RESPOND International Cohort Consortium of Infectious Diseases

Use of Preventive Measures for Cardiovascular Disease in People Living with HIV

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Presenter Disclosure Information

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Disclosed no conflict of interest

Background

- Prior studies reported suboptimal cardiovascular disease (CVD) risk prevention and management for people living with HIV[1,2]
- Previous investigations focused on overall usage of individual CVD preventive measures such as statins and aspirin without providing a wider overview
- Few analyses considered ART usage as a potential CVD preventive measure as recommended in European AIDS Clinical Society (EACS) Guidelines[3]
- Limited data for key subgroups, e.g., women, older individuals, etc.

1: Hatleberg CI et al. Curr Opin Hiv Aids; 2017, 2: Shahmanesh M et al. AIDS; 2016 , 3: European Aids Clinical Society Guidelines, V 11.0

Aims

- To assess the use of preventive measures for CVD in people living with HIV with a focus on individuals with very high (>10%) estimated 10-year CVD risk in key subgroups
- Preventive measures:
  - **Weight loss (>7%)** in obese (BMI>30kg/m^2) individuals
  - **Smoking cessation** in current smokers
  - **Discontinuation of ARVs*** previously associated with CVD in persons on the respective ARV
  - **Antihypertensive medication** use in persons with hypertension
  - **Angiotensin-converting enzyme inhibitor (ACEI)/ angiotensin receptor blocker (ARB)** use in persons with hypertension and/or diabetes (as a proxy of proteinuria)
  - **Antidiabetic medication** use in persons with diabetes
  - **Lipid-lowering drug (LLD)** use in persons with dyslipidemia

*lopinavir (LPV), darunavir (DRV) and abacavir (ABC) >6 months

Methods

- RESPOND[1] participants aged ≥18 years in whom an estimated 10-year D:A:D CVD risk[2] could be calculated
  - Participants with prior CVD were excluded
  - Follow-up was censored at developing a prospective CVD event
- Annual prevalence (1st July 2012 – 1st July 2019) of CVD preventive measure use among very high (>10%) estimated 10-year CVD risk individuals
  - Eligible for each preventive measure
  - With ≥12 months of follow-up
- Binomial regression to assess factors associated with the uptake of each CVD preventive measure among individuals with >10% estimated 10-year CVD risk eligible for the respective measure
  - Adjusted for age (<40/≥40 men, <50/≥50 women), gender, ethnicity, CVD risk region, body mass index, HIV acquisition risk, CD4 cell count, CD4 nadir, hypertension, diabetes, AIDS, cancer, chronic kidney disease, dyslipidaemia, calendar year, current smoking, cumulative exposure to LPV, DRV, and IDV, ABC use in past six months, and INSTIs exposure

1: Neesgaard et al. Microorganisms, 2020; 2: Friis-Møller et al. Eur J Prev Cardiol.; 2016

Baseline Characteristics, Stratified by 10-year estimated D:A:D CVD Risk

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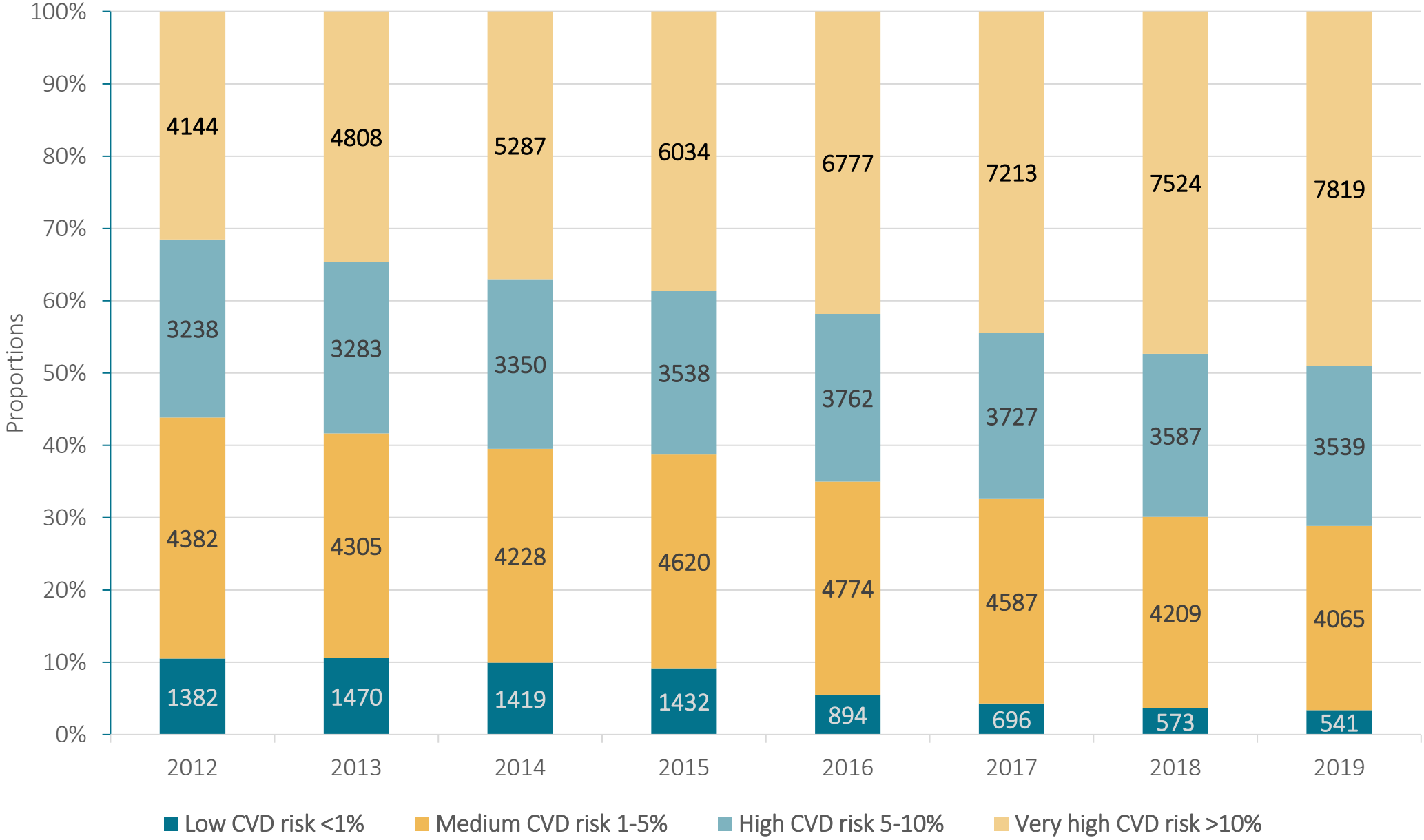
		All		Low CVD risk <1%		Medium CVD risk 1-5%		High CVD risk 5-10%		Very high CVD risk >10%	
		N	%	N	%	N	%	N	%	N	%
All		**22050**	**100**	**2931**	**13.3**	**8397**	**38.1**	**5002**	**22.7**	**5720**	**25.9**
Gender	Male	16564	75.1	1748	59.6	5818	69.3	3969	79.3	5029	87.9
Risk of HIV acquisition	MSM	10122	45.9	1280	43.7	3799	45.2	2343	46.8	2700	47.2
	IDU	3150	14.3	188	6.4	1084	12.9	851	17.0	1027	18.0
Ethnicity	White	16584	75.2	1911	65.2	6004	71.5	3951	79.0	4718	82.5
Diabetes		1184	5.4	43	1.5	97	1.2	170	3.4	874	15.3
Dyslipidemia		9448	42.8	752	25.7	2704	32.2	2382	47.6	3610	63.1
Hypertension		4267	19.4	177	6.0	789	9.4	1087	21.7	2214	38.7
Smoking status	Current	9817	44.5	781	26.6	3262	38.8	2460	49.2	3314	57.9
BMI (kg/m^2)	25-30	5521	25.0	568	19.4	1951	23.2	1387	27.7	1615	28.2
	>30	1863	8.4	203	6.9	709	8.4	419	8.4	532	9.3
Exp. Lopinavir		5862	26.6	530.0	18.1	1827	21.8	1412	28.2	2093	36.6
Exp. Darunavir		3669	16.6	426	14.5	1341	16.0	848	17.0	1054	18.4
Exp. Indinavir		3447	15.6	108	3.7	535	6.4	881	17.6	1923	33.6
Exp. Abacavir		7369	33.4	540	18.4	2017	24.0	1830	36.6	2982	52.1
Exp. INSTI		2713	12.3	425	14.5	1193	14.2	545	10.9	550	9.6
		Median	IQR	Median	IQR	Median	IQR	Median	IQR	Median	IQR
Age		45	(37, 52)	31	(26, 36)	40	(35, 45)	48	(44, 52)	55	(50, 62)
CD4 cell count		552	(390, 742)	523	(385, 710)	546	(385, 728)	569.5	(396, 760)	560	(391.5, 762)
Baseline*		01/12	(01/12,01/15)	06/12	(01/12, 05/15)	01/12	(01/12, 01/15)	01/12	(01/12, 09/14)	01/12	(01/12, 03/14)

*first date when 10-year D:A:D CVD risk could be calculated

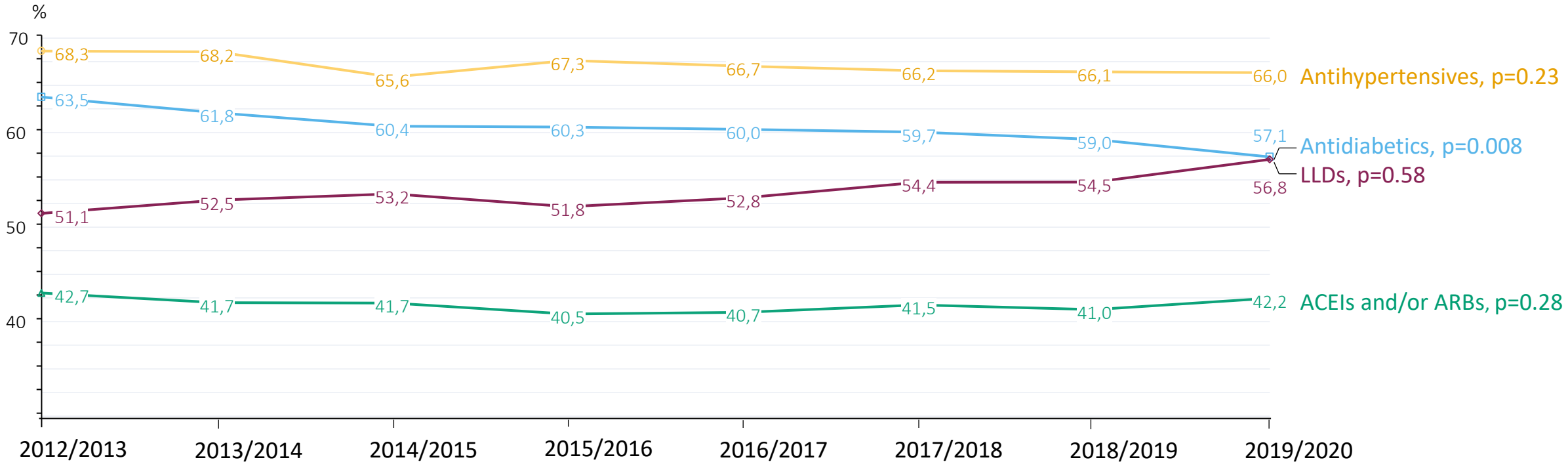
Temporal Proportions of Estimated 10-year CVD Risk



While participants were not allowed to switch CVD risk groups, the proportion of **very high estimated CVD risk** individuals increased in 2019 **(49%)** vs 2012 **(31.5%)**

Temporal Proportions of CVD Preventive Measures Use

Among Eligible Individuals with >10% Estimated 10-year CVD Risk

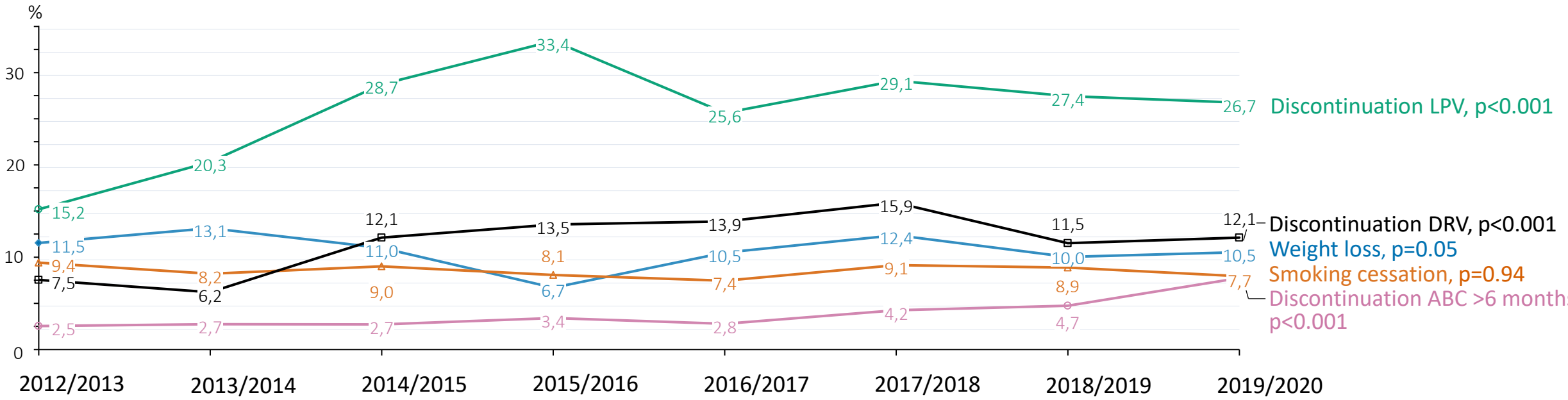


n	n	n	n	n	n	n	n	
1749	1932	2119	2272	2552	2756	2906	2229	Antihypertensives
602	663	735	792	861	950	995	767	Antidiabetics
2598	2693	2869	3147	3422	3597	3744	2696	LLDs
2007	2208	2426	2595	2897	3124	3278	2523	ACEIs and/or ARBs

All p are global, multivariate p-values for each preventive measure with calendar years per 2-year groups
n = individuals eligible for each of the respective preventive measures

Temporal Proportions of CVD Preventive Measures Use

Among Eligible Individuals with >10% Estimated 10-year CVD Risk



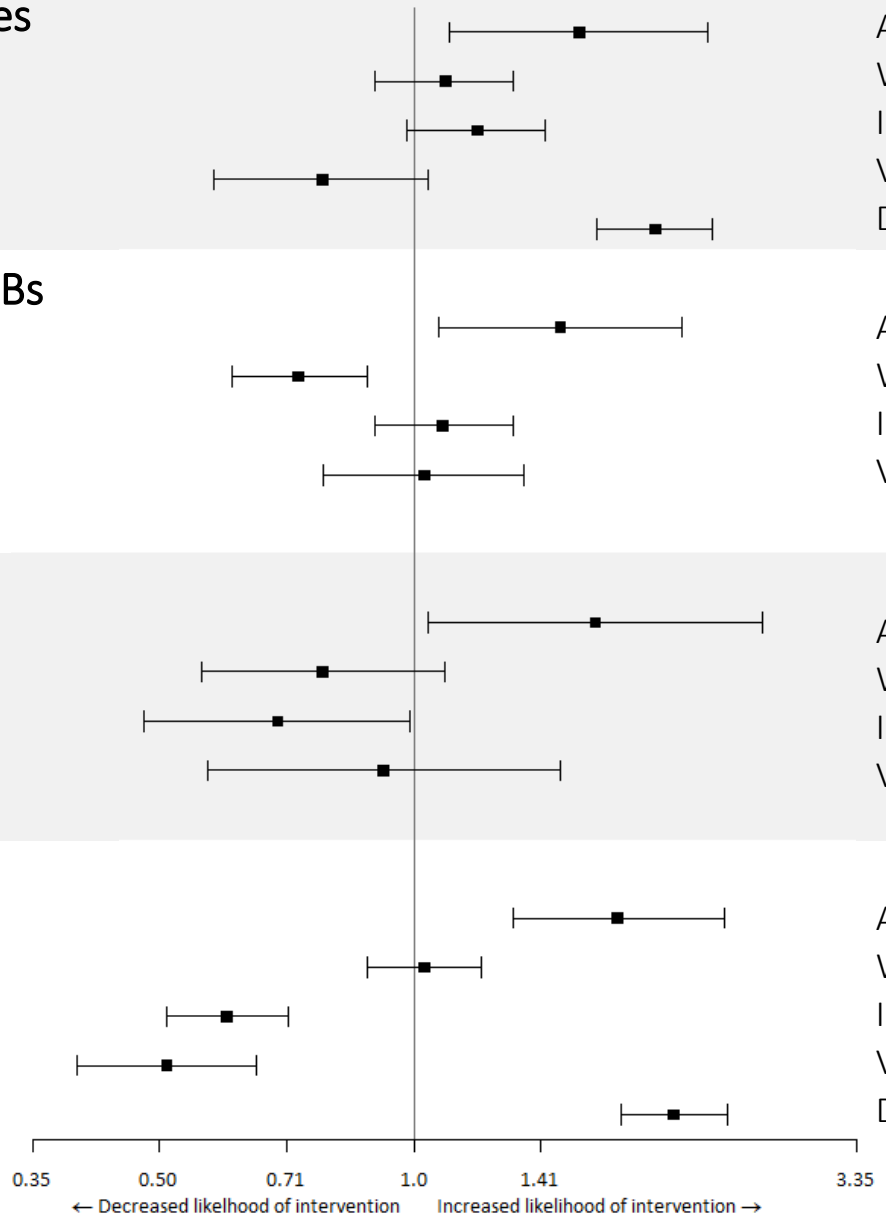
n	n	n	n	n	n	n	n	
593	553	477	403	305	232	161	86	Discontinuation LPV
650	805	972	1129	1192	1163	1973	702	**Discontinuation DRV**
312	360	381	406	440	511	575	454	**Weight loss**
2118	2217	2364	2643	2986	3099	3083	2199	Smoking cessation
1337	1470	1605	1891	2214	2257	2197	1515	**Discontinuation ABC**

All p are global, multivariate p-values for each preventive measure with calendar years per 2-year groups

n = individuals eligible for each of the respective preventive measures

Adjusted Odds Ratios (aOR) of CVD Preventive Measures Use for Key Subgroups

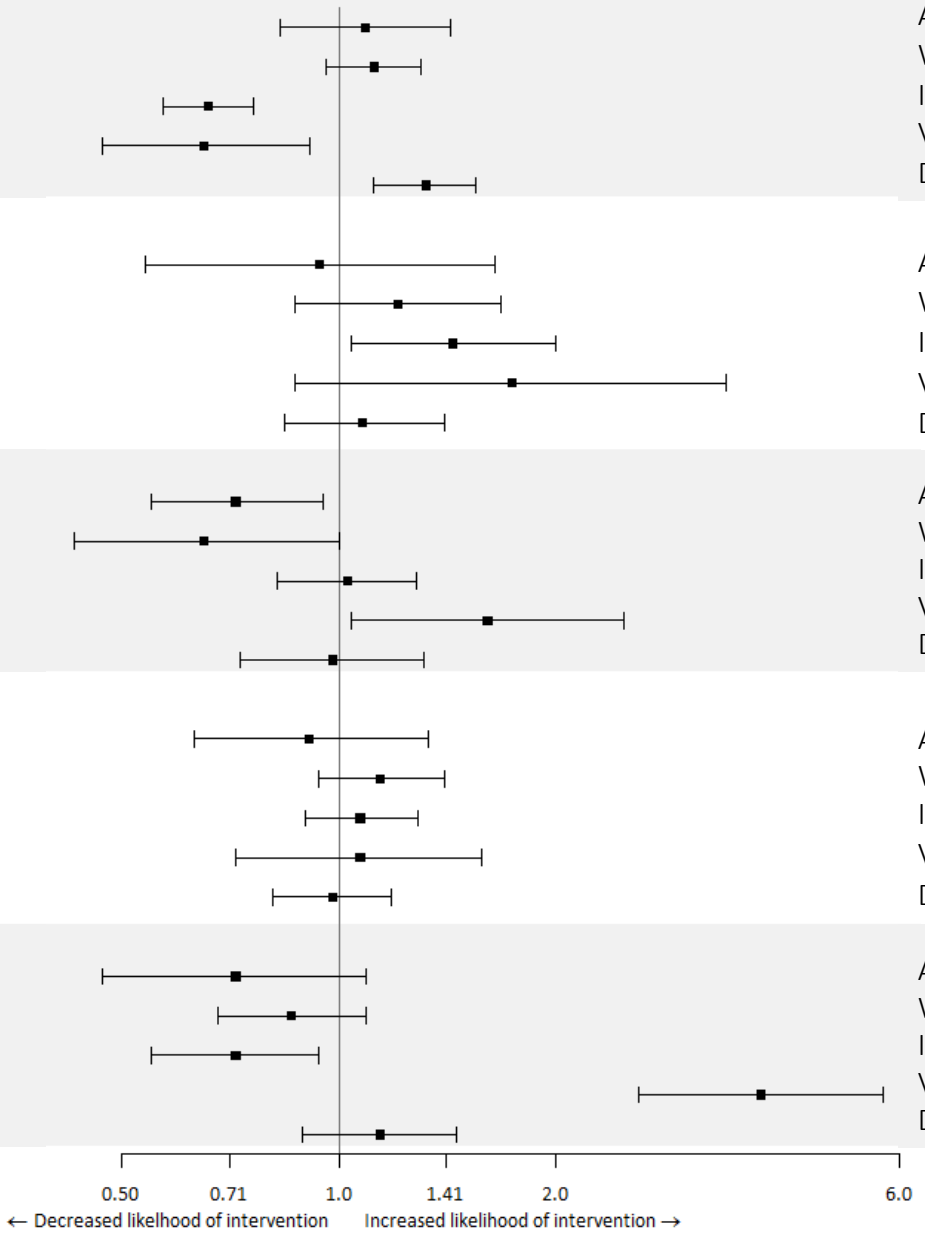
Preventive Measures	Subgroups	aOR [95% CI]
Antihypertensives	Age ≥50/≥40 (vs. <50/<40) years	1.57 [1.10 - 2.23]
	Women (vs. men)	1.09 [0.90 - 1.31]
	IDU (vs. non-IDU)	1.19 [0.98 - 1.43]
	VL >200 (vs. <200) copies/mL	0.78 [0.58 - 1.04]
	Diabetes (yes vs. no)	1.93 [1.65 - 2.26]
ACEIs and/or ARBs	Age ≥50/≥40 (vs. <50/<40) years	1.49 [1.07 - 2.08]
	Women (vs. men)	0.73 [0.61 - 0.88]
	IDU (vs. non-IDU)	1.08 [0.90 - 1.31]
	VL >200 (vs. <200) copies/mL	1.03 [0.78 - 1.35]
Antidiabetics	Age ≥50/≥40 (vs. <50/<40) years	1.64 [1.04 - 2.59]
	Women (vs. men)	0.78 [0.56 - 1.09]
	IDU (vs. non-IDU)	0.69 [0.48 - 0.99]
	VL >200 (vs. <200) copies/mL	0.92 [0.57 - 1.49]
LLDs	Age ≥50/≥40 (vs. <50/<40) years	1.74 [1.31 - 2.33]
	Women (vs. men)	1.03 [0.88 - 1.20]
	IDU (vs. non-IDU)	0.60 [0.51 - 0.71]
	VL >200 (vs. <200) copies/mL	0.51 [0.40 - 0.65]
	Diabetes (yes vs. no)	2.03 [1.76 - 2.35]



⁺Age subgroup: <40/≥40 years of age for men, <50/≥50 for women

Adjusted Odds Ratios (aOR) of CVD Preventive Measures Use for Key Subgroups

Preventive Measures	Subgroups	aOR [95% CI]
Smoking cessation	Age ≥50/≥40 (vs. <50/<40) years	1.09 [0.83 - 1.43]
	Women (vs. men)	1.12 [0.96 - 1.30]
	IDU (vs. non-IDU)	0.66 [0.57 - 0.76]
	VL >200 (vs. <200) copies/mL	0.65 [0.47 - 0.91]
	Diabetes (yes vs. no)	1.32 [1.12 - 1.55]
Weight loss (>7%)	Age ≥50/≥40 (vs. <50/<40) years	0.94 [0.54 - 1.65]
	Women (vs. men)	1.21 [0.87 - 1.68]
	IDU (vs. non-IDU)	1.44 [1.04 - 2.00]
	VL >200 (vs. <200) copies/mL	1.74 [0.87 - 3.45]
	Diabetes (yes vs. no)	1.08 [0.84 - 1.40]
Discontinuation LPV	Age ≥50/≥40 (vs. <50/<40) years	0.72 [0.55 - 0.95]
	Women (vs. men)	0.65 [0.43 - 1.00]
	IDU (vs. non-IDU)	1.03 [0.82 - 1.28]
	VL >200 (vs. <200) copies/mL	1.61 [1.04 - 2.49]
	Diabetes (yes vs. no)	0.98 [0.73 - 1.31]
Discontinuation DRV	Age ≥50/≥40 (vs. <50/<40) years	0.91 [0.63 - 1.33]
	Women (vs. men)	1.14 [0.94 - 1.40]
	IDU (vs. non-IDU)	1.07 [0.90 - 1.29]
	VL >200 (vs. <200) copies/mL	1.07 [0.72 - 1.58]
	Diabetes (yes vs. no)	0.98 [0.81 - 1.18]
Discontinuation ABC >6 months	Age ≥50/≥40 (vs. <50/<40) years	0.72 [0.47 - 1.09]
	Women (vs. men)	0.86 [0.68 - 1.09]
	IDU (vs. non-IDU)	0.72 [0.55 - 0.94]
	VL >200 (vs. <200) copies/mL	3.85 [2.61 - 5.68]
	Diabetes (yes vs. no)	1.14 [0.89 - 1.46]



Strengths and Limitations

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Strengths:

- Assessing multiple preventive measures for CVD in a contemporary, real-life setting
- Large size and heterogeneity
- Long follow-up time
- Clinically relevant subgroup analyses

Limitations:

- Residual confounding from factors not collected in RESPOND (e.g., diet, physical activity) or not included due to reporting differences by cohorts (e.g., family history of CVD) cannot be ruled out
  - ARVs may not necessarily have been discontinued because of increased CVD risk
- Unable to capture adherence levels to preventive measures

Conclusions

- Despite an increased proportion of individuals at very high estimated CVD risk in 2019 (49%) compared to 2012 (31.5%), CVD preventive measures were underused in RESPOND
- Older individuals and those with diabetes were more likely to receive antihypertensives and LLDs
- Participants with a viral load ≥200 copies/mL and IDU as HIV acquisition risk were less likely to use LLDs and cease smoking
- Besides women being less likely to receive ACEIs/ARBs, use of CVD preventive measures was similar between genders

Perspective

- Our findings call for greater awareness of management guidelines for CVD risk factors in people living with HIV
- Further analyses will assess the impact of multimorbidity on the uptake of CVD preventive measures and the effects of preventive measure use on CVD incidence in RESPOND

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