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BACKGROUND

- **Prevalence of obesity increased** globally within the last decades¹ also in people with HIV (PWH)¹¹
- Weight change is a **multifactorial** process → associated with demographics, diet, exercise, psychological and clinical comorbidities, and co-medications
- **Initiation of antiretroviral therapy (ART) & switch to/off certain ART regimen in PWH were associated with weight gain^{11,IV,V}**

→ Here: Evaluation of potential factors for weight gain over 5 years in PWH in the Ruhr-area of Germany

Table 1: Baseline characteristics of participants with a weight gain of ≥10% (group A, N=212) versus a stable weight from 0 to ±5% (group B, N=969) within 5 years.

	characteristics of HIV with weight gain ≥10% (n=212)		characteristics of HIV with weight change ≤5% to ≥-5 (n=969)	
	N	BL	N	after 5 years
sex (male)	212	160 (75.5%)	969	821 (84.7%)
caucasian ethnicity (yes)	212	180 (84.9%)	969	847 (87.4%)
age (years)	212	45.6±11.0	969	50.2±11.2
age at time of HIV infection (years)	210	33.7±9.4	949	36.3±10.4
duration of HIV infection (years)	210	11.9±7.4	949	13.8±7.4
weight (kg)	212	77.2±14.8	969	79.2±15.4
BMI (kg/m ²)	212	25.2±4.7	969	25.5±4.6
BMI categories				
underweight (<18.5)	4	1.9%	25	2.6%
normal weight (<25)	115	54.2%	38	17.9%
overweight (<30)	65	30.7%	96	45.3%
obese I (<35)	21	9.9%	48	22.6%
obese II (<40)	5	2.4%	20	9.5%
obese III (≥40)	2	0.9%	8	3.8%
cholesterol (mg/dl)	205	200.7±45.6	203	198.2±43.5
LDL (mg/dl)	196	130.1±42.7	199	131.5±42.8
HDL (mg/dl)	196	49.9±16.5	195	47.1±12.7
triglyceride (mg/dl)	206	131 (Q1:113;Q3:230)	203	162 (Q1:114;Q3:230)
Lipodystrophy (yes)	211	23 (10.9%)	948	153 (16.1%)
Lipoatrophy (yes)	202	15 (7.4%)	868	110 (12.7%)
Lipohypertrophy (yes)	201	9 (4.5%)	868	51 (5.9%)
blood pressure				
sys. BP (mmHg)	201	130.3±17.5	143	136.1±16.0
dia. BP (mmHg)	201	80.7±10.7	143	84.7±10.1
Hypertension (yes)	212	54 (25.5%)	969	288 (29.7%)
Hyperlipidaemia (yes)	212	105 (49.5%)	969	537 (55.4%)
smoking (yes)	204	95 (46.6%)	735	323 (44.0%)
diabetes mellitus (yes)	212	11 (5.2%)	969	82 (8.5%)
physical exercise (yes)	191	44 (23.0%)	594	155 (26.1%)
MSM				
Hetero	127	59.9%	588	60.7%
IVDU	42	19.8%	206	21.3%
transfusion	11	5.2%	48	5.0%
epidemic area	2	0.9%	13	1.3%
other	19	9.0%	71	7.3%
unknown	3	1.4%	5	0.5%
imm. CDC WHO HIV state				
HIV I	22	10.5%	84	8.8%
HIV II	92	43.8%	401	42.2%
HIV III	96	45.7%	466	49.0%
HIV A	94	44.7%	350	36.8%
HIV B	210	56 (26.7%)	951	293 (30.8%)
HIV C /AIDS	60	28.6%	308	32.4%
ART yes	211	205 (96.7%)	212	212 (100.0%)
CD4/CD8 ratio	211	0.8 (Q1:0.6;Q3:1.2)	209	0.9 (Q1:0.7;Q3:1.1)
CD4 cell count (counts/μl)	211	685.6±321.2	210	788.8±344.4
viral load below detection	212	191 (90.1%)	212	204 (96.2%)
NRTI	205	193 (94.2%)	933	881 (94.4%)
NNRTI	205	86 (42.0%)	933	332 (36.7%)
INSTI	205	78 (38.1%)	933	338 (36.2%)
PI	205	51 (24.9%)	933	315 (33.8%)
Booster	205	67 (32.7%)	933	379 (40.6%)
Entry inhibitor	205	5 (2.4%)	933	16 (1.7%)
combination medication (yes)	205	104 (50.7%)	933	551 (59.1%)
Single tablet regimen (yes)	205	86 (42.0%)	933	286 (30.7%)

Note: Categorical variables are presented as frequency (percent), continuous variables are presented as mean (+/-standard deviation) or median (interquartile range).
 Abbreviations: BL = Baseline, MSM = Men having sex with men, IVDU = intravenous drug users, BP = Blood pressure, LDL = Low density lipoprotein, HDL = High density lipoprotein, NRTI = nucleos(t)ide reverse transcriptase inhibitor, NNRTI = nonnucleoside reverse transcriptase inhibitor, PI = Protease inhibitor, INSTI = Integrase strand transferase inhibitors TDF = Tenofovir disoproxil fumarate, TAF = Tenofovir alafenamide, EFV = Efavirenz

Main findings

Association with higher risk of >10% weight gain within 5 years in PWH:
younger age & higher CD4/CD8 ratio at baseline, switching to TAF, switching off TDF (trend)

Association with lower risk of >10% weight gain within 5 years in PWH:
lipoatrophy at baseline, continuous use of PIs

METHODS

- **HIV-HEART Aging (HIVH) cohort:** Prospective study assessing cardiovascular risk of PWH in the Ruhr area (Germany) since 2004
- **Analysis population:** PWH from HIVH with weight measurements at two different time points 5 years apart
- **Risk factor assessment:** Logistic regression (adj. for baseline age, sex, duration of HIV) comparing **weight gain of ≥10% (group A, N=212)** with **stable weight from 0 to ±5% (group B, N=974)** in 5 years
- **Odds ratios (OR) & corresponding 95% confidence limits (CI) for variables at baseline (BL)** are shown (Continuous variables: OR per standard deviation (SD); Antiretrovirals (ARV): dummy variables (each N=1108) with “no ARV taken at BL and 5-year follow-up (5YFU)” as reference

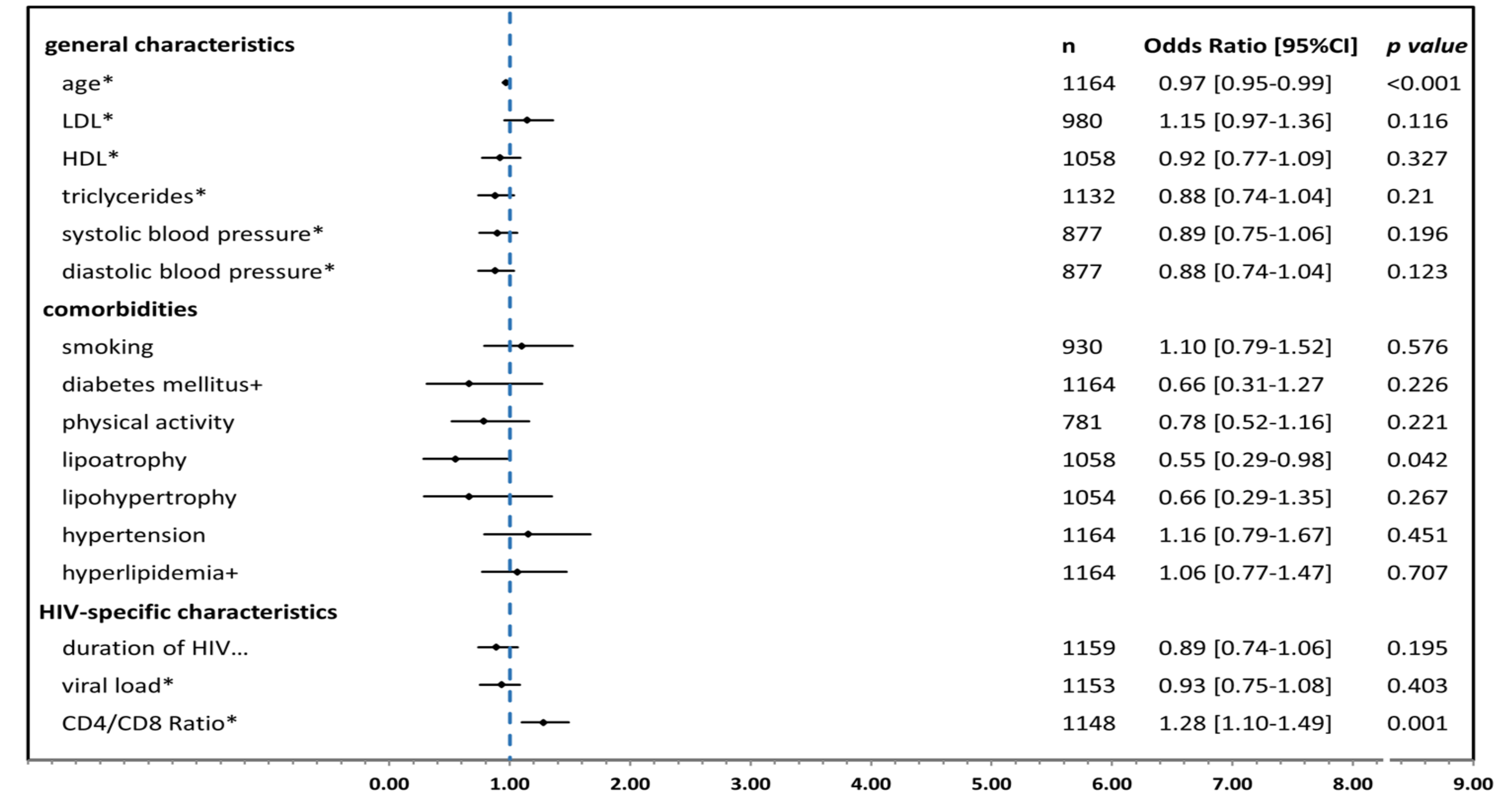


Figure 1: Logistic regression models of potential risk factors for ≥10% weight gain over 5 years. Estimates are presented as Odds ratio and corresponding 95% confidence limit (CI). All variables are considered at baseline (BL).
 *) per standard deviation +) covariate diabetes mellitus diagnosis or anti-diabetes medication, Hyperlipidemia combines diagnosis hyperlipidemia and lipid lowering medication

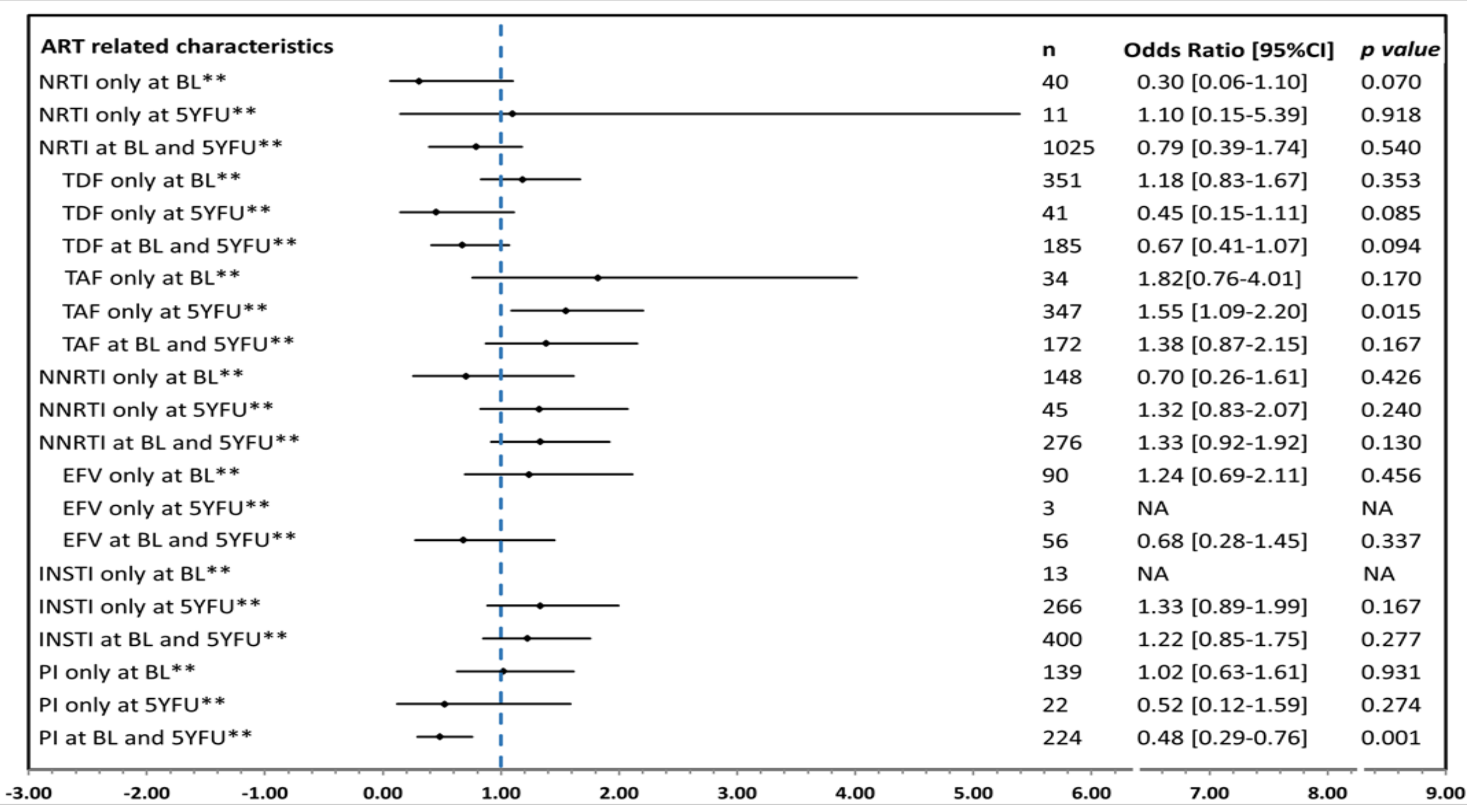


Figure 2: Logistic regression models of potential risk factors for ≥10% weight gain over 5 years. Estimates are presented as Odds ratio and corresponding 95% confidence limit (CI). INSTI use only at BL and EFV only at 5 year follow-up (5YFU) could not be shown (NA) because of low number of persons in this subgroup.
 ++) for all ARV variables the reference group is ARV not used at BL and 5YFU

RESULTS

- **1186 participants:** mean age 49.4±11.3 years, 16.9% females, 87% Caucasian, 2% ART naïve
- **Mean weight change within 5 years:**
 - **Group A:** 77.2±14.8 to 89.8±17.2kg
 - **Group B:** 79.2±15.7 to 79.5±15.8kg
- **Regression models in Figure 1 & 2:**
 - Increasing age: OR 0.97 [95%CI 0.95-0.99]
 - Prevalent lipoatrophy: OR 0.55 [95%CI 0.29-0.98]
 - Increasing CD4/CD8 ratio: OR 1.28 [95%CI 1.10-1.49]
 - PIs at BL & 5YFU vs. no PIs at BL & 5YFU: OR 0.48 [95%CI 0.29-0.76]
 - CD4/CD8 ratio increased from 0.8±0.5 (BL) to 1.0±3.1 (after 5 years) within this group
 - Lipoatrophy changed from 15.8% (BL) to 14.3% (after 5 years) within this group
 - Specific NRTIs: Switch to TAF after BL: OR 1.55 [95%CI 1.09-2.20] TDF at BL & 5YFU: OR 0.67 [95%CI 0.41-1.07]
 - 80.7% of TAF group switched from TDF at BL to TAF during the observation period

CONCLUSION

- Younger age & increasing CD4/CD8 ratio at BL associated with ≥10% weight gain within 5 years; Lipoatrophy at BL associated with lower risk of weight gain within 5 years
- Continuous use of PIs associated with a lower risk of weight gain
- No association of NNRTI or INSTI intake with ≥10% weight gain over 5 years
- Switching off TDF: Trend towards increased weight gain
- Switching to TAF after BL associated with increased risk for ≥10% weight gain.

ADDITIONAL KEY INFORMATION

Acknowledgement: We want to thank all patients and the whole study team who participated in the HIV HEART Aging Study. The HIV HEART Aging study was supported by Gilead Sciences and ViiV Health Care. The HIV HEART Aging study was registered in ClinicalTrials.gov (NCT04156048) and has been approved by the local ethics committee of the Medical Faculty of the University Duisburg-Essen number 14-5874-BO.
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