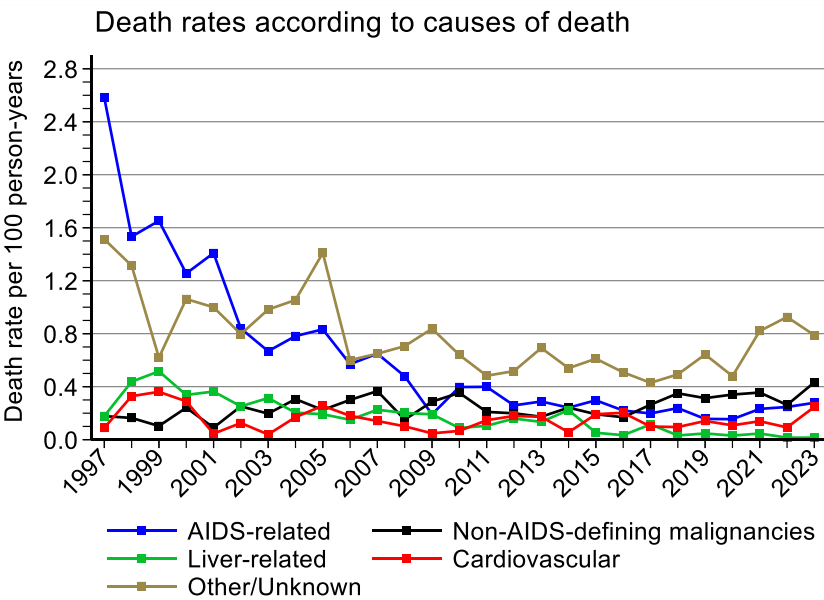
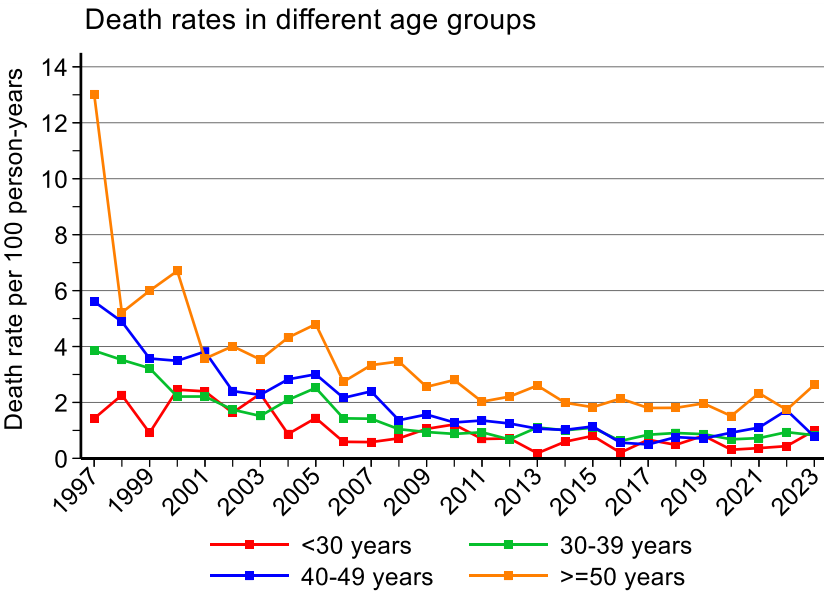
Date of censoring: last contact with the HIV centre (34 missing)

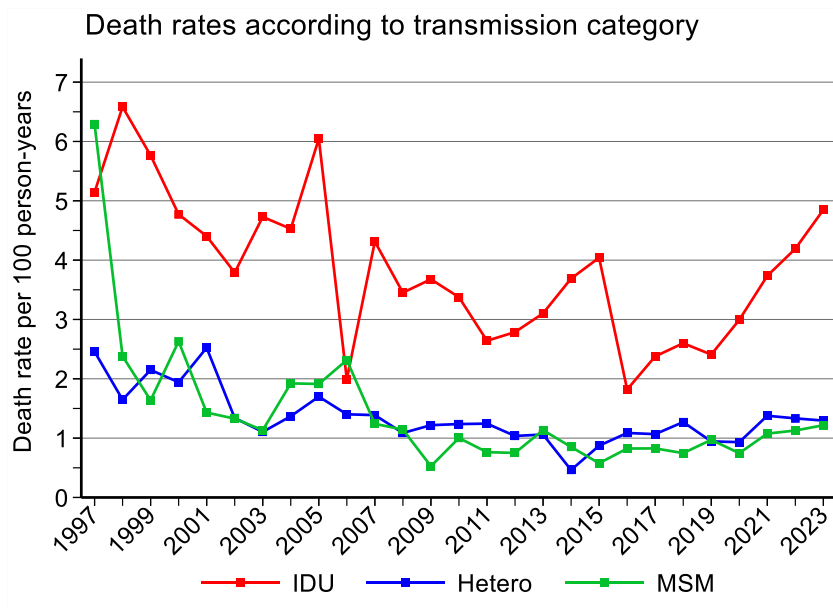
All centres	870	7435	11.70%	Univariable Cox Regression			Multivariable Cox Regression		
	Frequencies		%	HR	[95% CI]	p value	HR	[95% CI]	p value
Demographic characteristics									
Age at time of HIV diagnosis									
< 30 years	226	2549	8.87%	0.26	[0.22,0.31]	<0.001	0.19	[0.15,0.23]	<0.001
30-50 years	399	3921	10.18%	0.32	[0.27,0.38]	<0.001	0.28	[0.24,0.34]	<0.001
≥ 50	245	965	25.39%	1.00		.	1.00		.
HIV transmission category									
Male IDU	242	785	30.83%	3.77	[3.14,4.51]	<0.001	4.14	[3.42,5.01]	<0.001
Female IDU	78	252	30.95%	3.32	[2.57,4.30]	<0.001	3.93	[3.00,5.16]	<0.001
Male heterosexual	183	1350	13.56%	1.70	[1.40,2.07]	<0.001	1.18	[0.97,1.45]	0.101
Female heterosexual	77	1237	6.22%	0.71	[0.55,0.92]	0.009	0.73	[0.56,0.96]	0.022
Other	59	486	12.14%	2.07	[1.56,2.76]	<0.001	1.76	[1.31,2.36]	<0.001
MSM	231	3325	6.95%	1.00		.	1.00		.
Population size of area of residence									
Missing value	6	109	5.50%	0.71	[0.32,1.58]	0.400	0.97	[0.42,2.21]	0.934
< 100 000	276	2999	9.20%	0.60	[0.51,0.69]	<0.001	0.65	[0.56,0.76]	<0.001
≥ 100 000	93	1006	9.24%	0.59	[0.47,0.73]	<0.001	0.75	[0.60,0.95]	0.015
> 1 million	495	3321	14.91%	1.00		.	1.00		.
Nationality									
Missing/Unknown	4	36	11.11%	1.11	[0.41,2.96]	0.837	1.37	[0.50,3.78]	0.538
Low prevalence countries	104	1951	5.33%	0.44	[0.35,0.54]	<0.001	0.59	[0.48,0.73]	<0.001
High prevalence countries	48	796	6.03%	0.40	[0.30,0.53]	<0.001	0.67	[0.49,0.91]	0.011
Austria	714	4652	15.35%	1.00		.	1.00		.
Stage of disease									
Advanced diagnosis									
Yes	360	1979	18.19%	2.08	[1.82,2.38]	<0.001	1.90	[1.65,2.19]	<0.001
No	510	5456	9.35%	1.00		.	1.00		.
Calendar period of HIV test									
2005-2008	240	1545	15.53%	0.78	[0.66,0.93]	0.006	0.87	[0.73,1.04]	0.131
2009-2012	171	1514	11.29%	0.75	[0.62,0.91]	0.004	0.85	[0.69,1.03]	0.097
2013-2016	88	1317	6.68%	0.62	[0.49,0.80]	<0.001	0.72	[0.56,0.93]	0.012
≥ 2017	55	1744	3.15%	0.55	[0.41,0.75]	<0.001	0.60	[0.44,0.81]	0.001
2001-2004	316	1315	24.03%	1.00		.	1.00		.

Survival after the HIV diagnosis



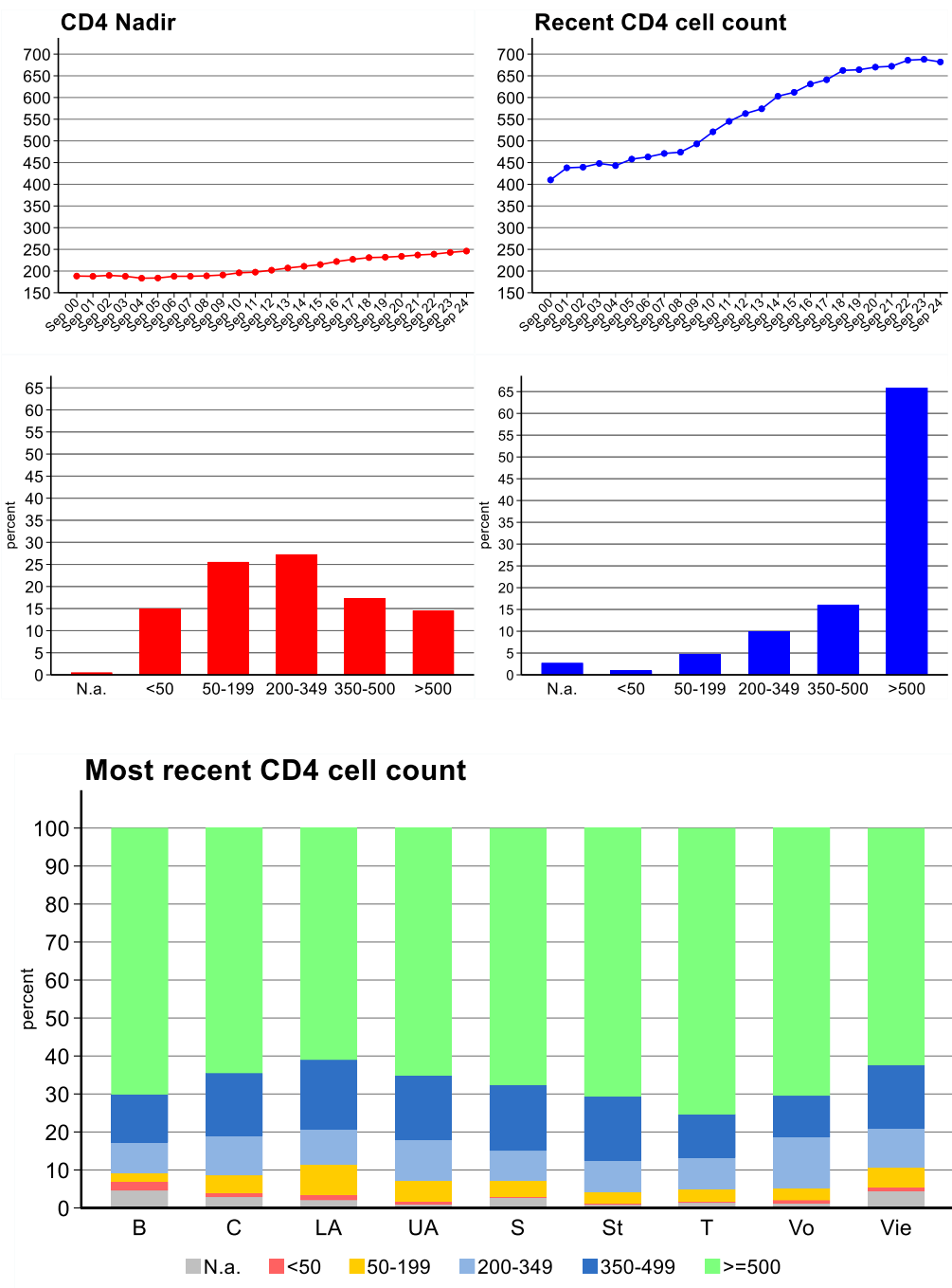
10.3 Mortality in combination ART era (years 1997-2017)





10.4 CD4 cell counts

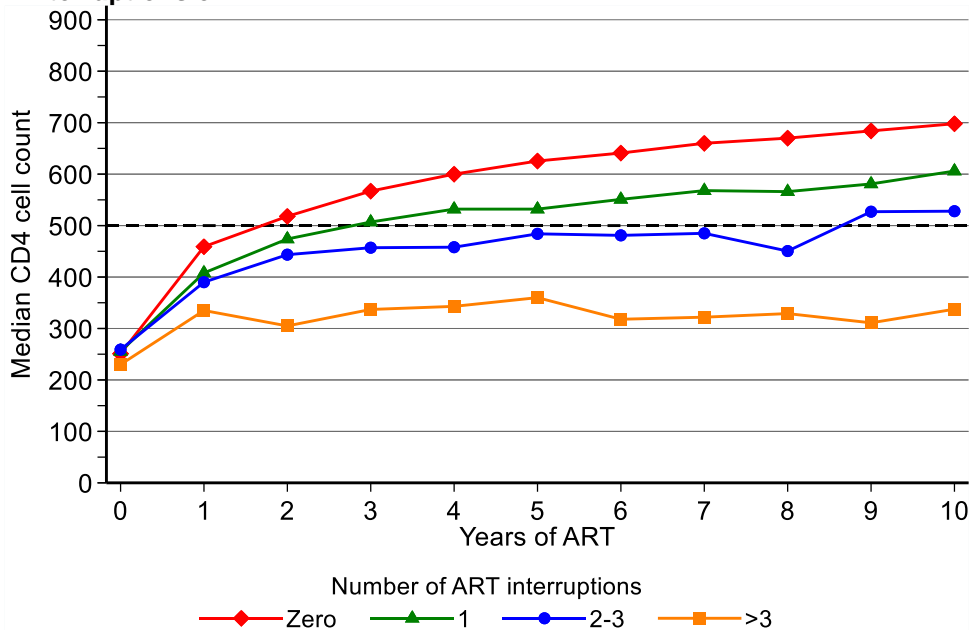
10.4.1 CD4 cell counts: nadir and most recent



10.4.2 Median CD4 cell counts after initiating ART

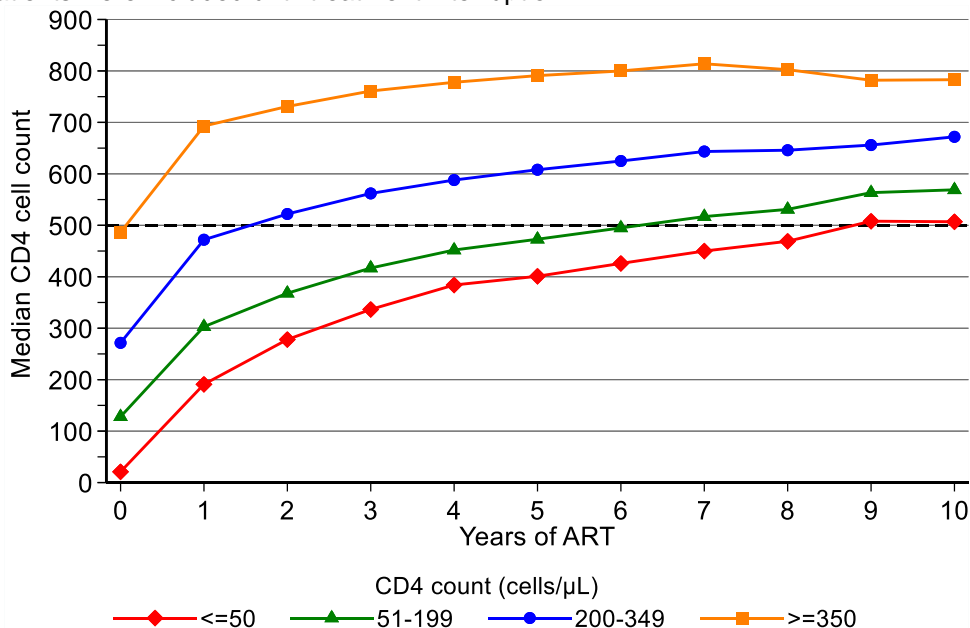
The analyses include only patients who initiated ART after January 1st, 1997.

a) Interruptions of ART



b) Baseline CD4 count

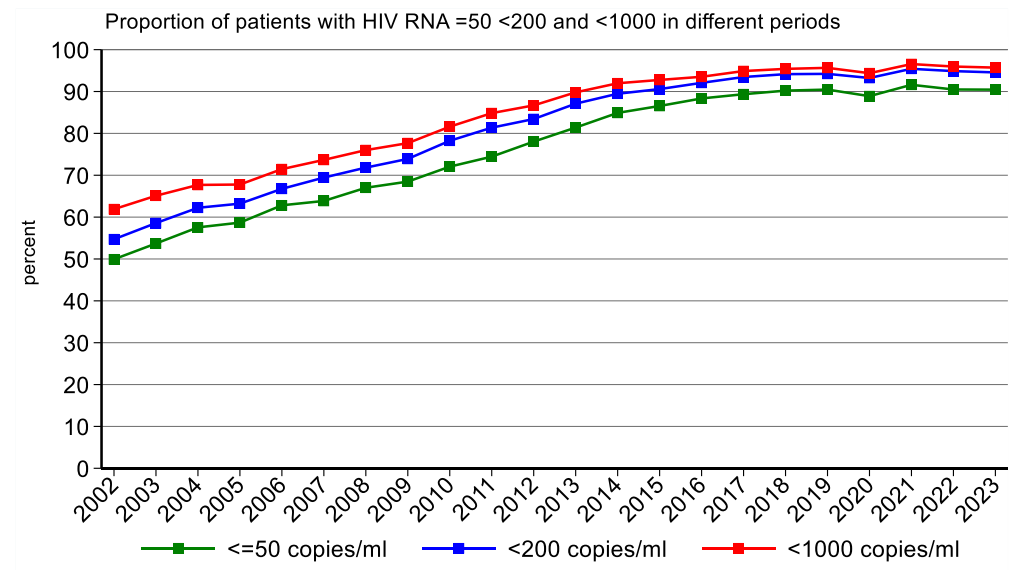
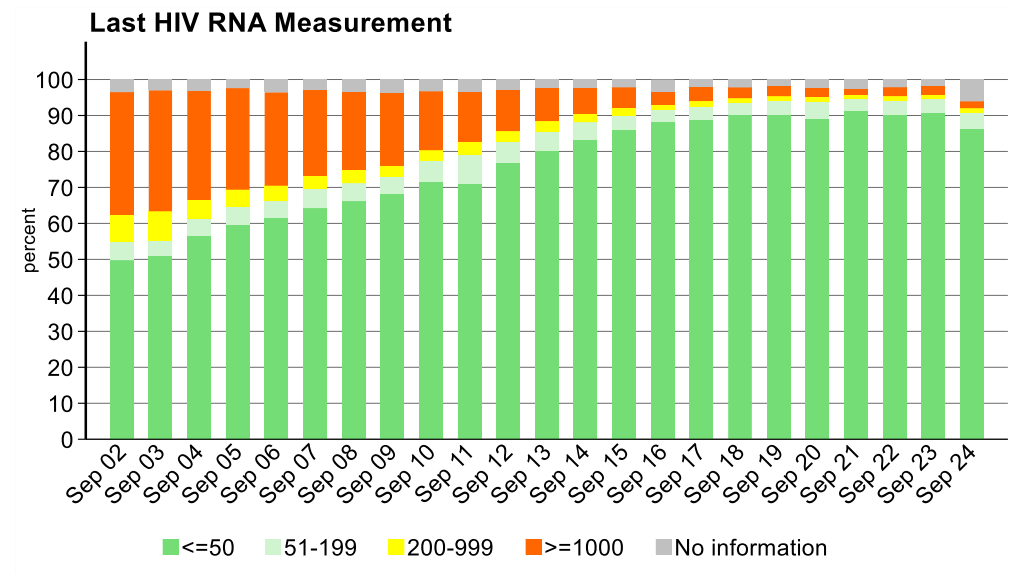
Patients were included until treatment interruption.



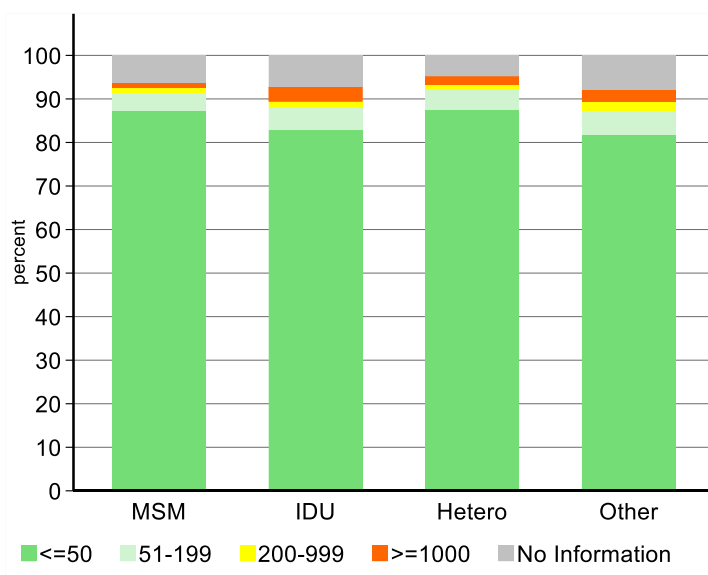
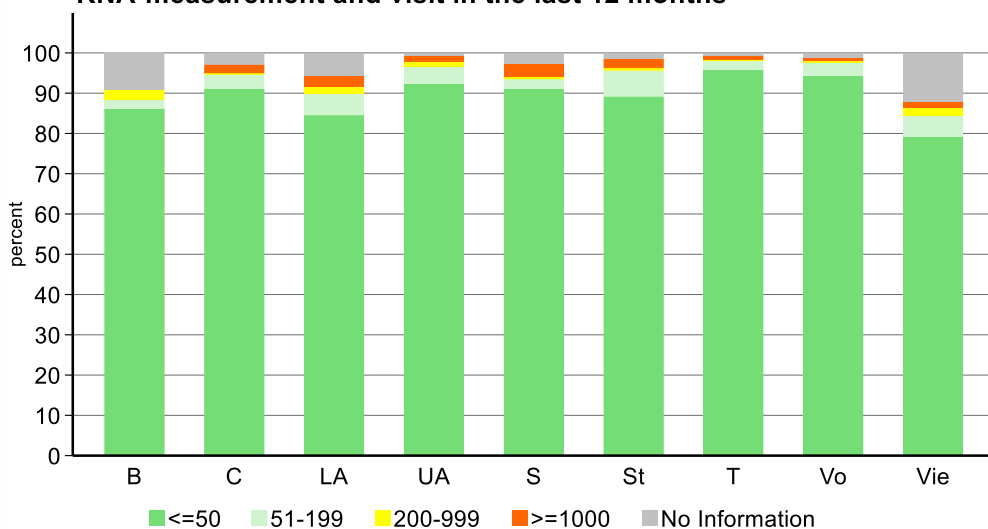
10.5 HIV RNA (viral load)

10.5.1 Last HIV RNA currently in care regardless of ART

91.8% of the patients currently in care (4750 of 5172) have a current HIV RNA below 400 copies/ml.



RNA-measurement and visit in the last 12 months



10.5.2 The continuum of care in Austria

Data from AHIVCOS were used to derive the four-stage continuum of HIV care and assessed for all patients and for men who have sex with men (MSM) for the years 2010 to 2022.

- a. People living with HIV (PLHIV) estimates were obtained using back-calculation models (ECDC tool 1.3.0) to estimate HIV incidence and the undiagnosed fraction.
- b. Proportion ever diagnosed.
- c. Proportion ever diagnosed who ever initiated ART
- d. Proportion of them who were virally suppressed (≤ 200 c/mL)
- e. Proportion suppressed of all PLHIV (e) for all patients in Austria

For high estimates patients lost to follow-up (LTFU, no contact 1.5 years before the end of the respective year) were excluded and for low estimates they were included. The preferred estimate was the mid-point between the high and low estimate.

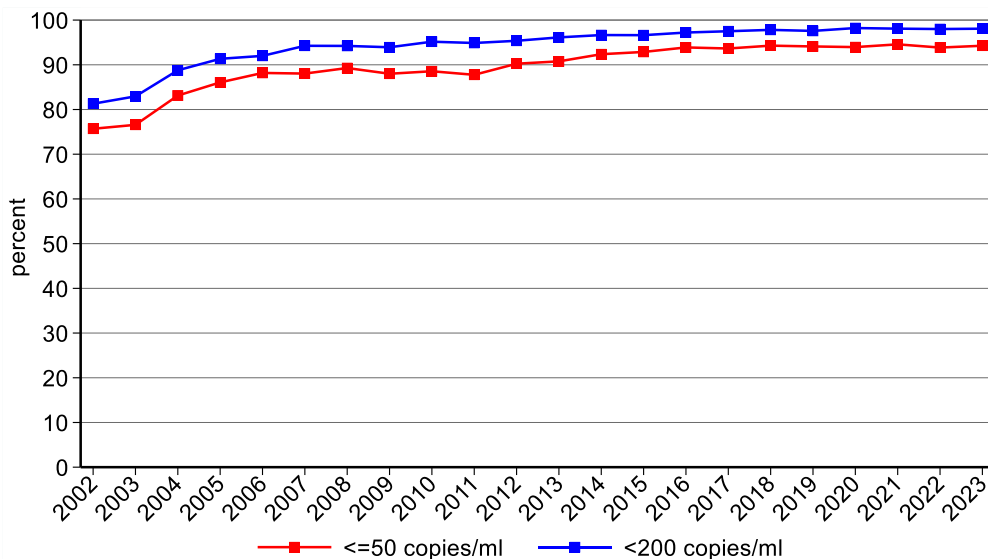
Missing HIV-RNA was considered as unsuppressed.

Year	(a) PLHIV	(b) Diagnosed [estimated range]	(c) On ART Mean [low, high estimate]	(d) Suppressed Mean [low, high estimate]	(e) Suppressed of all PLHIV
2010	6254	84% [80%,86%]	83% [76%,89%]	79% [71%,86%]	55%
2011	6432	86% [82%,88%]	85% [79%,91%]	80% [72%,88%]	59%
2012	6594	88% [84%,90%]	87% [81%,93%]	81% [73%,89%]	62%
2013	6734	89% [85%,91%]	89% [83%,94%]	83% [74%,91%]	66%
2014	6864	90% [86%,92%]	91% [85%,96%]	84% [75%,92%]	69%
2015	6975	91% [88%,94%]	92% [87%,97%]	84% [75%,93%]	70%
2016	7079	92% [89%,94%]	94% [89%,98%]	85% [77%,93%]	74%
2018	7480	94% [91%,96%]	95% [91%,99%]	85% [76%,94%]	76%
2019	7655	94% [91%,97%]	95% [91%,99%]	85% [74%,95%]	76%
2020	7652	96% [93%,99%]	96% [92%,99%]	89% [72%,95%]	82%
2021	7732	97% [94%,100%]	96% [92%,99%]	89% [69%,96%]	82%
2022	7596	96% [93%, 99%]	96% [93%, 99%]	89% [70%, 95%]	82%

We conclude that Austria has finally reached the 90-90-90 target of UNAIDS for 2020. The somewhat smaller estimate of viral suppression may be explained substantially by transfer of care in Vienna and out-migration. This and the decrease in HIV incidence support the hypothesis that the high estimate of being on ART and virally-suppressed is the more likely scenario. For more reliable nationwide estimates data from private physicians might be included.

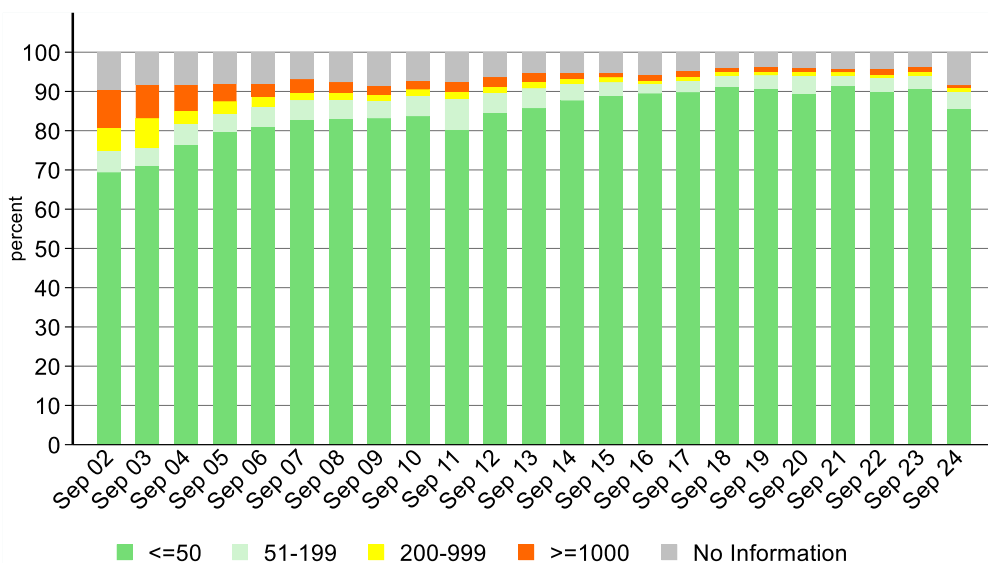
10.5.3 Last HIV RNA on ART

Patients were included if there were at least 75 days between ART initiation and HIV RNA measurement.



10.5.3.1 Last HIV RNA on ART at different points in time

Patients currently in care (12 months), currently on ART and measurement of viral load at least 2.5 months after ART initiation



10.5.4 Risk factors for viral replication

Risk factors for HIV RNA ≥ 200 copies/ml on ART

The analyses in this chapter include all patients with a visit in the last 12 months who have been on ART for at least 75 days before the measurement of the viral load.

	107	4978	2.15%	Univariable logistic regression			Multivariable logistic regression		
				OR	[95% CI]	p value	OR	[95% CI]	p value
Age									
< 30 years	5	146	3.42%	2.47	[0.96,6.36]	0.062	2.82	[0.99,8.08]	0.053
30-50 years	64	2151	2.98%	2.13	[1.42,3.20]	<0.001	2.63	[1.67,4.14]	<0.001
≥ 50	38	2681	1.42%	1.00		.	1.00		.
HIV transmission category									
Male IDU	10	403	2.48%	1.77	[0.86,3.64]	0.121	0.90	[0.42,1.90]	0.773
Female IDU	7	178	3.93%	2.85	[1.24,6.56]	0.014	1.33	[0.55,3.22]	0.524
Male heterosexual	22	933	2.36%	1.68	[0.97,2.92]	0.066	1.54	[0.86,2.77]	0.148
Female heterosexual	28	1006	2.78%	1.99	[1.19,3.34]	0.009	1.19	[0.67,2.13]	0.553
Other	9	271	3.32%	2.39	[1.12,5.07]	0.023	1.84	[0.83,4.07]	0.133
MSM	31	2187	1.42%	1.00		.	1.00		.
Nationality									
Missing/unknown	1	13	7.69%	4.21	[0.54,32.84]	0.170	2.33	[0.27,20.14]	0.441
High prevalence	20	420	4.76%	2.53	[1.52,4.20]	<0.001	1.61	[0.88,2.92]	0.119
Low prevalence	18	1041	1.73%	0.89	[0.53,1.50]	0.660	0.79	[0.45,1.38]	0.405
Austria	68	3504	1.94%	1.00		.	1.00		.
Population size of area of residence									
Rural areas	41	2313	1.77%	0.58	[0.39,0.87]	0.009			
Capital cities	11	839	1.31%	0.43	[0.22,0.82]	0.011			
Vienna	55	1826	3.01%	1.00		.			
AIDS									
Yes	19	766	2.48%	1.19	[0.72,1.97]	0.493			
No	88	4212	2.09%	1.00		.			
CD4 Nadir									
<50	27	771	3.50%	2.49	[1.53,4.07]	<0.001	2.24	[1.34,3.76]	0.002
50-199	38	1277	2.98%	2.11	[1.35,3.28]	0.001	1.88	[1.17,3.01]	0.009
≥ 200	42	2926	1.44%	1.00		.	1.00		.
ART initiation									
Before 1.1.1997	10	353	2.83%	1.36	[0.70,2.63]	0.360	0.87	[0.41,1.84]	0.710
After 1.1.1997	97	4625	2.10%	1.00		.	1.00		.
Ever ART interruptions									
None	53	3822	1.39%	0.20	[0.13,0.32]	<0.001	0.18	[0.10,0.30]	<0.001
1	21	646	3.25%	0.49	[0.28,0.85]	0.011	0.51	[0.29,0.92]	0.024
≥ 2	33	510	6.47%	1.00		.	1.00		.
Art duration									
< 9 months	6	80	7.50%	4.01	[1.70,9.45]	0.001	5.43	[2.17,13.61]	<0.001
9-18 months	7	150	4.67%	2.42	[1.10,5.32]	0.027	3.93	[1.69,9.15]	0.001
> 18 months	94	4748	1.98%	1.00		.	1.00		.

11 Development of resistance to ART (data: 03/2024)

11.1 Abstract

Prevalence of Development of Drug Resistance in HIV infected patients in Austria

Objective: To determine the prevalence of development of drug resistance, predictors and temporal trends in resistance.

Method: Patients currently in care in one of nine centres who have ever been on antiretroviral therapy (ART) were analyzed. Mutations were judged as resistant according to “2022 Update of the Drug Resistance Mutations in HIV-1” from the International Antiviral-Society-USA (<https://www.iasusa.wpenginpowered.com/wp-content/uploads/2022/10/30-4-559.pdf>).

Results: Overall 4744 patients have ever received ART, 1248 had a resistance test after ART (26.3%). The overall prevalence of development of drug resistance was 63.3% (790 of 1248 patients), the prevalence of NRTI resistance was 30.1%, the prevalence of NNRTI resistance was 24.8%, and the prevalence of PI resistance was 53.1%. The prevalence of 3-class-resistance was 13.1% (163 of 1248 patients). The risk factors for developing a 3-class-resistance were a CD4 nadir <50 (OR=3.6; 95% CI: 2.3-5.6), a CD4 nadir between 50 and 200 (OR=1.9; 95% CI: 1.3-2.9) and initial therapy before 1997 (OR=33.1; 95% CI: 20.9-52.5) as well as from 1997 to 2003 (OR=8.2; 95% CI: 5.1-13.4), a CD4 nadir between 50 and 200 (OR=2.1; 95% CI: 1.3-3.3) and an age at ART-start <30 (OR=2.3; 95% CI: 1.01-5.4). The risk to develop a 3-class-resistance was lower in patients with a low viral load (for <50 copies/ml OR=0.2; 95% CI: 0.1-0.4).

Conclusions: The overall prevalence of development of drug resistance is at a rather high level, while the prevalence of 3-class-resistance was found to be stabilizing at a low level. The risk for developing resistance is small in those who initiated therapy in recent years.

11.2 Definition of resistance under ART

The rate of resistance development during antiretroviral therapy („percent with resistance“) corresponds to the number of patients with resistance mutations in relation to the number of patients on ART (see also chapter 5).

“Cumulative resistance” includes any mutation ever found in a particular patient.

The resistance mutations have been classified according to the “2022 Update of the Drug Resistance Mutations in HIV-1” from the International AIDS-Society-USA (<https://www.iasusa.wpenginepowered.com/wp-content/uploads/2022/10/30-4-559.pdf>).

The following codons and amino acids have been classified as resistance (IAS):

Reverse transcriptase				Protease	
NRTI		NNRTI			
M41	L	V90	I	L10	F, R, I, V
A62	V	A98	G	V11	I
K65	R, E, N	L100	I	K20	R, M, T
D67	N	K101	H, E, P	L24	I
T69	ins	K103	N, S	D30	N
K70	R, E	V106	A, M, I, T	V32	I
L74	V	V108	I	L33	F
V75	I	E138	A, G, K, Q, R	M36	I, L, V
F77	L	V179	D, F, T, L	K43	T
Y115	F	Y181	C, I, V	M46	I, L
F116	Y	Y188	L, H, C	I47	V, A
Q151	M	G190	A, S, E	G48	V
M184	V, I	H221	Y	I50	V, L
L210	W	P225	H	F53	L, Y
T215	Y, F	F227	C, L, R, I, V	I54	V, M, L, T, S, A
K219	Q, E	M230	I, L	Q58	E
		L234	I	I62	V
		Y318	F	H69	K, R
				A71	V, T
				G73	S, T, C, A
				T74	P
				L76	V
				V77	I
				V82	A, T, F, S, I, L, M
				N83	D
				I84	V
				I85	V
				N88	D, S
				L89	V, I, M
				L90	M

11.3 Frequency of resistance

11.3.1 Frequency of NRTI-associated resistance mutations

11.3.1.1 Overview

The table shows the numbers of patients with NRTI-associated resistance mutations among all patients who have ever been treated with Nucleoside Reverse Transcriptase Inhibitors („NRTI“).

All centers	Deceased since 1997, NRTI use N = 1574	Patients currently in care and NRTI use ever N = 4737
Resistance to NRTI	255 (16.2%)	376 (7.9%)
Codon 41	93 (5.9%)	136 (2.9%)
Codon 62	10 (0.6%)	25 (0.5%)
Codon 65	11 (0.7%)	25 (0.5%)
Codon 67	81 (5.1%)	118 (2.5%)
Codon 69	3 (0.2%)	3 (0.1%)
Codon 70	61 (3.9%)	101 (2.1%)
Codon 74	36 (2.3%)	29 (0.6%)
Codon 75	5 (0.3%)	7 (0.1%)
Codon 77	3 (0.2%)	6 (0.1%)
Codon 115	7 (0.4%)	13 (0.3%)
Codon 116	2 (0.1%)	4 (0.1%)
Codon 151	2 (0.1%)	6 (0.1%)
Codon 184	199 (12.6%)	261 (5.5%)
Codon 210	62 (3.9%)	62 (1.3%)
Codon 215	105 (6.7%)	142 (3.0%)
Codon 219	51 (3.2%)	64 (1.4%)

11.3.1.2 Risk factors for the resistance mutation K65R of the RT

Recruitment for this analysis has been in agreement to entry criteria of COHERE. Additionally, patients who died before 1.1.2000 have been excluded.

All centres						Model 1 (N = 9105)		
	Frequencies N=		Univariable regression			Multivariable regression*		
Variable	48 /	9105	(0.5%)	OR (95% CI)		p-value	OR (95% CI)	p-value
Demographic characteristics								
Age at ART start								
<30 years	12 /	2420	(0.5%)	2.1	0.6 – 7.6	0.238		
30-50 years	33 /	5391	(0.6%)	2.7	0.8 – 8.7	0.106		
>50 years	3 /	1294	(0.2%)	1				
Sex/ mode of transmission								
Male IDU	7 /	1058	(0.7%)	2.4	0.9 – 6.1	0.077	1.4	0.5 – 3.6
Female IDU	6 /	447	(1.3%)	4.8	1.8 – 13.1	0.002	2.6	0.9 – 7.4
Male heterosexual	10 /	1594	(0.6%)	2.2	0.9 – 5.3	0.066	1.8	0.7 – 4.3
Female heterosexual	14 /	1559	(0.9%)	3.2	1.5 – 7.1	0.004	2.7	1.2 – 6.0
Other	0 /	543	(0.0%)	-	-	-	-	-
MSM	11 /	3904	(0.3%)	1			1	
Population size of area of residence								
Missing value	0 /	86	(0.0%)	-	-	-		
Rural areas	16 /	3614	(0.4%)	0.7	0.4 – 1.3	0.215		
Capital cities	5 /	1277	(0.4%)	0.6	0.2 – 1.6	0.290		
Vienna	27 /	4128	(0.7%)	1				
Stage of disease								
AIDS								
Yes	27 /	2512	(1.1%)	3.4	1.9 – 6.0	<0.001		
No	21 /	6593	(0.3%)	1				
CD4 nadir								
Missing value	0 /	93	(0.0%)	-	-	-	-	-
<50 cells/µl	23 /	1610	(1.4%)	8.9	4.0 – 19.8	<0.001	7.0	3.1 – 16.1
50-199 cells/µl	17 /	2508	(0.7%)	4.2	1.8 – 9.7	0.001	3.2	1.4 – 7.7
≥200 cells/µl	8 /	4894	(0.2%)	1			1	0.008
ART								
Abacavir use ever								
Yes	21 /	3374	(0.6%)	1.3	0.7 – 2.3	0.337		
No	27 /	5731	(0.5%)	1				
Tenofovir use ever								
Yes	45 /	6039	(0.7%)	7.7	2.4 – 24.7	0.001	6.3	1.9 – 20.3
No	3 /	3066	(0.1%)	1			1	0.002
ART initiation								
Before 1.1.1997	9 /	820	(1.1%)	2.3	1.1 – 4.9	0.022		
After 1.1.1997	39 /	8285	(0.5%)	1				

* adjusted for the variables: age, population size of area of residence, Abacavir use ever, ART initiation

11.3.2 Frequency of NNRTI-associated resistance mutations

The table shows the numbers of NNRTI-associated resistance mutations among patients who have ever been treated with Non-Nucleoside Reverse Transcriptase Inhibitors („NNRTI“).

All centers	Deceased since 1997, NNRTI use	Patients currently in care and NNRTI use ever
	N = 920	N = 2423
Resistance to NNRTI	193 (21.0%)	257 (10.6%)
Codon 90	9 (1.0%)	20 (0.8%)
Codon 98	16 (1.7%)	12 (0.5%)
Codon 100	5 (0.5%)	8 (0.3%)
Codon 101	30 (3.3%)	28 (1.2%)
Codon 103	100 (10.9%)	127 (5.2%)
Codon 106	19 (2.1%)	23 (0.9%)
Codon 108	29 (3.2%)	24 (1.0%)
Codon 138	10 (1.1%)	33 (1.4%)
Codon 179	8 (0.9%)	16 (0.7%)
Codon 181	74 (8.0%)	75 (3.1%)
Codon 188	10 (1.1%)	14 (0.6%)
Codon 190	46 (5.0%)	43 (1.8%)
Codon 221	14 (1.5%)	14 (0.6%)
Codon 225	7 (0.8%)	6 (0.2%)
Codon 227	6 (0.7%)	4 (0.2%)
Codon 230	4 (0.4%)	5 (0.2%)
Codon 234	0 (0.0%)	0 (0.0%)
Codon 318	4 (0.4%)	0 (0.0%)

11.3.3 Frequency of PI-associated resistance mutations

The table shows the numbers of the PI-associated resistance mutations among patients who have ever been treated with Protease Inhibitors („PI“).

Minor mutations:

All centers	Deceased since 1997, PI use	Patients currently in care and PI use ever
	N = 1217	N = 2167
Any minor resistance to PI	377 (31.0%)	568 (26.2%)
Codon 10	120 (9.9%)	177 (8.2%)
Codon 11	7 (0.6%)	5 (0.2%)
Codon 20	67 (5.5%)	71 (3.3%)
Codon 24	7 (0.6%)	11 (0.5%)
Codon 33	19 (1.6%)	30 (1.4%)
Codon 36	182 (15.0%)	280 (12.9%)
Codon 43	3 (0.2%)	6 (0.3%)
Codon 53	10 (0.8%)	11 (0.5%)
Codon 62	49 (4.0%)	82 (3.8%)
Codon 69	31 (2.5%)	102 (4.7%)
Codon 71	152 (12.5%)	157 (7.2%)
Codon 73	21 (1.7%)	14 (0.6%)
Codon 77	137 (11.3%)	202 (9.3%)
Codon 85	1 (0.1%)	2 (0.1%)
Codon 89	32 (2.6%)	103 (4.8%)

Major mutations:	All centers	Deceased since 1997, PI use	Patients currently in care and PI use ever
		N = 1217	N = 2167
	Any major resistance to PI	125 (10.3%)	165 (7.6%)
	Codon 30	12 (1.0%)	31 (1.4%)
	Codon 32	12 (1.0%)	5 (0.2%)
	Codon 46	60 (4.9%)	66 (3.0%)
	Codon 47	8 (0.7%)	6 (0.3%)
	Codon 48	4 (0.3%)	7 (0.3%)
	Codon 50	1 (0.1%)	5 (0.2%)
	Codon 54	38 (3.1%)	42 (1.9%)
	Codon 58	7 (0.6%)	10 (0.5%)
	Codon 74	0 (0.0%)	1 (0.0%)
	Codon 76	1 (0.1%)	0 (0.0%)
	Codon 82	47 (3.9%)	65 (3.0%)
	Codon 83	1 (0.1%)	1 (0.0%)
	Codon 84	20 (1.6%)	17 (0.8%)
	Codon 88	15 (1.2%)	22 (1.0%)
	Codon 90	63 (5.2%)	60 (2.8%)

11.3.4 Resistance to single or multiple drug classes

All centres	Deceased since 1997, ever ART	Patients currently in care and ever ART
	N = 1583	N = 4744
Resistance test available	683 (43.1%)	1248 (26.3%)
Wild type	194 (12.3%)	458 (9.7%)
"Any" resistance	489 (30.9%)	790 (16.7%)
NRTI	256 (16.2%)	376 (7.9%)
NNRTI	223 (14.1%)	310 (6.5%)
PI	411 (26.0%)	663 (14.0%)
NRTI and PI	199 (12.6%)	284 (6.0%)
NRTI and NNRTI	154 (9.7%)	202 (4.3%)
NNRTI and PI	179 (11.3%)	236 (5.0%)
3-class-resistance	131 (8.3%)	163 (3.4%)

11.3.5 Resistance according to demographic characteristics

All patients	Number of patients	Resistance test available	Wild type	Resistance to					3-class-resistance
				Any resistance	NRTI	NNRTI	PI	NRTI and PI	
Year of ART initiation									
Up to 1995	212	168	8	160	134	77	128	102	70
1996	134	94	21	73	57	33	60	45	31
1997	96	62	16	46	25	17	38	18	14
1998	97	48	6	42	15	11	35	9	6
1999	85	47	13	34	16	17	26	10	9
2000	99	57	10	47	21	17	44	19	11
2001	72	29	7	22	9	6	19	6	5
2002	94	46	17	29	14	11	27	13	8
2003	99	47	18	29	3	9	26	3	2
2004	123	41	19	22	7	9	21	7	3
2005	123	45	11	34	9	9	33	9	8
2006	141	36	19	17	4	6	16	4	4
2007	152	44	17	27	7	9	25	6	5
2008	157	40	25	15	7	5	12	4	3
2009	216	56	32	24	9	11	20	7	6
2010	217	47	25	22	5	7	17	3	3
2011	224	47	26	21	7	9	16	4	6
2012	231	44	23	21	7	10	19	5	4
2013	225	40	20	20	3	3	15	-	8
2014	219	31	13	18	4	7	14	2	1
2015	222	32	16	16	4	7	11	2	5
2016	216	23	11	12	3	5	10	2	3
2017	221	21	11	10	2	8	8	2	4
2018	164	18	14	4	1	2	3	1	6
2019	175	23	9	9	-	2	7	-	1
2020	145	18	14	4	1	2	2	-	-
2021	169	13	10	3	-	-	3	-	-
2022	212	17	12	5	-	1	5	-	1
2023	204	14	10	4	2	-	3	1	-
Federal state									
Burgenland	79	23	9	14	6	4	13	5	3
Carinthia	246	34	14	20	8	5	15	4	4
Lower Austria	467	116	32	84	43	37	70	31	2
Upper Austria	661	192	72	120	78	53	96	60	33
Salzburg	284	73	18	55	23	26	45	17	33
Styria	462	111	50	61	19	22	55	17	19
Tyrol	578	181	51	130	69	44	103	46	16
Vorarlberg	237	61	16	45	16	12	40	11	34
Vienna	1669	445	191	254	113	104	221	93	7
Foreign countries	61	12	5	7	1	3	5	-	65
Missing value	-	-	-	-	-	-	-	-	1
Total	4744	1248	458	790	376	310	663	284	202
									236
									163

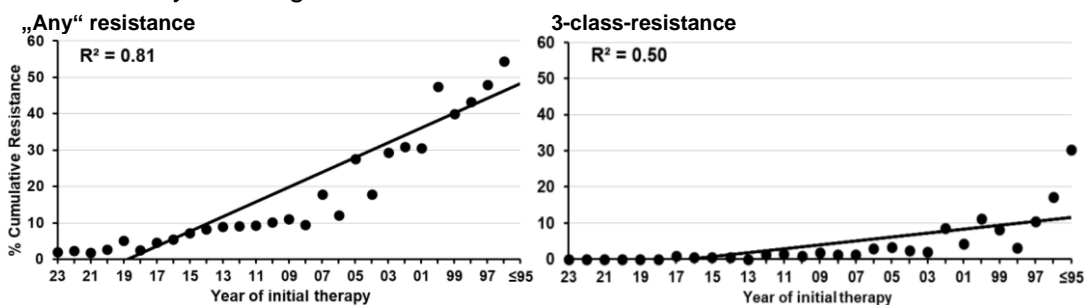
Patients who initiated ART after 2000		Number of patients	Resistance test	Wild type	Resistance to					3-class- resistance	
					Any resistance	NRTI	NNRTI	PI	NRTI and NNRTI		
Year of ART initiation											
2001	72	29	7	22	9	6	19	6	5	4	3
2002	94	46	17	29	14	11	27	13	8	10	8
2003	99	47	18	29	3	9	26	3	2	6	2
2004	123	41	19	22	7	9	21	7	3	8	3
2005	123	45	11	34	9	9	33	9	4	8	4
2006	141	36	19	17	4	6	16	4	4	5	4
2007	152	44	17	27	7	9	25	6	3	7	2
2008	157	40	25	15	7	5	12	4	3	4	2
2009	216	56	32	24	9	11	20	7	6	7	4
2010	217	47	25	22	5	7	17	3	3	3	2
2011	224	47	26	21	7	9	16	4	6	4	3
2012	231	44	23	21	7	10	19	5	5	8	3
2013	225	40	20	20	3	3	15	-	1	-	-
2014	219	31	13	18	4	7	14	2	1	5	1
2015	222	32	16	16	4	7	11	2	2	3	1
2016	216	23	11	12	3	5	10	2	1	4	1
2017	221	21	11	10	2	8	8	2	2	6	2
2018	164	18	14	4	1	2	3	1	-	1	-
2019	175	23	14	9	-	2	7	-	-	-	-
2020	145	18	14	4	1	2	2	-	1	-	-
2021	169	13	10	3	-	-	3	-	-	-	-
2022	212	17	12	5	-	1	5	-	-	1	-
2023	204	14	10	4	2	-	3	1	-	-	-
Population size of area of residence											
Missing value	3	2	1	1	-	1	1	-	-	1	-
Rural areas	1916	336	163	173	51	65	152	40	30	50	25
Capital cities	667	139	53	86	21	27	71	15	10	13	5
Vienna	1435	295	167	128	36	45	108	26	20	30	15
Sex/ mode of transmission											
MSM	1857	247	135	112	21	43	93	15	11	27	8
Male IDU	301	109	52	57	16	18	51	13	7	13	5
Female IDU	107	44	23	21	4	4	21	4	1	4	1
Male heterosexual	775	150	72	78	28	29	67	23	18	19	14
Female heterosexual	784	197	92	105	36	41	86	24	21	28	15
Others	197	25	10	15	3	3	14	2	2	3	2
Age at time of HIV-test											
< 35 years	1995	490	234	256	69	94	222	52	40	67	30
≥ 35 years	2026	282	150	132	39	44	110	29	20	27	15
Total	4021	772	384	388	108	138	332	81	60	94	45

11.3.6 Cumulative resistance related to different time periods of ART initiation

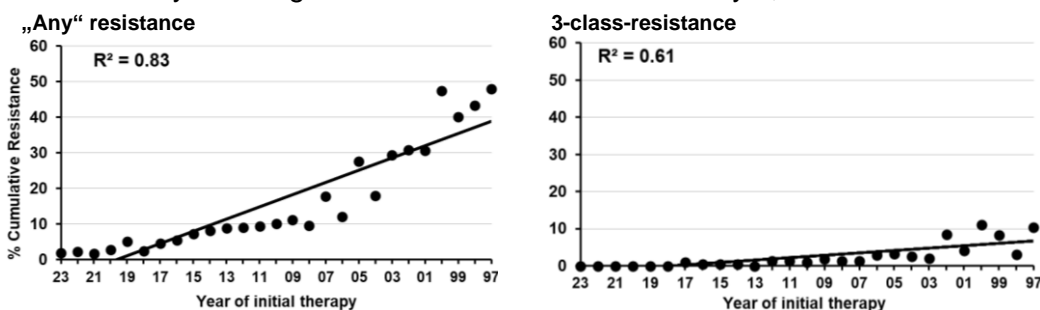
	Initial therapy before 1.1.1997		Initial therapy between 1.1.1997 and 31.12.2002		Initial therapy after 1.1.2003	
	N	%	N	%	N	%
Ever HIV RNA \geq 200 copies/ml	331	95.7%	404	74.4%	1147	29.8%
At least 5 HIV RNA \geq 200 copies/ml	278	80.3%	227	41.8%	296	7.7%
No resistance test after ART	84	24.3%	254	46.8%	3152	81.9%
Resistance test after ART	262	75.7%	289	53.2%	695	18.1%
Total	346	100%	543	100%	3847	100%
Number of NRTI-associated resistance mutations						
0 mutations	71	20.5%	189	34.8%	610	15.9%
1 mutation	35	10.1%	51	9.4%	57	1.5%
2 mutations	26	7.5%	20	3.7%	16	0.4%
3 mutations	30	8.7%	12	2.2%	8	0.2%
4 mutations	45	13.0%	10	1.8%	2	0.1%
5 mutations	29	8.4%	7	1.3%	1	0.0%
6 mutations	18	5.2%			1	0.0%
7 mutations	6	1.7%				
8 mutations	2	0.6%				
Number of NNRTI-associated resistance mutations						
0 mutations	152	43.9%	210	38.7%	574	14.9%
1 mutation	51	14.7%	40	7.4%	73	1.9%
2 mutations	38	11.0%	32	5.9%	32	0.8%
3 mutations	12	3.5%	7	1.3%	9	0.2%
4 mutations	6	1.7%			4	0.1%
5 mutations	2	0.6%			3	0.1%
6 mutations	1	0.3%				
Number of PI-associated resistance mutations						
0 mutations	74	21.4%	100	18.4%	409	10.6%
1 mutation	57	16.5%	79	14.5%	91	2.4%
2 mutations	46	13.3%	45	8.3%	65	1.7%
3 mutations	17	4.9%	36	6.6%	62	1.6%
4 mutations	17	4.9%	12	2.2%	45	1.2%
5 mutations	16	4.6%	10	1.8%	18	0.5%
6 mutations	11	3.2%	2	0.4%	1	0.0%
7 mutations	5	1.4%	3	0.6%	2	0.1%
8 mutations	4	1.2%	2	0.4%	0	0.0%
9 mutations	3	0.9%			2	0.1%
10 mutations	2	0.6%				
11 mutations	2	0.6%				
12 mutations	3	0.9%				
13 mutations	5	1.4%				

11.3.7 Probability of development of resistance

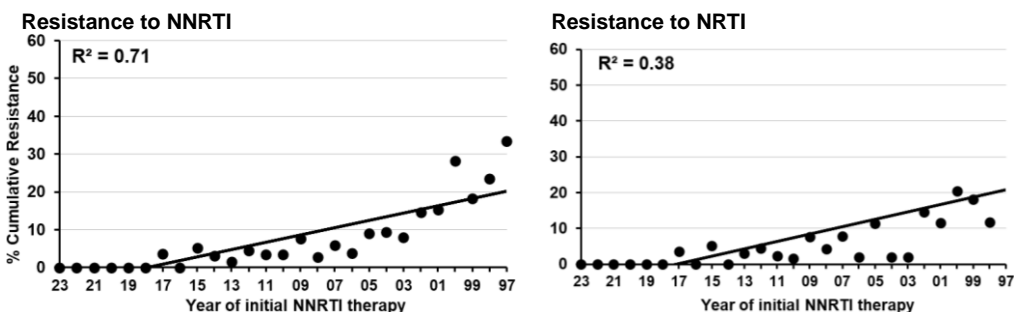
11.3.7.1 Any ART regimen



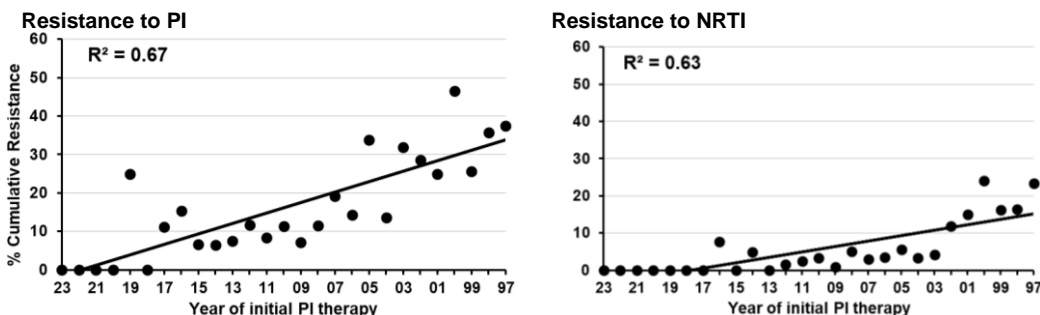
11.3.7.2 Any ART regimen and initial ART after January 1, 1997



11.3.7.3 Initial ART with 2 NRTI + 1 NNRTI

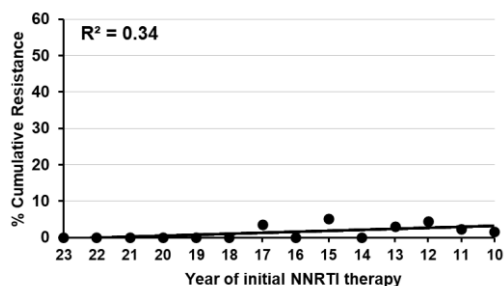


11.3.7.4 Initial ART with 2 NRTI + 1 PI

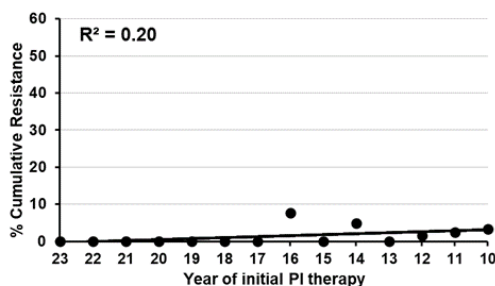


11.3.7.5 Development of resistance to NRTI, ART after Jan. 2010

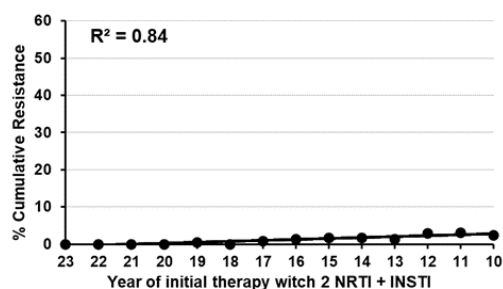
A) ART with 2 NRTI + 1 NNRTI



B) ART with 2 NRTI + 1 PI



C) ART mit 2 NRTI + 1 INSTI



11.3.8 Risk factors for the development of resistance

11.3.8.1 Patients with 3-class-resistance

All centres	All deaths after 1996	AIDS related deaths after 1996	AIDS related deaths after 1996 and ART > 6 months	Patients currently in care and ART use ever
	N = 1949	N = 518	N = 446	N = 4744
3-class-resistance	131 (6.7%)	37 (7.1%)	37 (8.3%)	163 (3.4%)

3-class-resistance	Patients currently in care and ART use ever N = 163	
Age (years; mean \pm S. D.)	57.8	\pm 11.0
Federal states		
Carinthia	0	(0.0%)
Upper Austria	33	(20.2%)
Salzburg	10	(6.1%)
Styria	11	(6.7%)
Tyrol	22	(13.5%)
Vienna	56	(34.4%)
Other federal states	31	(19.0%)
Foreign countries	0	(0.0%)
Sex/ Mode of transmission		
MSM	52	(31.9%)
Male IDU	10	(6.1%)
Female IDU	10	(6.1%)
Male heterosexual	37	(22.7%)
Female heterosexual	40	(24.5%)
Others	14	(8.6%)
AIDS	79	(48.5%)
CD4 nadir (cells/μl; mean \pm S. D.)	123	\pm 126.6
Current CD4 cell counts (cells/μl; mean \pm S. D.)	678.6	\pm 352.9
Last HIV-RNA		
≤ 50 copies/ml	141	\pm (86.5%)
51-199 copies/ml	13	(7.4%)
≥ 200 copies/ml	20	(6.1%)
Duration of ART (months; mean \pm S. D.)	303.7	\pm 75.4

Risk factors for the development of 3-class-resistance

All centres			Model 1 (N = 4744)			
Variable	Frequencies N=		Univariable regression		Multivariable regression*	
	163 /	4744	OR (95% CI)	p-value	OR (95% CI)	p-value
Demographic characteristics						
<i>Age at ART start</i>						
<30 years	61 /	1183	5.2	2.4 -11.4	2.3	1.0 -5.4
30-50 years	95 /	2885	3.3	1.5 -7.0	1.8	0.8 -4.0
>50 years	7 /	676	1		1	0.165
<i>Sex/mode of transmission</i>						
Male IDU	10 /	376	1.1	0.5 -2.1		
Female IDU	10 /	167	2.5	1.3 -5.0		
Male heterosexual	37 /	894	1.7	1.1 -2.6		
Female heterosexual	40 /	953	1.7	1.1 -2.6		
Other	14 /	253	2.3	1.3 -4.2		
MSM	52 /	2101	1			
<i>Population size of area of residence</i>						
Missing value	0 /	3	-	-		
Rural areas	71 /	2254	0.9	0.7 -1.3		
Capital cities	36 /	815	1.3	0.9 -2.0		
Vienna	56 /	1672	1			
Stage of disease						
<i>AIDS</i>						
Yes	79 /	1095	3.3	2.4 -4.5		
No	84 /	3649	1			
<i>CD4 nadir</i>						
Missing value	0 /	9	-	-		
<50 cells/µl	61 /	728	7.0	4.6 -10.6	4.0	2.5 -6.3
50-199 cells/µl	66 /	1230	4.3	2.9 -6.5	2.1	1.3 -3.3
≥200 cells/µl	36 /	2777	1		1	<0.001
<i>Current HIV RNA</i>						
Missing value	0 /	22	-	-		
≤50 copies/ml	141 /	4424	0.3	0.2 -0.6	0.2	0.1 -0.4
51-199 copies/ml	12 /	188	0.7	0.3 -1.6	0.6	0.2 -1.7
≥200 copies/ml	10 /	110	1		1	0.356
ART						
<i>ART initiation</i>						
Before 1.1.1997	87 /	346	37.8	24.9 -57.2	33.1	20.9 -52.5
1.1.1997 to 31.12.2002	42 /	543	9.4	5.9 -14.9	8.2	5.1 -13.4
Since 1.1.2003	34 /	3855	1		1	<0.001

*adjusted for the variables: sex/ mode of transmission, population size of area of residence

11.3.8.2 Patients with any resistance (ART start since 1.1.1997)

All centres	All deaths after 1996	AIDS related deaths after 1996	AIDS related deaths after 1996 and ART > 6 months	Patients currently in care and ART use ever after 1996
	N = 1591	N = 425	N = 354	N = 4398
Any resistance	307 (19.3%)	80 (18.8%)	80 (22.6%)	557 (12.7%)

Any resistance	Patients currently in care and ART use ever after 1996 N = 557	
Age (years; mean \pm S. D.)	34.5 \pm 9.7	
Federal states		
Carinthia	16	(2.9%)
Upper Austria	82	(14.7%)
Salzburg	48	(8.6%)
Styria	51	(9.2%)
Tyrol	72	(12.9%)
Vienna	186	(33.4%)
Other federal states	96	(17.2%)
Foreign countries/ missing	6	(1.1%)
Sex/ Mode of transmission		
MSM	168	(30.2%)
Male IDU	75	(13.5%)
Female IDU		
Male heterosexual	112	(20.1%)
Female heterosexual	149	(26.8%)
Others	23	(4.1%)
AIDS	208	(37.3%)
CD4 nadir (cells/μl; mean \pm S. D.)	115.8 \pm	154.7
Current CD4 cell counts (cells/μl; mean \pm S. D.)	667.5 \pm	332.3
Last HIV-RNA		
≤ 50 copies/ml	505	(90.7%)
51-199 copies/ml	24	(4.3%)
≥ 200 copies/ml	28	(5.0%)
Duration of ART (months; mean \pm S. D.)	215.3 \pm	80.6

Risk factors for the development of any resistance

All centres		Frequencies N=		Univariable regression		Model 1 (N = 4398)	
Variable		557 / 4398	(12.7%)	OR (95% CI)	p-value	OR (95% CI)	p-value
Demographic characteristics							
<i>Age at ART start</i>							
<30 years	191 / 1053	(18.1%)		3.5	2.5 -5.1	3.2	2.2 -4.7
30-50 years	327 / 2683	(12.2%)		2.2	1.6 -3.1	1.8	1.2 -2.6
>50 years	39 / 662	(5.9%)		1		1	
<i>Sex/ mode of transmission</i>							
Male IDU	75 / 333	(22.5%)		3.1	2.3 -4.2	2.5	1.8 -3.5
Female IDU	30 / 133	(22.6%)		3.1	2.0 -4.9	1.8	1.1 -2.9
Male heterosexual	112 / 849	(13.2%)		1.6	1.3 -2.1	1.4	1.1 -1.8
Female heterosexual	149 / 881	(16.9%)		2.2	1.7 -2.8	1.7	1.3 -2.1
Other	23 / 221	(10.4%)		1.3	0.8 -2.0	0.8	0.5 -1.4
MSM	168 / 1981	(8.5%)		1		1	
<i>Population size of area of residence</i>							
Missing value	1 / 3	(33.3%)		-	-	-	-
Rural areas	250 / 2094	(11.9%)		1.0	0.8 -1.2	1.1	0.9 -1.4
Capital cities	120 / 740	(16.2%)		1.4	1.1 -1.8	1.6	1.2 -2.1
Vienna	186 / 1561	(11.9%)		1		1	
Stage of disease							
<i>AIDS</i>							
Yes	208 / 943	(22.1%)		2.5	2.1 -3.0		
No	349 / 3455	(10.1%)		1			
<i>CD4 nadir</i>							
Missing value	0 / 9	(0.0%)		-	-	-	-
<50 cells/μl	144 / 643	(22.4%)		3.2	2.6 -4.1	2.9	2.3 -3.8
50-199 cells/μl	194 / 1073	(18.1%)		2.5	2.0 -3.0	1.8	1.5 -2.3
≥200 cells/μl	219 / 2673	(8.2%)		1		1	
<i>Current HIV RNA</i>							
Missing value	0 / 22	(0.0%)		-	-	-	-
≤50 copies/ml	505 / 4093	(12.3%)		0.4	0.3 -0.6	0.4	0.2 -0.6
51-199 copies/ml	24 / 177	(13.6%)		0.4	0.2 -0.8	0.6	0.3 -1.1
≥200 copies/ml	28 / 106	(26.4%)		1		1	
ART							
<i>ART initiation</i>							
1.1.1997 to 31.12.2002	220 / 543	(40.5%)		7.1	5.8 -8.7	6.0	4.8 -7.5
Since 1.1.2003	337 / 3855	(8.7%)		1		1	

*adjusted for the variables: age

12 Co-morbidities and Co-medication

12.1 Co-morbidities related to age

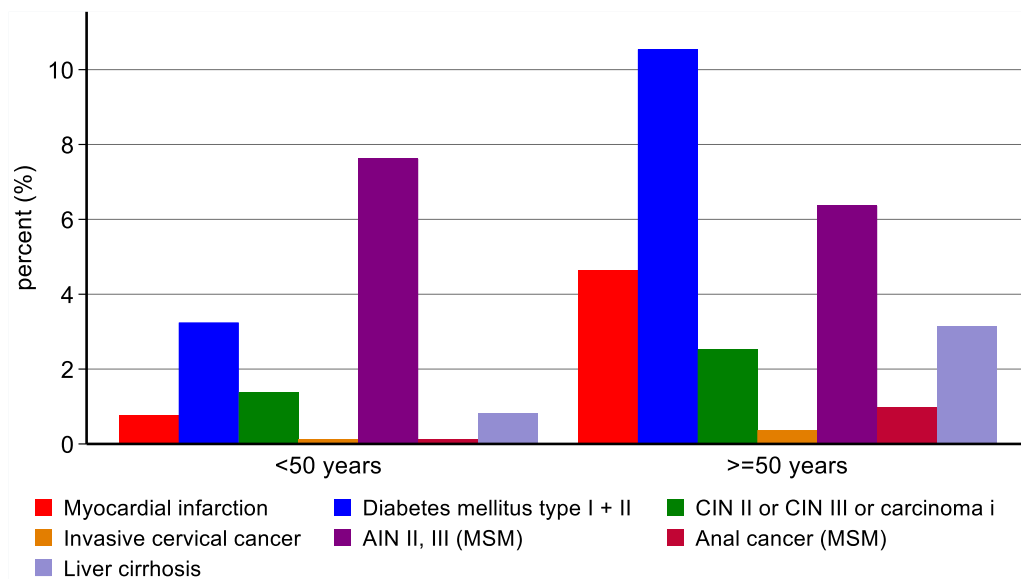
One aim of the Austrian HIV Cohort Study is to document co-morbidities and adverse drug reactions, as well as to investigate possible associations with ART. As a first step, important co-morbidities are illustrated.

Cumulative incidence in patients with a follow-up in the last 12 months (co-morbidities ever documented)

< 50 years										
	Male IDU		Female IDU		Male hetero		Female hetero		MSM	
Number of patients	223	%	87	%	320	%	521	%	1147	%
Hypertension	18	8.1	5	5.7	41	12.8	50	9.6	90	7.8
Coronary heart disease	4	1.8	1	1.1					6	0.5
Myocardial infarction	1	0.4	1	1.1	2	0.6			13	1.1
Stroke	4	1.8	1	1.1	3	0.9	4	0.8	5	0.4
Diabetes mellitus type I + II	8	3.6	3	3.4	20	6.3	19	3.6	23	2.0
CIN II or CIN III or carcinoma in situ			5	5.7			29	5.6		
Invasive cervical cancer							3	0.6		
St. p. hysterectomy			1	1.1			5	1.0		
Anal intraepithelial neoplasia II, III	4	1.8	1	1.1	9	2.8	3	0.6	188	16.4
Anal cancer					1	0.3			3	0.3
Osteoporosis	1	0.4			4	1.3	9	1.7	14	1.2
Liver cirrhosis	9	4.0	2	2.3	1	0.3	4	0.8	2	0.2
Attempted suicide or suicide	7	3.1	3	3.4	1	0.3	1	0.2	11	1.0
Drug overdose (mainly opiates)	9	4.0	3	3.4			1	0.2	5	0.4
Chronic kidney disease	3	1.3	4	4.6	6	1.9	10	1.9	16	1.4

≥ 50 years										
	Male IDU		Female IDU		Male hetero		Female hetero		MSM	
Number of patients	199	%	104	%	640	%	516	%	1110	%
Hypertension	57	28.6	18	17.3	218	34.1	144	27.9	334	30.1
Coronary heart disease	25	12.6	14	13.5	81	12.7	31	6.0	125	11.3
Myocardial infarction	11	5.5	6	5.8	27	4.2	10	1.9	64	5.8
Stroke	16	8.0	7	6.7	20	3.1	10	1.9	30	2.7
Diabetes mellitus type I + II	16	8.0	7	6.7	93	14.5	53	10.3	98	8.8
CIN II or CIN III or carcinoma in situ			14	13.5			53	10.3		
Invasive cervical cancer			4	3.8			5	1.0		
St. p. hysterectomy			12	11.5			32	6.2		
Anal intraepithelial neoplasia II, III	5	2.5	6	5.8	18	2.8	10	1.9	172	15.5
Anal cancer			2	1.9	5	0.8	3	0.6	26	2.3
Osteoporosis	33	16.6	27	26.0	58	9.1	86	16.7	105	9.5
Liver cirrhosis	28	14.1	13	12.5	9	1.4	7	1.4	24	2.2
Attempted suicide or suicide	7	3.5	3	2.9	7	1.1	3	0.6	13	1.2
Drug overdose (mainly opiates)	11	5.5	7	6.7	3	0.5	1	0.2	7	0.6
Chronic kidney disease	12	6.0	22	21.2	51	8.0	67	13.0	54	4.9

Comparison of co-morbidities in different age groups

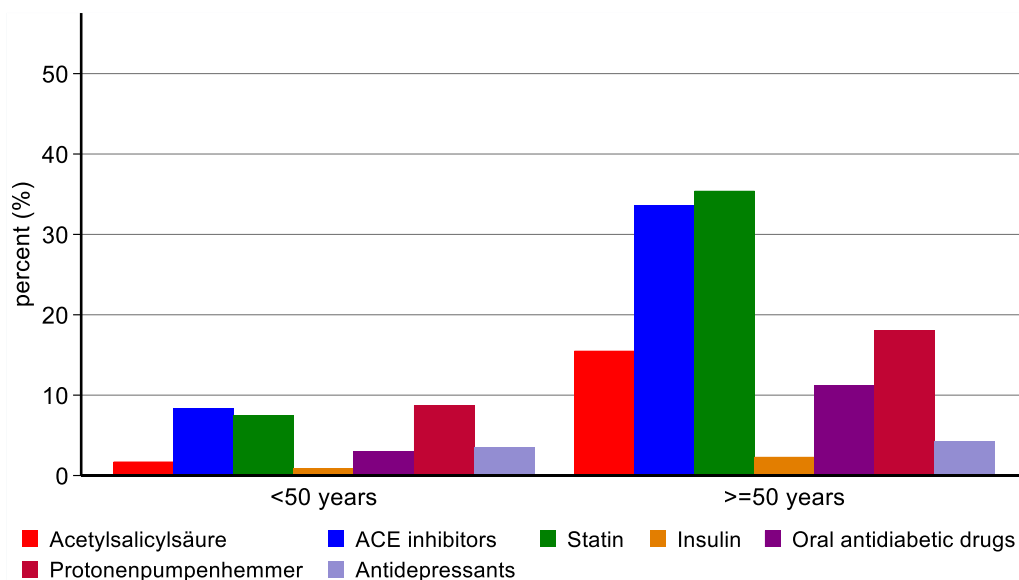


12.2 Co-medication related to age

< 50 years									
Current therapies	Male IDU		Female IDU		Male hetero		Female hetero		MSM
	223	%	87	%	320	%	521	%	1147
Acetylsalicylic acid	7	3.1	3	3.4	9	2.8	3	0.6	18
ACE inhibitors/angiotensin antagonists	14	6.3	5	5.7	35	10.9	40	7.7	92
Beta blocker	14	6.3	3	3.4	13	4.1	15	2.9	47
Statin	15	6.7	1	1.1	28	8.8	31	6	97
Insulin	2	0.9			7	2.2	3	0.6	8
Oral antidiabetic drugs	8	3.6	5	5.7	24	7.5	18	3.5	17
Proton pump inhibitors	48	21.5	15	17.2	31	9.7	46	8.8	65
Bisphosphonates	1	0.4			1	0.3	1	0.2	5
Thyroid hormones	3	1.3	6	6.9	9	2.8	35	6.7	20
Opiate substitution	134	60.1	52	59.8	17	5.3	5	1.0	15
Psychotropic drugs	164	73.5	62	71.3	51	15.9	82	15.7	191
Anxiolytics, hypnotics, sedatives	60	26.9	31	35.6	14	4.4	13	2.5	32
Antidepressants	52	23.3	20	23.0	21	6.6	49	9.4	113
Antipsychotics	52	23.3	18	20.7	15	4.7	31	6.0	54

≥ 50 years									
	Male IDU		Female IDU		Male hetero		Female hetero		MSM
Current therapies	199	%	104	%	640	%	516	%	1110
Acetylsalicylic acid	45	22.6	16	15.4	108	16.9	56	10.9	173
ACE inhibitors/angiotensin antagonists	66	33.2	23	22.1	260	40.6	152	29.5	370
Beta blocker	37	18.6	15	14.4	118	18.4	69	13.4	193
Statin	61	30.7	36	34.6	255	39.8	185	35.9	387
Insulin	7	3.5			22	3.4	12	2.3	19
Oral antidiabetic drugs	14	7	6	5.8	102	15.9	50	9.7	116
Proton pump inhibitors	52	26.1	32	30.8	107	16.7	84	16.3	193
Bisphosphonates	1	0.5	5	4.8	12	1.9	25	4.8	24
Thyroid hormones	19	9.5	21	20.2	31	4.8	72	14.0	69
Opiate substitution	109	54.8	57	54.8	24	3.8	12	2.3	44
Psychotropic drugs	127	63.8	74	71.2	129	20.2	131	25.4	305
Anxiolytics, hypnotics, sedatives	53	26.6	31	29.8	27	4.2	31	6.0	54
Antidepressants	45	22.6	29	27.9	67	10.5	83	16.1	187
Antipsychotics	29	14.6	12	11.5	30	4.7	35	6.8	68

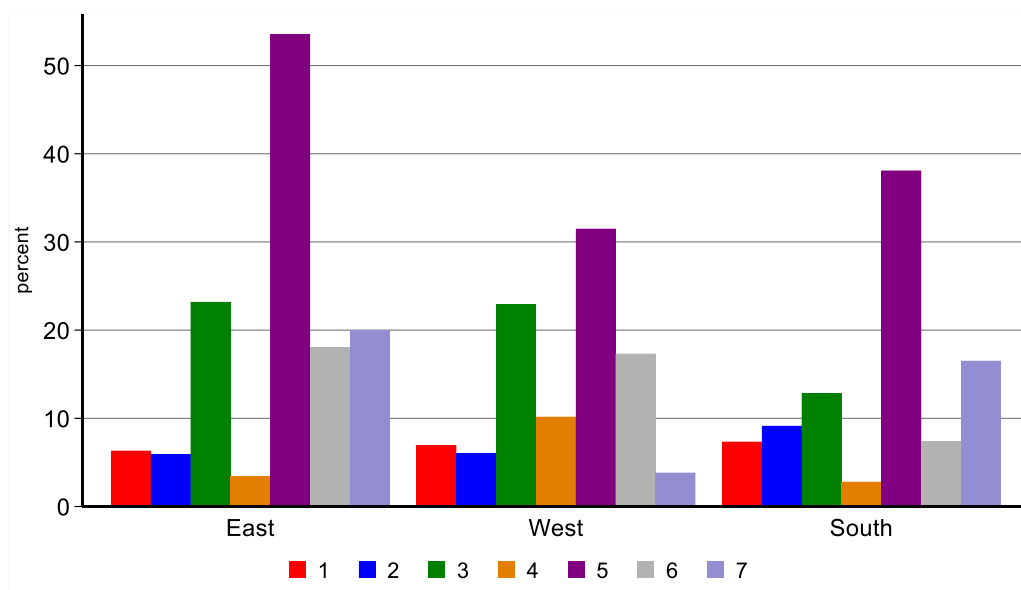
Comparison of co-medications in the different age groups



12.3 Examples of quality assurance

"Quality assurance"	Fulfilled	Total	%
LDL cholesterol documented within the last 12 months	4782	5172	92.5%
LDL > 160 mg/dl (1*)	322	4782	6.7%
Smoking history documented	4830	5172	93.4%
Smoking	2213	4830	45.8%
LDL > 160 mg/dl & smoking in those 50 years and above (2*)	67	2704	2.5%
Blood pressure documented within the last 12 months	5065	5172	97.9%
Arterial hypertension (3*)	1093	5065	21.6%
Smoking among those with arterial hypertension	362	1093	33.1%
Coronary heart disease (CHD) or MI or ICP stenting (4*)	305	5172	5.9%
No statin use among patients with CHD (5*)	116	305	38.0%
Diabetes or Glucose >200 or HbA1c	365	5172	7.1%
Diabetes and recent HbA1c > 8 (6*)	62	365	17.0%
Hepatitis C RNA pos. within the last 12 months	121	5172	2.3%
No syphilis screening in the last 6 months in MSM (7*)	298	2269	13.1%

*Conditions (numbers in parentheses) are shown in the figure (legend) below



13 Summary

HIV Patient Management System

The Austrian HIV Cohort Study uses its own electronic health record, the *HIV Patient Management System*, which is the common tool for the HIV Cohort. The data input is done decentralized in the HIV centres. The input of laboratory results is done mostly electronically, and in every centre various professional groups are involved in data entry. Before data sets are merged, the cohort participants have been made anonymous. Therefore, it is very laborious to identify cohort participants who are/ were treated in more than just one treatment centre. This cannot be done by using personal data such as initials, date of birth or postal code, but with HIV specific data (date of the HIV test, CD4 cell counts etc.).

On the one hand, the *HIV Patient Management System* fulfills complex tasks for the clinical management of HIV infected patients, and on the other hand it allows queries and analyses to be performed by the users without restrictions. However, to allow both individual patient management and scientific queries is an enormous challenge which scientific HIV cohorts in other countries have not had to deal with. While for the clinical patient management the focus is on readability of diagnoses and therapies, creation of medical reports, prescriptions (trade names!), print-out of results etc., scientific queries need precise coding and categorization. Furthermore, the optimization of individual patient management requires an ongoing adjustment to the progress of information technology, whereas purely scientific data bases do not have such technological renewal pressure. However, in Austria, there was no acceptance for a purely scientific data base.

Patients with a follow-up in the last 12 months

The highest number of cohort participants are seen at the AKH Vienna (27.4%), followed by the OWS Vienna (15.9%), Innsbruck (14.7%), Linz (13.9%), Graz (9.5%), Salzburg (6.7%), Klagenfurt (5.0%), Favoriten Vienna (4.2%) and Feldkirch (2.6%). However, a considerable proportion 27.7%) of patients did not have a follow-up within the last 12 months. The main reasons for this „loss of follow-up“ is the transfer of care to health-care providers outside the hospital based HIV-centres of AHIVCOS and the substantial number of individuals who have left the country.

Who and how many are infected with HIV in Austria?

The median age at diagnosis has been between 30 and 40 years since 1990. 25.1% of the patients with a follow-up in the last 12 months are female. The rate is highest in Burgenland (33.4%), Upper Austria (31.0%), Vorarlberg (26.7%), Styria (26.4%) and Lower Austria (25.8%).

In the subgroup of heterosexually acquired infections, the rate of the women is 51.9%. It is highest in Upper Austria (56.8%), Styria (56.7%), Carinthia (55.5%) and Tyrol (54.3%). Among patients newly diagnosed in 2024, 34.9% have been infected through heterosexual contacts. Since 2000, 35.0% of all newly diagnosed HIV infections were transmitted through heterosexual contacts.

Most of the cohort participants are Austrian nationals (68.6%). 8.2% come from high prevalence countries and 20.8% from low prevalence countries outside Austria. Information on the nationality of the remaining patients is missing.

According to Dachverband der Sozialversicherungsträger, 7768 persons received ART in 2022. According to the ECDC modelling tool the proportion of PLHIV on ART in 2022 is estimated to be between 86,5% and 92,2%. Thus, the estimate for PLHIV in Austria ranges from 8400 to 9000 for end of 2022.

As of January 1st 2022, the modelling tool of ECDC reveals 7596 PLHIV. Assuming that AHIVCOS is representative for Austria, the overall estimate for PLHIV sums up to 11860. This is an overestimation, since the ascertainment of persons who left the country is very incomplete (e.g. migrant workers from Europe mainly in the tourism industry and rejection of asylum application).

Is the HIV test used efficiently?

Austria has one of the highest rates of HIV tests per capita in Europe. Nevertheless, a substantial number of patients (~25%) is already immune deficient (CD4 cell count <200/ μ l) at the time of the first contact with an HIV centre.

Therefore, risk factors for an “early” and a “late” diagnosis have been evaluated. Patients who have been diagnosed with HIV between 2001 and 2024 were analysed. During this period, 7435 HIV infections were newly diagnosed. The infections occurred in 34.8% through heterosexual transmission, in 44.9% through MSM and in 14.0% through IDU.

An “early” diagnosis is defined by: a seroconversion illness (westernblot pattern or antigen/HIV RNA with corresponding clinical symptoms) or documented seroconversion with negative test not more than 3 years before the first positive HIV test.

A „late“ diagnosis is defined by: CD4<350 at time of HIV diagnosis and/or AIDS within 3 months of HIV diagnosis.

16.3% of the examined patients had an “early“ diagnosis and 42.1% a “late“ diagnosis.

A higher risk to be diagnosed “late” was found in older patients (>50), in those who have been infected heterosexually and male IDU compared to MSM and in persons originating not from Austria.

An „early“ diagnosis was found more frequently in younger patients (<50), MSM, in patients originating from Austria and in persons residing in places with less than 1 million inhabitants.

Transmission of drug resistant HIV

In all centres, 282 (7.1%) of 3998 patients were identified who had at least one resistance mutation before their first antiretroviral therapy. Two patients had a 3-class resistance to NRTI, NNRTI and PI before starting ART. Ten patients had a resistance to NRTI and PI, eight patients had a resistance to NRTI and NNRTI, and five patients had a resistance to NNRTI and PI. The transmission of drug resistant HI viruses has decreased in the last years. However, not all centres did resistance tests before ART initiation or at diagnosis, but most have implemented the routine testing in 2003.

Stage of HIV disease

The cohort participants represent all stages of HIV infection. Half of the patients have a CD4 nadir <200/μl. The median of the CD4 nadir of the patients with a visit in the last 12 months is 247/μl. The current CD4 cell count is 683/μl (median at the last measurement). As of September 1st, 2024, about 3.4% of the patients with a visit in the last 12 months had a current CD4 cell count below 200/μl and 17 (0.3%) of them had a CD4 cell count <50/μl. The mean CD4 cell count is currently 723/μl. Therefore, the number of patients with an opportunistic infection will remain low in the following years.

Mortality

The reduction of mortality after the implementation of antiretroviral combination therapies is impressive (see items 10.1 and 10.2). In 1994, the death rate of patients with AIDS was 40.6 per 100 person-years for men and 44.4 for women. Over the last years the rate decreased to below 5 for men and for women. From 2005 to 2023 (except for the year 2006), injecting drug users had a higher death rate than homosexual men. Only in 2006 the death rate of homosexual men was higher than for IDU.

Viral suppression under antiretroviral therapy

The rate of viral suppression under antiretroviral therapy in Austria is similar to figures from other countries. However, it has to be considered that the rate of viral suppression has been measured with the patients currently in care and that patients with “loss of follow-up” are not included.

Increase of CD4 cell counts during antiretroviral therapy

The CD4 cells during antiretroviral therapy have continuously increased, and the increase continues after 5 and 7.5 years of ART initiation. The increase is faster in patients on continuous ART compared to patients with treatment interruptions (see item 10.3.2).

Development of resistances during antiretroviral therapy

The probability of developing resistance to antiretroviral drugs seems to be decreasing (chapter 12.3.7). So, the risk of „any“ resistance after more than 20 years of ART is about 40%, for NRTI-associated resistance about 20% and for 3-class resistance 10%. The probability of NNRTI-associated resistance after more than 20 years is about 20% in patients who started ART with NNRTIs. The probability of PI-associated resistance after 20 years is about 35% in patients who had a PI-based antiretroviral combination therapy as their initial therapy. The results are about the same if transmitted resistances are excluded.

The strongest risk factor for the development of 3-class-resistance during antiretroviral therapy is initiation of ART before 1997 as well as from 1997 to 2003, followed by low CD4 nadir and younger age at initiation of ART. Persons with a current HIV RNA below 50 copies/ml seem to have a lower risk of developing 3-class-resistance during ART.

In our cohort, 48 patients of 9105 (0.5%) have a mutation of the codon 65 of the RT (K65R). The occurrence of the mutation K65R was more frequent in regimens including Tenofovir compared with Abacavir and could be found more often in patients with advanced immune deficiency (low CD4 nadir/ AIDS; chapter 12.3.1.2) as well as in women infected heterosexually or through IDU.

Co-infections

Co-infections with syphilis, hepatitis B, and hepatitis C are common. Like in other European countries, an enormous increase of new syphilis infections, especially among MSM, is apparent. This indicates a lack of prevention and “Safer Sex” practices. However, it is necessary to note that an increased “*sero-sorting*” behaviour (sexual

contacts with partners with the same HIV status) could have substantially contributed to this increase.

In Austria, infection with hepatitis C is still uncommon in MSM. Not all patients are offered vaccination against hepatitis B, although it is recommended for all HIV infected persons.

Co-morbidities

Improved survival has shifted the health care towards more individuals older than 50 years. The medical needs of older HIV-infected patients may differ from those of younger patients. Older individuals, with new or longstanding HIV infection, are at greater risk for non-HIV-related morbidities. Of special concern are cardiovascular diseases, osteoporosis, liver and neuropsychiatric disorders. Thus, aging of the HIV-infected population under care will lead to more complex medical management and increased costs of care. Health care agencies need to be aware of the impact of this important change in near future.

Outlook

The report of the Austrian HIV Cohort Study is still representative of the epidemiology of HIV/AIDS in Austria and therefore serves as source of data for the ECDC in Stockholm. It can be well compared with other reports from Austria, such as the report of renal replacement therapy of the Austrian Society for Nephrology and Austrotransplant. Moreover, the establishment of the *HIV Patient Management System* has played an important role to improve clinical care for persons with HIV/AIDS („*Good Clinical Chronic Disease Practice*“).

Some remaining problems are mainly due to inconsistent use of the *HIV Patient Management System* with the corollary of inconsistent data entry into this software. Regular updates and improvements of the *HIV Patient Management System* should help to face these challenges.

The development of the HIV Patient Management System incorporated the international standard format, the HIV Cohorts Data Exchange Protocol (HICDEP). Therefore, data merging with international networks of cohorts like RESPOND and ART-CC has been and will be greatly facilitated.

A	Austria
Ab	Antibody
ACE	Angiotensin-converting enzyme
AGES	Austrian Agency for Health and Food Safety
AHIVCOS	Austrian HIV Cohort Study
ART	Antiretroviral therapy (HIV-therapy)
ARVs	Antiretrovirals
ATC-Code	Anatomical therapeutic-chemical code
B	Burgenland
betw.	between
BMSGPK	Bundesministerium für Soziales, Gesundheit, Pflege und Konsumentenschutz
C	Carinthia
cART	Combination antiretroviral therapy
CDC	Centers for Disease Control
CHD	Coronary heart disease
CIN	Cervical intraepithelial neoplasia
CIS	Commonwealth of Independent States
ECDC	European Centre for Disease Prevention and Control
EuroHIV	European Centre for the Epidemiological Monitoring of AIDS
GP	General practitioner
HBA1c	Hemoglobin A1c
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HDL	High density lipoprotein
Hetero	Heterosexually acquired infection
HIP	HIV-Patient-Management-System
IAS	International AIDS-Society
ICD	International Classification of Diseases (WHO)
IDU	Injecting drug users
INSTI	Integrase strand transfer inhibitor
Interm.	Intermediate
KFJ	Kaiser-Franz-Josef-Spital Wien/Kaiser-Franz-Josef-Hospital Vienna
LA	Lower Austria
LDL	Low density lipoprotein
m.	month(s)
MI	Myocardial infarction
MSM	Men who have sex with men
N.a.	Not available/ not applicable
n.s.	not significant
neg.	negative
NNRTI	Non Nucleoside Reverse Transcriptase Inhibitor
NRTI	Nucleoside Reverse Transcriptase Inhibitor
OWS	Otto-Wagner-Spital Wien/Otto-Wagner Hospital Vienna
P	Protease
PI	Protease inhibitor
RNA	Ribonucleic acid
RT	Reverse transcriptase
S	Salzburg
SD/ s.d.	Standard deviation
St	Styria
St. p.	Status post
T	Tyrol
UA	Upper Austria
UK	United Kingdom
Vertical	Vertical transmission
Vie	Vienna
Vo	Vorarlberg
WHO	World Health Organization
ys.	years

15 Austrian HIV Cohort Study Group

As of November 2024

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