

# AGEING: HAART USE

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 **OSPEDALE  
SAN RAFFAELE**

# Disclosures

- I have received travel grants from Gilead Sciences.
- I have received honorarium from MSD, Gilead, ViiV Healthcare.
- GEPP0 project was partially supported from ViiV Healthcare.

ORIGINAL RESEARCH

# Ageing with HIV: do comorbidities and polymedication drive treatment optimization?\*

L Cuzin,<sup>1,2,3</sup> C Katlama,<sup>4,5</sup> L Cotte,<sup>6,7</sup> P Pugliese,<sup>8</sup> A Cheret,<sup>9,10,11</sup> C Bernaud,<sup>12</sup> D Rey,<sup>13</sup> I Poizot-Martin,<sup>14,15</sup> C Chirouze,<sup>16,17</sup> F Bani-Sadr<sup>18,19</sup> and A Cabie<sup>20,21</sup> for the Dat'AIDS Study Group<sup>†</sup>

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**Table 1** Patients' characteristics, and comparisons between the younger patients, recently diagnosed ageing patients, diagnosed after 2000 ('recent'), and experienced ageing patients, with a long HIV history ('exp.')

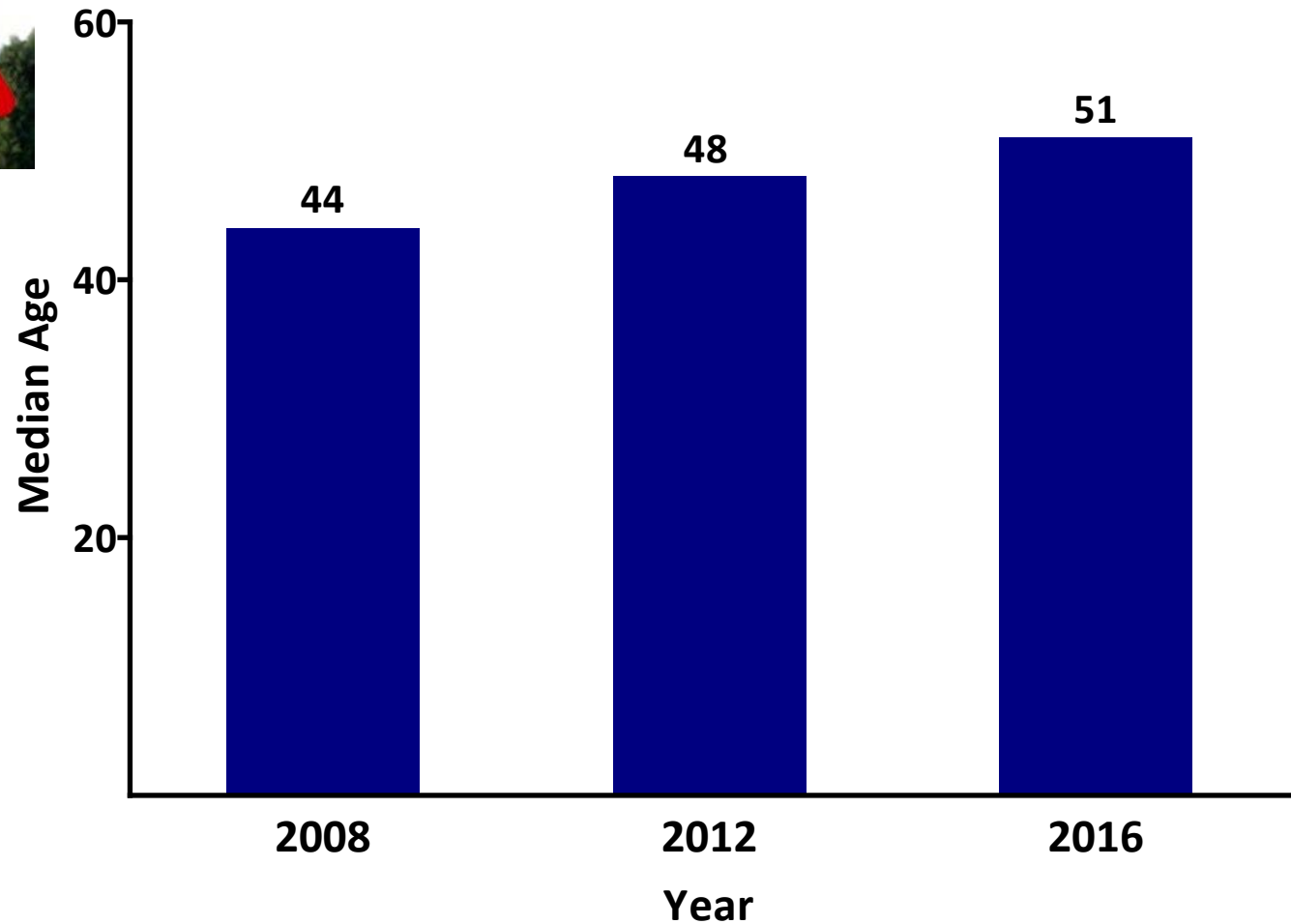
	Total ( <i>n</i> = 23683)	≤50 years old ( <i>n</i> = 13302)	Ageing, recent ( <i>n</i> = 3293)	Ageing, exp. ( <i>n</i> = 7025)	<i>P</i> *
Sex (% men)	70.5	65.2	76.7	77.7	<0.0001
Hepatitis C virus coinfection (%)	12.4	9.8	6.3	20.3	<0.0001
Most probable route of HIV acquisition (%)					
Men who have sex with men	39.8	40.4	32.9	42.1	<0.0001
Heterosexual	41.4	43.4	53.8	31.7	
Injecting drug use	9.1	6.7	2.2	16.7	
Other	9.7	9.5	11.1	9.5	
CDC class C (%)	24.2	20	26.6	31.2	<0.0001
Body mass index (kg/m <sup>2</sup> ) (%)					
<18.5	10.3	10.8	7.7	10.5	<0.0001
18.5–24	57.1	57.9	48.5	59.9	
25–30	24.1	22.8	31.3	23.0	
>30	8.6	8.6	12.5	6.7	
Duration of known infection (years) [median (25% IQR)]	14 (7–21)	11 (6–18)	8 (5–11)	22 (18–26)	<0.0001
Duration of ART (years) [median (25% IQR)]	11 (5–16)	8 (4–14)	7 (4–10)	16 (14–19)	<0.0001
Pre-ART CD4 count (cells/mL) [median (25% IQR)]	280 (158–402)	298 (180–424)	237 (97–346)	269 (151–390)	<0.0001
Pre-ART viral load (log copies/ml) [median (25% IQR)]	4.7 (4.1–5.3)	4.7 (4.1–5.2)	4.9 (4.4–5.5)	4.7 (3.8–5.3)	<0.0001
Number of different ART regimens [median (25% IQR)]	4 (2–7)	3 (2–6)	3 (2–4)	7 (4–9)	<0.0001

ART, antiretroviral therapy; CDC, Centers for Disease Control and Prevention; IQR, interquartile range.

\*Comparisons between the three patient groups.



# Population ageing



Subjects > 65 years-old: 391 (9%)



gerpro  
cohort

**GE**riatric **P**atients living with HIV/AIDS  
a **P**rospective multidimensional **cO**hort

# GEPPO

## (GERiatricPatients living with HIV/AIDS in Italy)

### 10 ID Italian Centers + 1 Geriatric Center



### Institutions

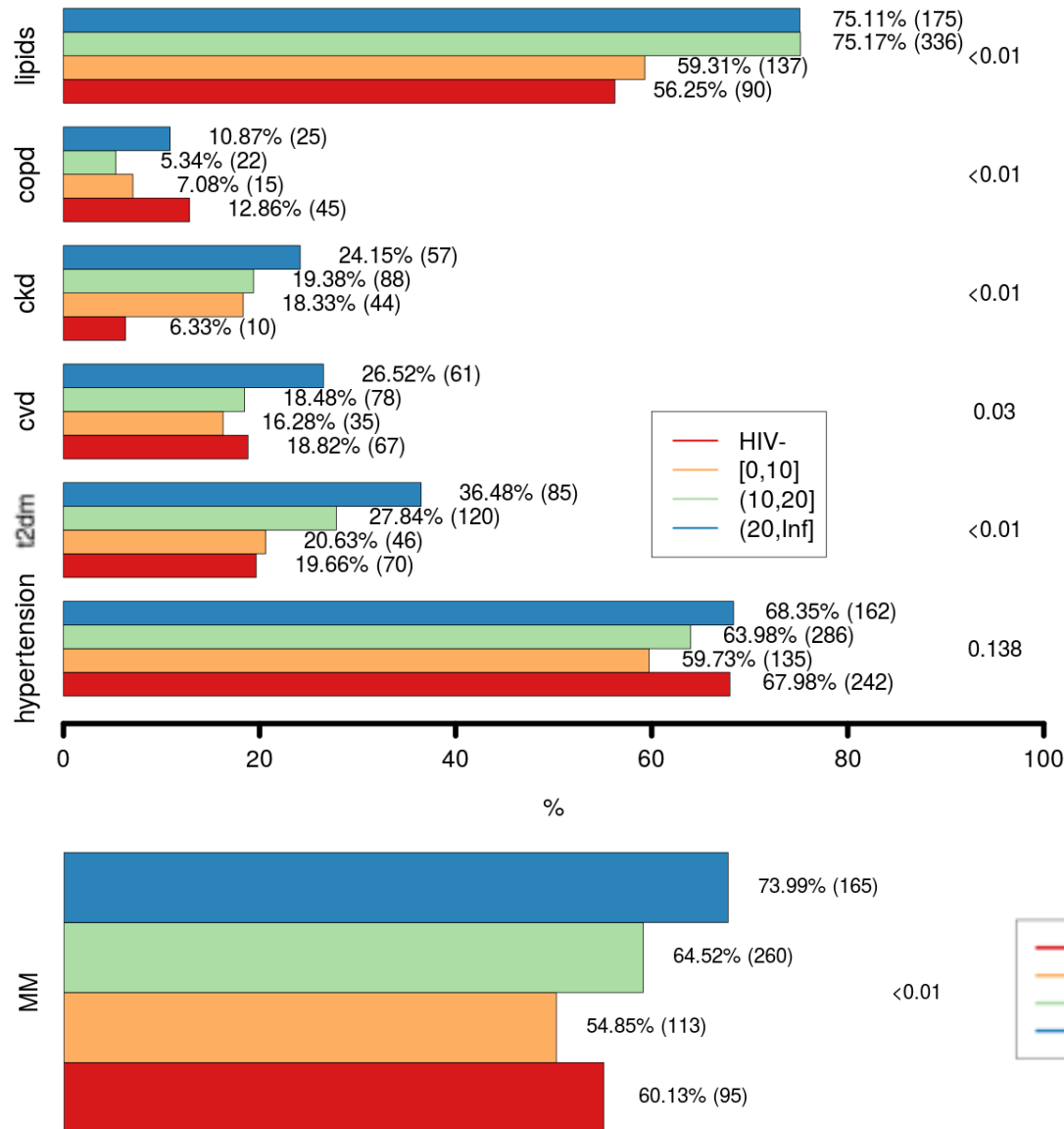
1. BRESCIA (Castelli): *EMANUELE FOCA'*
2. CATANIA (Cacopardo): *CELESIA BENEDETTO*
3. MILANO IRCCS (Lazzarin) *NOZZA SILVIA*
4. MILANO L. SACCO (Rizzardini) *PICONI STEFANIA*
5. MILANO L. SACCO (Galli) *RIVA AGOSTINO*
6. MODENA POLICLINICO *GUARALDI GIOVANNI*
7. PADOVA *CATTELAN ANNA MARIA*
8. PERUGIA (Baldelli) *DE SOCIO GIUSEPPE*
9. TORINO: *DI PERRI GIOVANNI; CALCAGNO ANDREA*
10. TORINO (Caramello) *OROFINO GIANCARLO*
11. MODENA BAGGIOVARA *MUSSI CHIARA*



# GEPP0 demographics

	Total (n = 1679)	HIV- (n = 356)	HIV+ (n = 1323)	P-Value
	Mean (SD) [n]	Mean (SD) [n]	Mean (SD) [n]	
- F	24.78% [416]	54.21% [193]	16.86% [223]	< 0.01
- M	75.22% [1263]	45.79% [163]	83.14% [1100]	
Age median (ds)	71.37 (5.04) [1679]	71.62 (5.27) [356]	71.3 (4.98) [1323]	0,293
- [65,69)	45.07% [755]	43.82% [156]	45.41% [599]	
- [70,74)	30.15% [505]	29.21% [104]	30.4% [401]	
- [75,Inf]	24.78% [415]	26.97% [96]	24.18% [319]	
Current smoker	22.65% [325]	14.71% [49]	25.05% [276]	< 0.0001
BMI	26.62 (8.39) [1318]	28.75 (4.38) [345]	25.86 (9.29) [973]	< 0.01
HIV duration (years)			16.55 (7.5) [1302]	
<10 years			424 (33.11%)	
10-20 years			596 (46.5%)	
>20 years			<b>261 (20%)</b>	
CD4 Nadir			<b>218.84 (175.77)</b>	
Current CD4			641.31 (287.62) [1294]	
CD4 / CD8 median and SD			0.97 (1.42) [1077]	
Viral Load ≤ 40			<b>94.07% [1078]</b>	
Viral Load Undetectable			86.37% [963]	
HBV co-infection			9.6% [105]	
HCV co-infection			12.61% [147]	

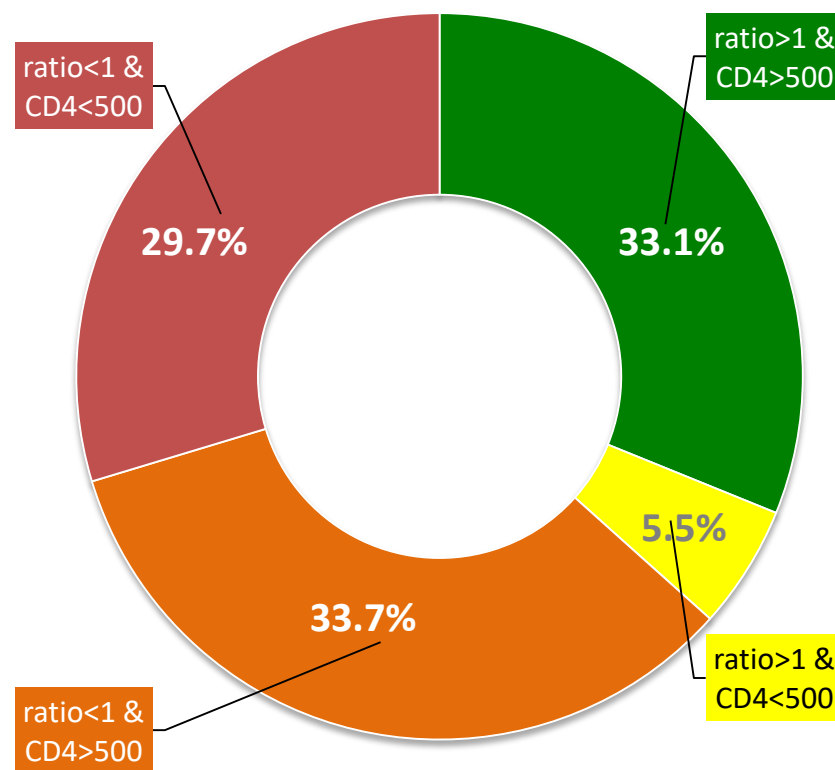




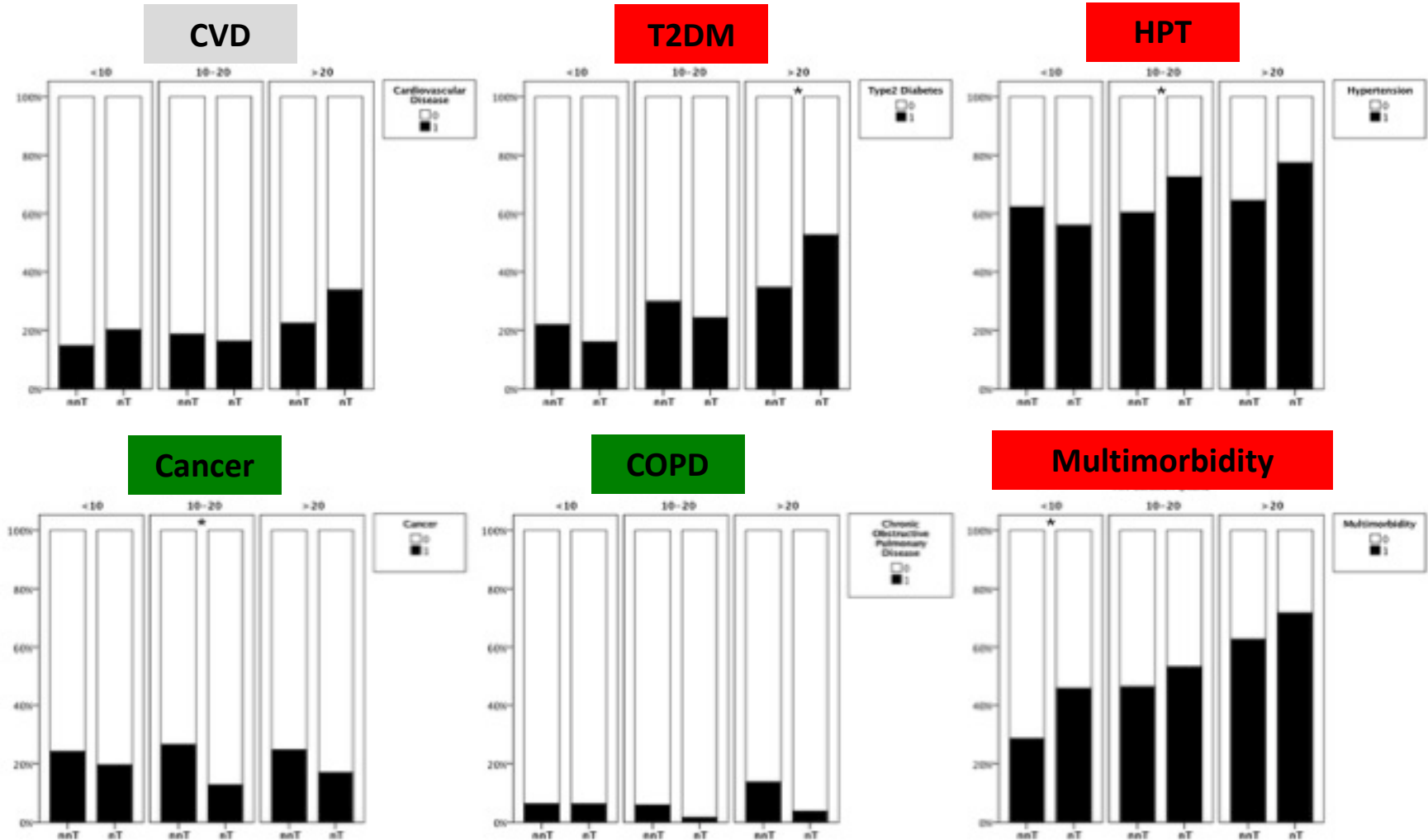
## Normalized T-cell subset prevalence and predictors

- n=1092 GEPP0 participants: 95.1% HIV RNA < 50 copies/mL

- At multivariate binary logistic analysis (including HIV duration and age), only
  - **plasma HIV RNA < 50 copies/mL** (P = 0.004, aOR 3.77, 95%CI 1.53 to 9.26)
  - **female sex** (P = 0.002, aOR 1.75, 95% CI: 1.22 to 2.51)
  - **and nadir CD4+ cell count** (per 100 cells/mL increase P = 0.001, aOR 1.50, 95% CI: 1.36 to 1.66) were independent predictors of nT



# Normalized T-cell subset HIV-associated Non AIDS conditions

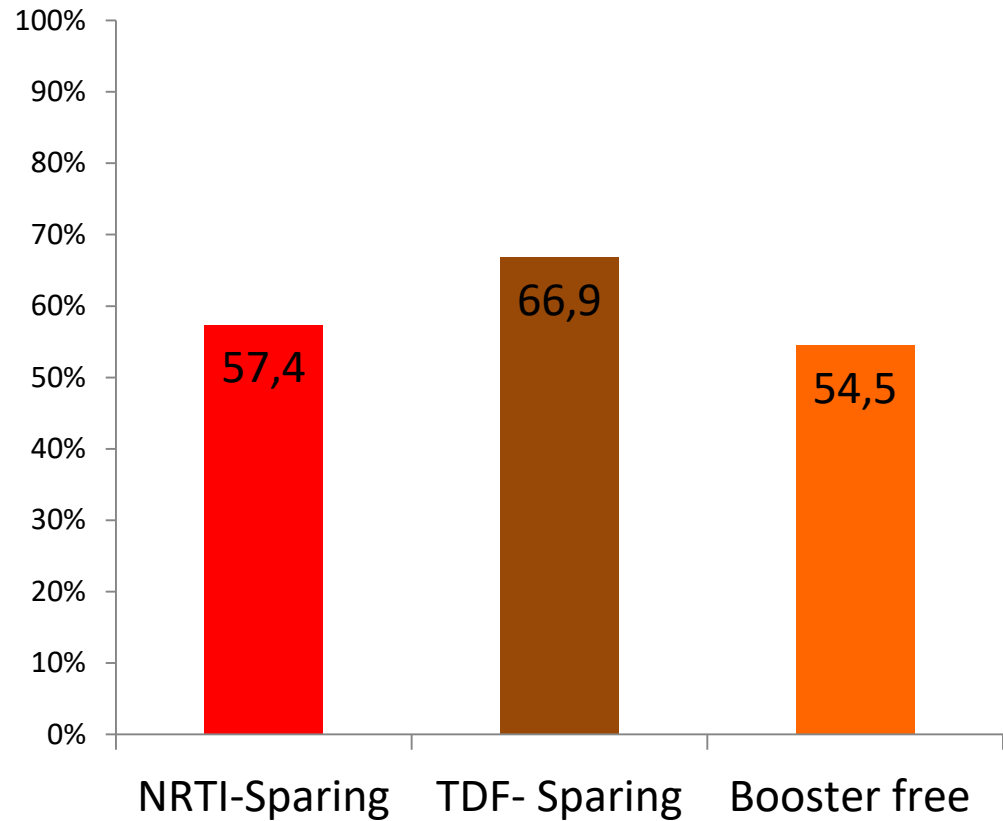
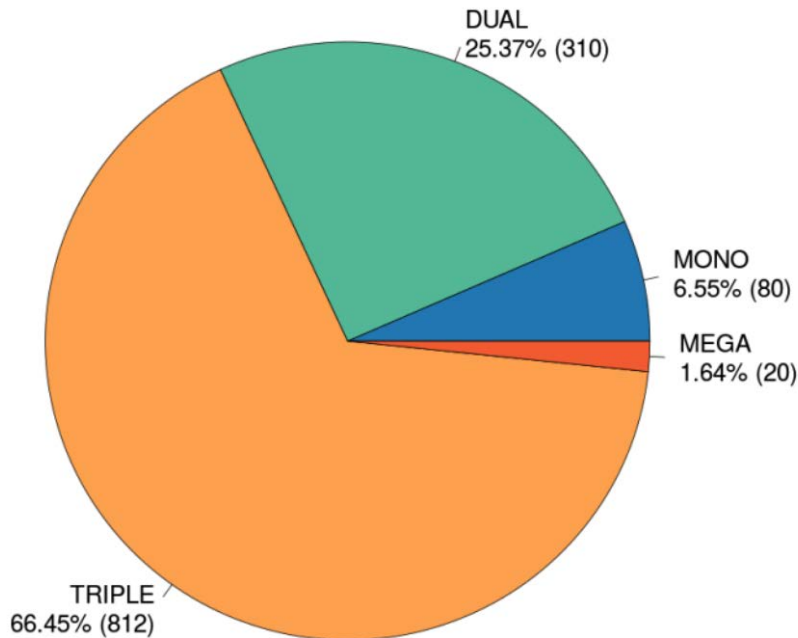


## Normalized T-cell subset HIV-associated Non-AIDS conditions

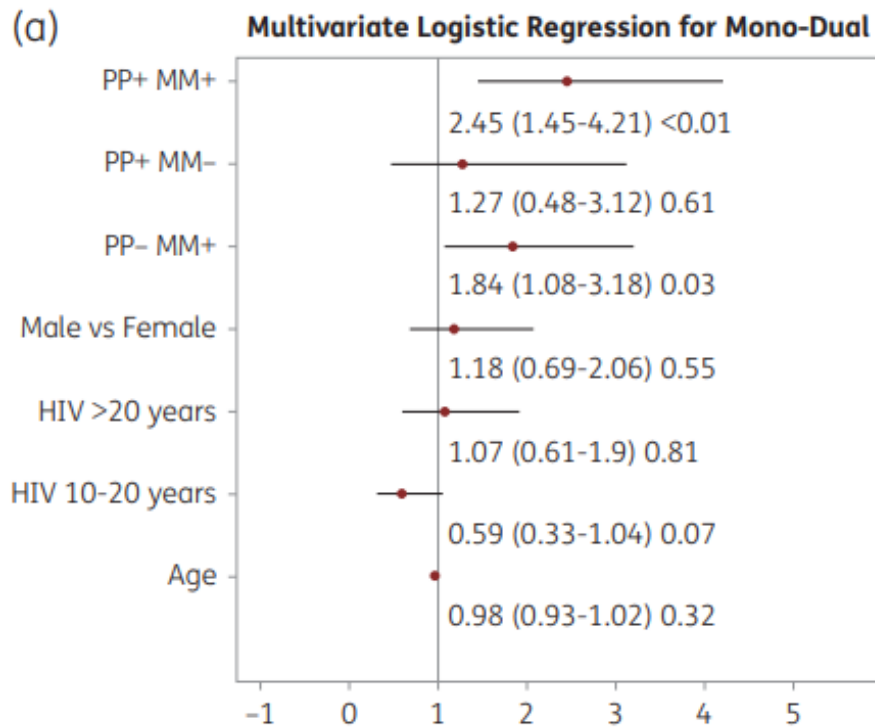
After correcting for age, gender, body mass index and n-T, **HIV duration** was an independent predictor of **chronic kidney impairment, bone disease, lipid abnormalities, hypertension, diabetes and cirrhosis**. **n-T** was independently protective for **cancer and COPD**. **HIV duration and n-T** were simultaneous predictors of **multimorbidity**.

# GEPP0 and Antiretrovirals

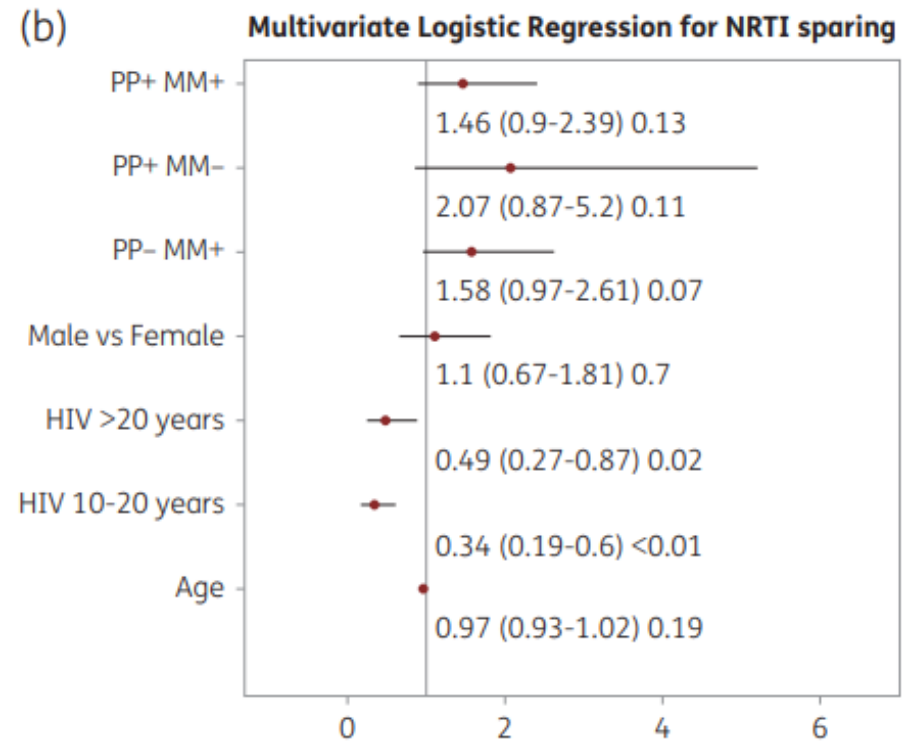
ARV Therapy



# Tailored regimens

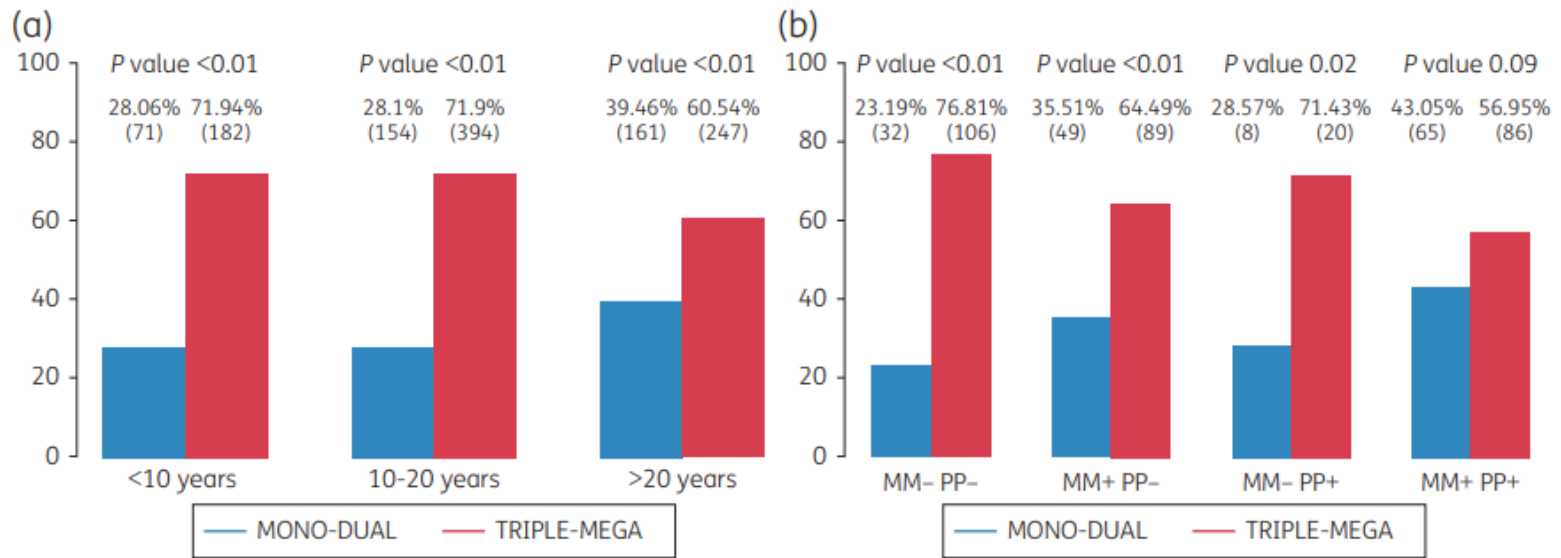


mono and dual combination of therapy panel a



NRTI-sparing therapy panel b

# Tailored regimens



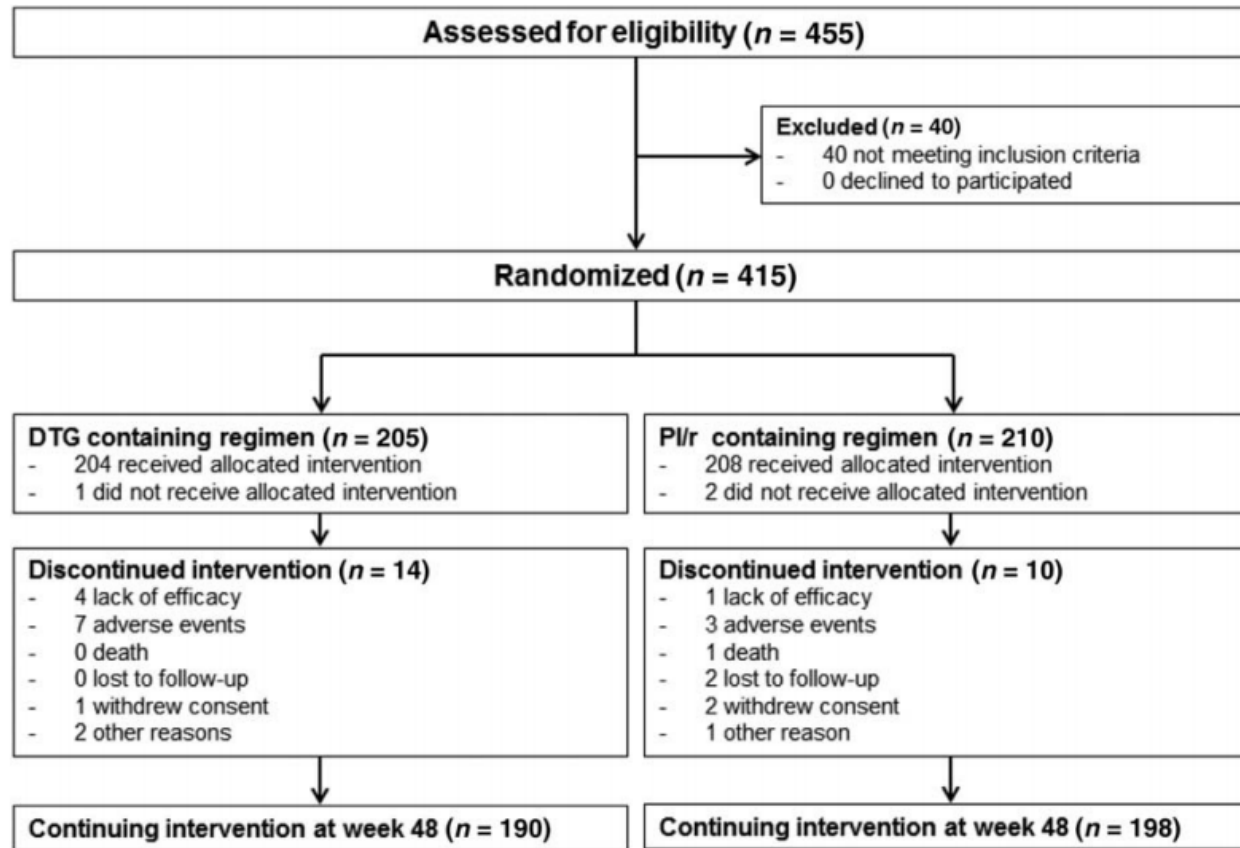
**Figure 2.** ARV prescription strategies. (a) According to duration of HIV infection (categorized in three intervals: <10, 10-20 and >20 years). (b) According to combinations of MM and PP.



OPEN

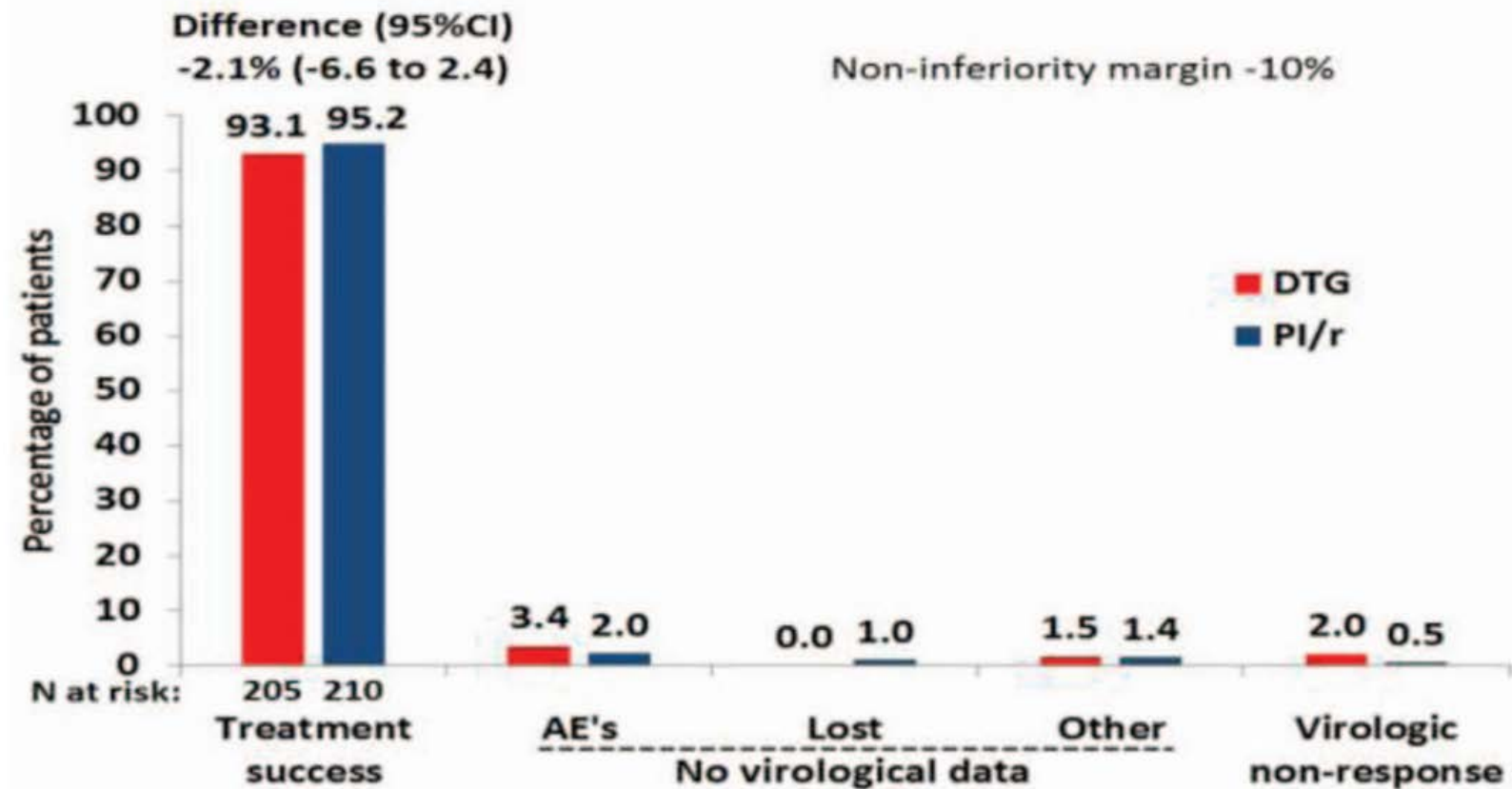
# Switching from a ritonavir-boosted protease inhibitor to a dolutegravir-based regimen for maintenance of HIV viral suppression in patients with high cardiovascular risk

José M. Gatell<sup>a</sup>, Lambert Assoumou<sup>b</sup>, Graeme Moyle<sup>c</sup>, Laura Waters<sup>d</sup>,  
Margaret Johnson<sup>e</sup>, Pere Domingo<sup>f</sup>, Julie Fox<sup>g</sup>, Esteban Martinez<sup>a</sup>,  
Hans-Jürgen Stellbrink<sup>h</sup>, Giovanni Guaraldi<sup>i</sup>, Mar Masia<sup>j</sup>,  
Mark Gompels<sup>k</sup>, Stephane De Wit<sup>l</sup>, Eric Florence<sup>m</sup>, Stefan Esser<sup>n</sup>,  
François Raffi<sup>o</sup>, Anton L. Pozniak<sup>c</sup>, NEAT022 Study Group<sup>\*</sup>

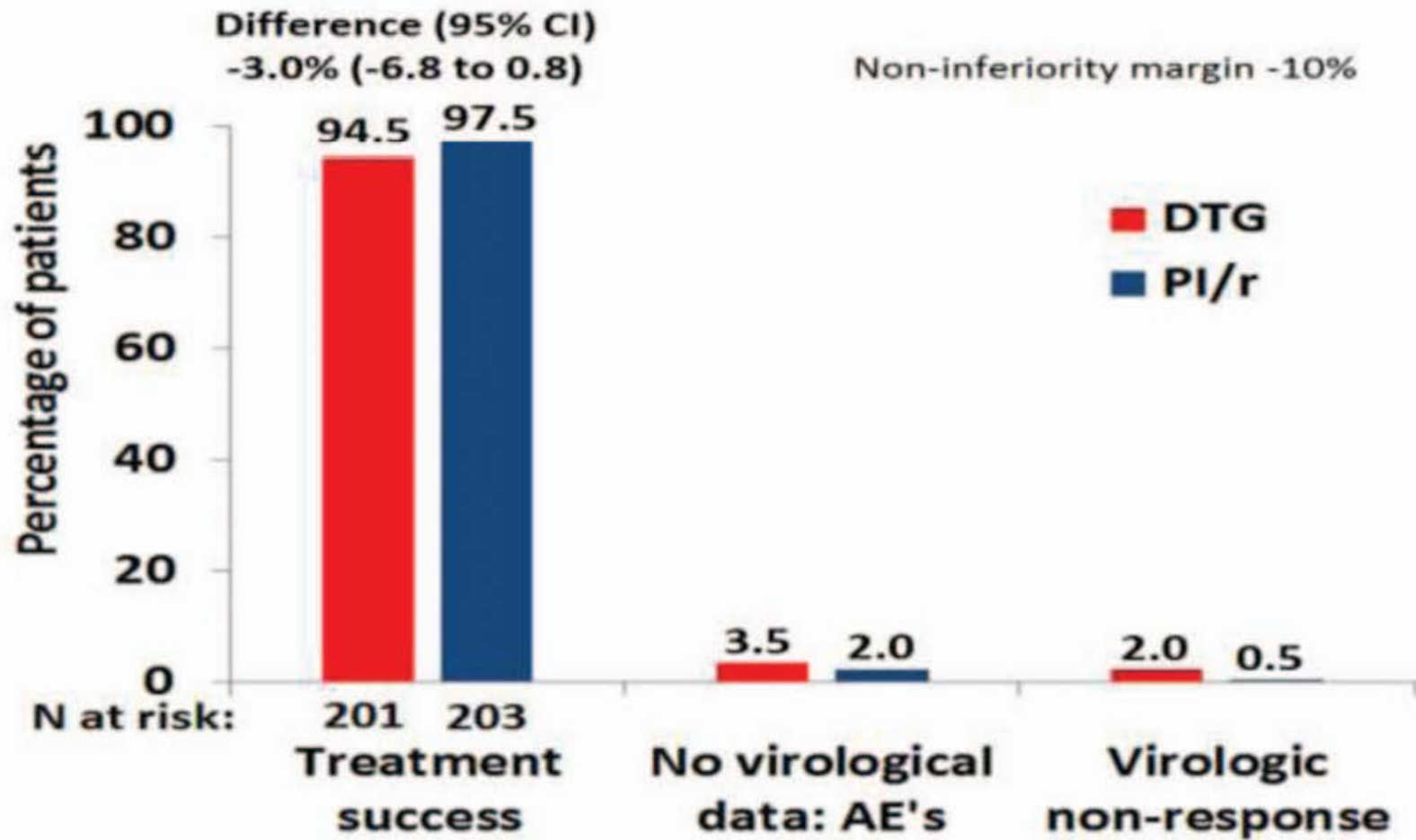


**Fig. 1. Trial profile.** DTG, dolutegravir; PI/r, ritonavir-boosted protease inhibitors. A genotypic resistance test was available in 19 (47.5%) of the 40 patients assessed for eligibility but not randomized. Presence of resistance mutations was the reason in two (5%) of these 40 patients.

(a) Intent-to-treat (ITT) analysis



(b) Per-protocol analysis



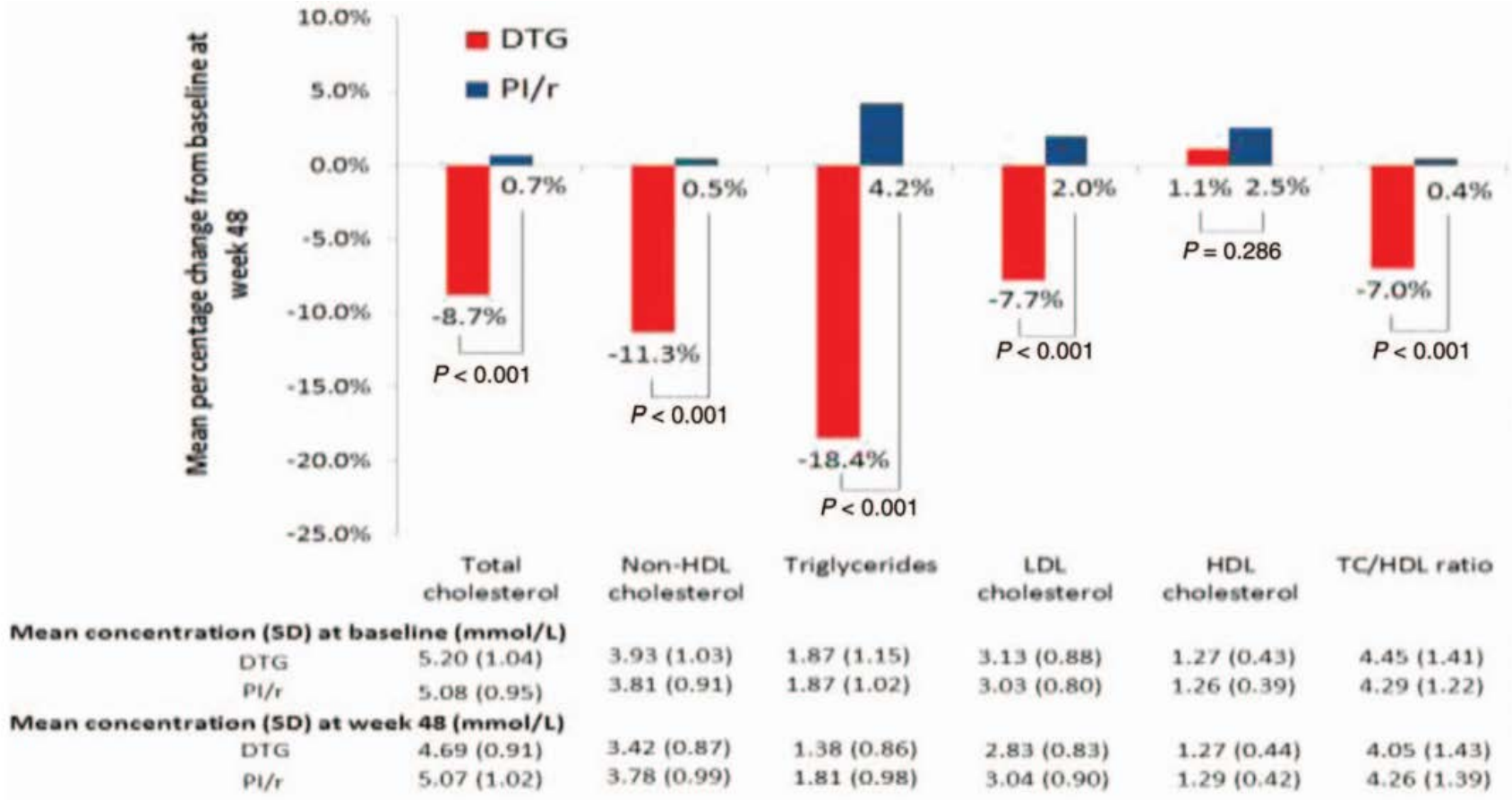
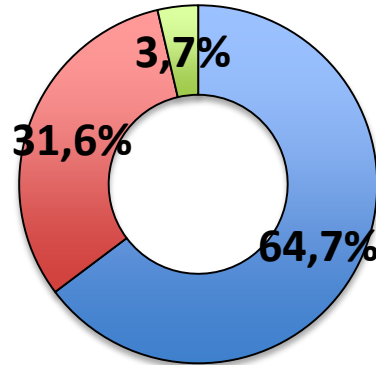


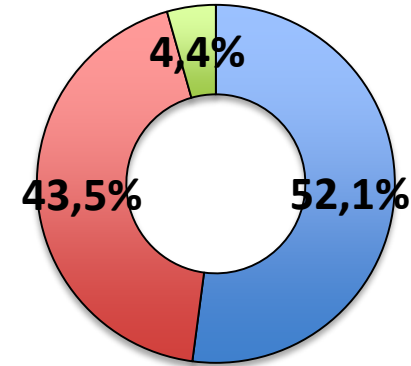
Fig. 3. Changes in fasting lipid concentration from baseline to week 48 (N = 415). DTG, dolutegravir; PI/r, ritonavir-boosted protease inhibitors; TC, total cholesterol.

Guaraldi G, et al. for the GEPO cohort. Under Review

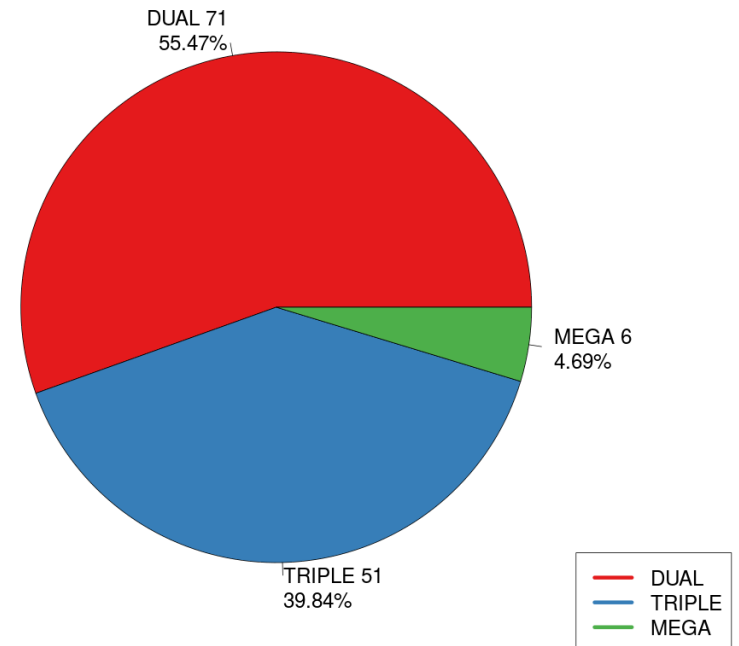
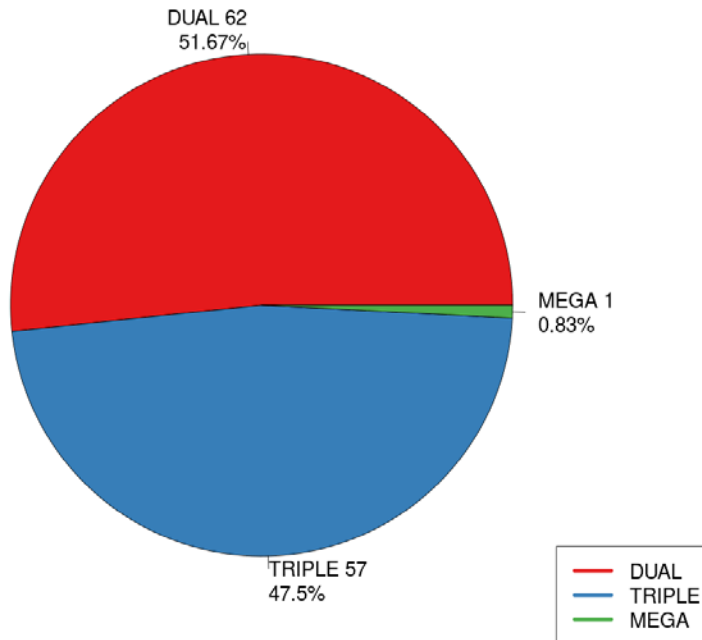
# 2015 vs. 2017



INSTI regimens with DTG (2015)



INSTI regimens with DTG (2017)

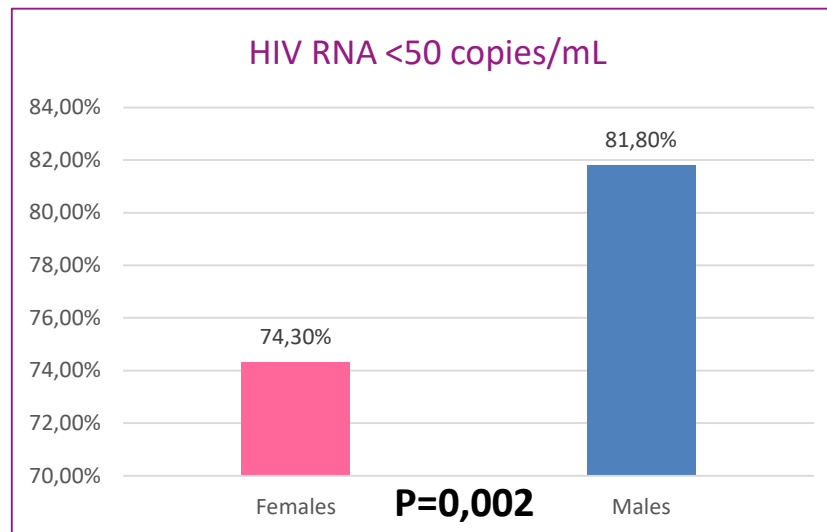
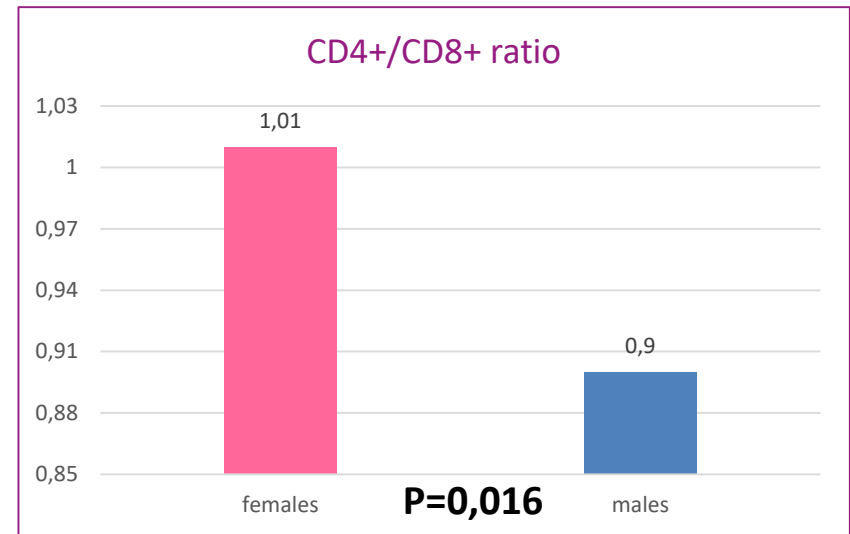
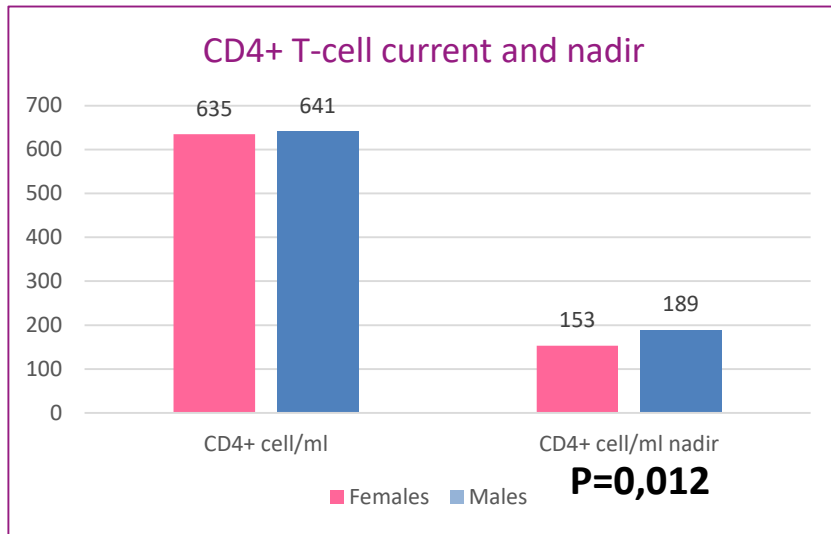




Variable	Females (n=210)	Males (n= 1027)	Total (n=1237)	p
<b>ARV therapies</b>				
• Mono-dual	60 (28.6%)	299 (29.1%)	359 (29%)	n.s
• Triple	147 (70%)	711 (69.2%)	858 (69.3%)	
• Other	3 (1.4%)	17 (0.3%)	20 (1.61%)	
<b>Regimen including:</b>				
• PI	83 (39.5%)	481 (46.8%)	564 (45.5%)	<b>0.05</b>
• NNRTI	86 (41%)	441 (42.9%)	527 (42.6%)	n.s.
• InSTI	75 (35.7%)	305 (29.7%)	380 (30.7%)	n.s
<b>NRTI-sparing regimens</b>	52 (24.8%)	278 (27.1%)	330(26.6%)	n.s.
<b>TDF-sparing regimens</b>	157 (74.8%)	742 (72.2%)	899 (72.6%)	n.s.
<b>Unboosted regimens</b>	143 (68.1%)	642 (62.5%)	785 (63.4%)	n.s.
<b>Mean comorbidities</b>	2.19 (±1.42)	2.37 (±1.42)	2.34 (±1.42)	n.s.
<b>Comorbidities</b>				
• CVD	14 (9.5%)	154 (22.8%)	168 (20.46%)	<b>&lt; 0.001</b>
• CKD	34 (21.3%)	150 (20.8%)	184 (20.8%)	n.s.
• Hypertension	113 (65.3%)	456 (64.5%)	569 (64.6%)	n.s.
• T2DM	38 (24.5%)	201 (29.1%)	239 (28.3%)	n.s.
• Bone disease	79 (48.8%)	134 (22.9%)	213 (28.5%)	<b>&lt; 0.001</b>
• Hyperlipidemia	134 (75.3%)	497 (70.5%)	631 (71.4%)	n.s.
• COPD	7 (4.8%)	57 (8.6%)	64 (7.9%)	n.s.
• Cancer	30 (16%)	147 (22.3%)	177 (20.92%)	n.s.
<b>Polypharmacy (≥5 drug excluded cART)</b>	42 (20%)	234 (22.8%)	254 (20.5%)	n.s.

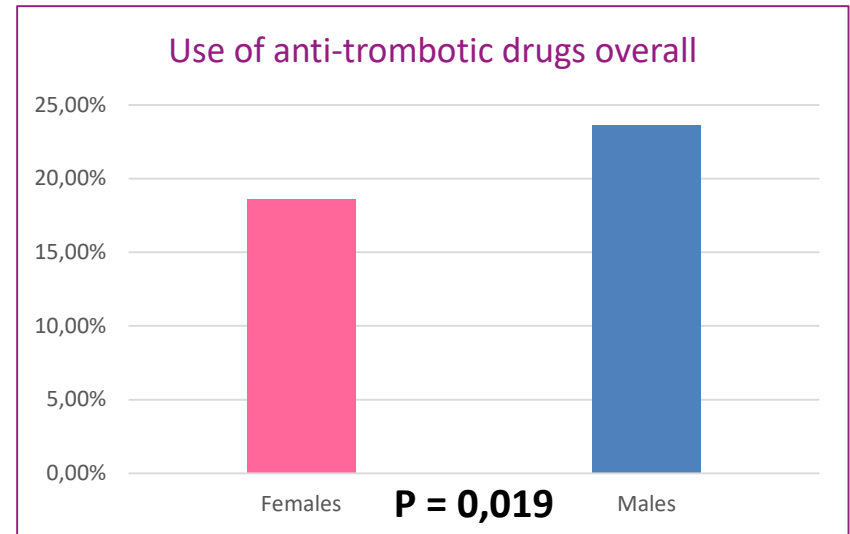
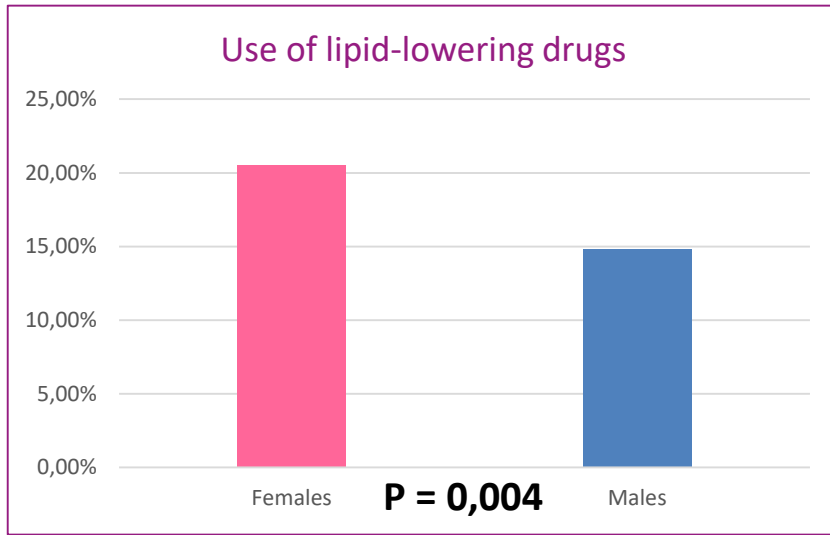


# GEPPPO "PINK"



# GEPPPO "PINK"

Polypharmacy rate was similar: 20% vs. 22.8%



- A higher use of lipid-lowering drugs (20.5% vs. 14.8%,  $p = 0.04$ ) was observed in females
- Women were less likely to receive anti-thrombotic agents (18.6% vs. 26.3%,  $p = 0.019$ ) even when CVD was recorded ( $p = 0.018$ )



GEriatric Patiens living with HIV/AIDS  
a Prospective multidimensional cOhort

# The GEPPPO Prospective cohort The „Master“ Project



A clinical cohort assessing the trajectory of ageing and the role of

- Polypharmacy/DDIs/Single drugs
  - Comorbidities
- Other factors including nutrition, immune profile, microbiome composition, urinary metabolomics
  1. In the transition to frailty and to disability
  2. In neurocognitive decline
  3. In the quality of life

## Take Home Messages

- There is higher prevalence of non conventional ARV regimens in elderly HIV
- ARV is prescribed according to age, HIV duration, MM and PP
- There is not a preferred regimen in elderly HIV patients
- DTG and RAL have a smart profile for elderly patients
- Prospective data of our cohort will be available

# Ageing with HIV - a young cohort -

Oana Săndulescu, MD, PhD



National Institute for Infectious Diseases  
"Prof. Dr. Matei Bals"  
Romania



Department of Infectious Diseases, Carol Davila University of  
Medicine and Pharmacy  
Bucharest, Romania

# Disclosures

- Disclosures:
  - Partial funding from Abbvie: osteo-renal and neurocognitive programs
  - Partial funding from MSD: cardio-metabolic program
- No relevant conflict of interest to declare in relation to this presentation.

# Romania – 20 millions people

- HIV prevalence: 0.07%<sup>1</sup>
- Annual incidence: 0.002%<sup>1</sup>
  - 725 new cases per year on average during 2007-2017:
    - 2007-2010 (**538** cases/year)
    - 2011-2017 (**850** cases/year)
- Romanian “pediatric HIV cohort” – infection occurred during childhood, in the late 80’s

<sup>1</sup>Calculated based on: [www.cnlas.ro](http://www.cnlas.ro). Data current through 30 Jun 2017.



## HIV infection in Romania

Romanian  
“cohort”

- Infected late 80’s early 90’s<sup>1</sup>
- Epidemiologic accident
- Subtype F1<sup>2,3</sup>

Injecting  
drug users

- “Legal highs”<sup>4</sup>
- Short half-life
- 10-14 injections/day

New waves

- Heterosexual adult transmission
- MSM<sup>5</sup>
- Low rate of MTCT<sup>6</sup>

<sup>1</sup>Streinu-Cercel A. *GERMS*. 2014;4(2):29

<sup>2</sup>Paraschiv S *et al*, *Int J Infect Dis*. 2007;11(2):123-8

<sup>3</sup>Stanojevic M *et al*, *AIDS Rev*. 2012;14(1):28-36

<sup>4</sup>Erscoiu S *et al*, *BMC Infect Dis*. 2013;13(Suppl 1):O6

<sup>5</sup>Paraschiv S *et al*, *Infect Genet Evol*. 2012;12(5):1052-7

<sup>6</sup>Tudor AM *et al*, *Germs*. 2015;5(4):116-24

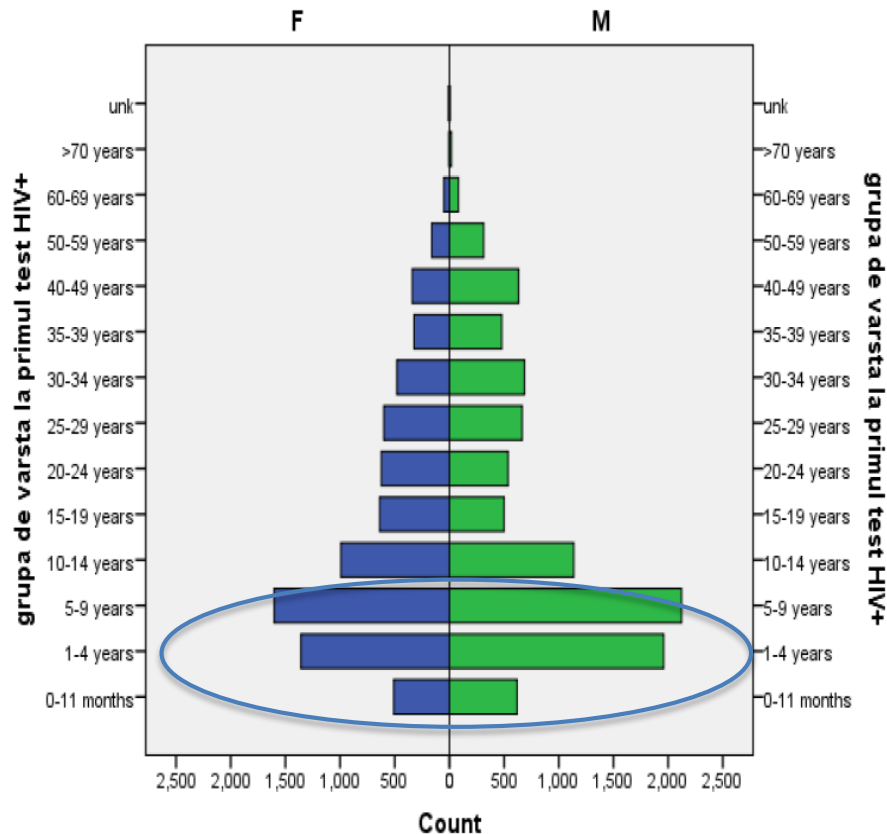
# Treatment regimens

- Universal access to ART since 2001: 87.2% of patients on HAART<sup>1</sup>
- Treatment regimens:
  - 45% 2 NRTIs + 1 PI/r
  - 33% 2 NRTIs + 1 NNRTI
  - 5% II-containing regimens

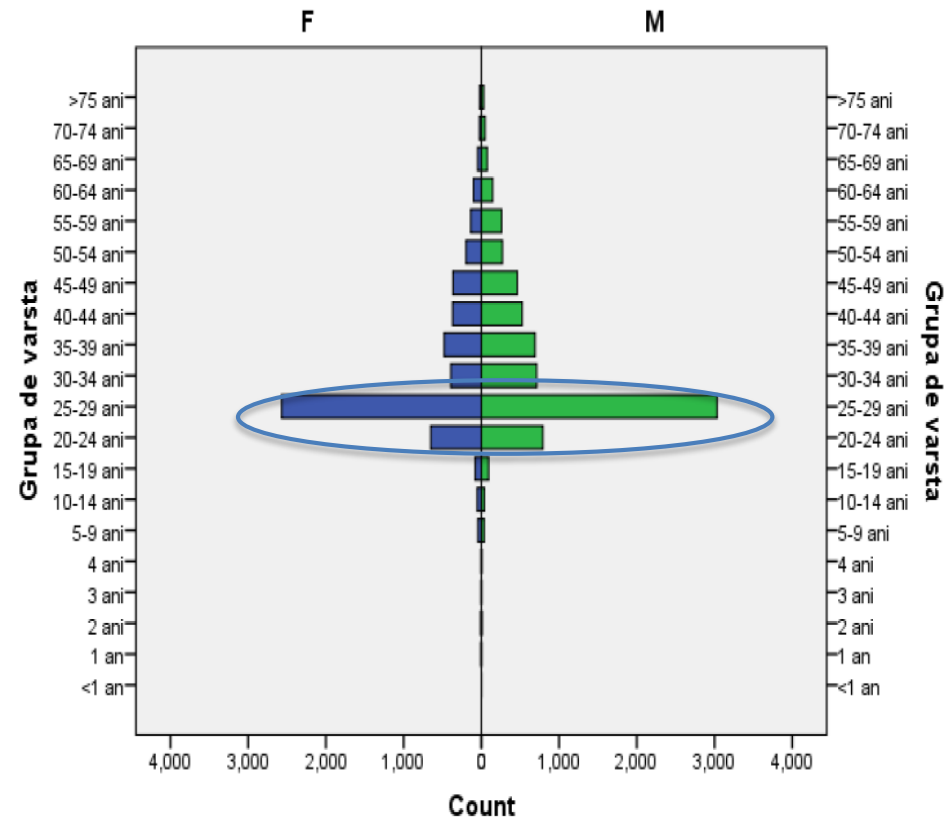
<sup>1</sup>Calculated based on: [www.cnlas.ro](http://www.cnlas.ro). Data current through 30 Jun 2017

# Romanian HIV cohort – young by age...

Age at the time of detection/notification



Current age



## ... old by treatment ... premature ageing

- Late 80's, early 90's
- Antiretrovirals timeline
- Ageing with HIV
- Comorbidities

# Long-term impact of HIV infection, ART

- Ageing with HIV<sup>1</sup>

## HIV and Aging: Time for a New Paradigm

Amy C. Justice

### ORAL PRESENTATION

Open Access

- Neurocognitive impairment<sup>2</sup>

Computerized screening tools for neurocognitive impairment in patients with HIV infection

Ioana-Catrinel Cercel<sup>1\*</sup>, Șerban Polli<sup>1</sup>, Oana Streinu-Cercel<sup>1,2</sup>, Anca Streinu-Cercel<sup>1,2</sup>, Adrian Streinu-Cercel<sup>1,2</sup>

### POSTER PRESENTATION

Open Access

- Cardio-metabolic risk<sup>3</sup>

Screening for cardio-metabolic risk factors in the Romanian cohort of HIV-positive patients

Anca Streinu-Cercel<sup>1,2\*</sup>, Oana Săndulescu<sup>1,2</sup>, Claudiu Mihai Șchiopu<sup>2</sup>, Adrian Streinu-Cercel<sup>1,2</sup>

- Osteo-renal impairment<sup>4</sup>

HIV and bone mineral density

Anca Streinu-Cercel\*  
Editor

<sup>1</sup>Justice AC. *Curr HIV/AIDS Rep.* 2010;7(2):69-76

<sup>2</sup>Cercel IC *et al*, *BMC Infectious Diseases*. Oral presentation. 2014;14(Suppl 4):O29

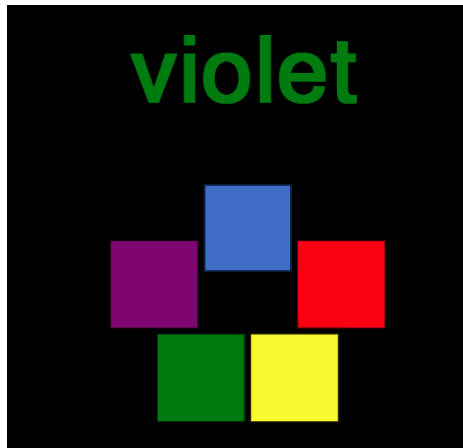
<sup>3</sup>Streinu-Cercel A *et al*, *BMC Infectious Diseases*. Poster presentation. 2014;14(Suppl 7):P61

<sup>4</sup>Streinu-Cercel A. *Germs*. 2015;5(1):7

# Computerized neurocognitive assessment



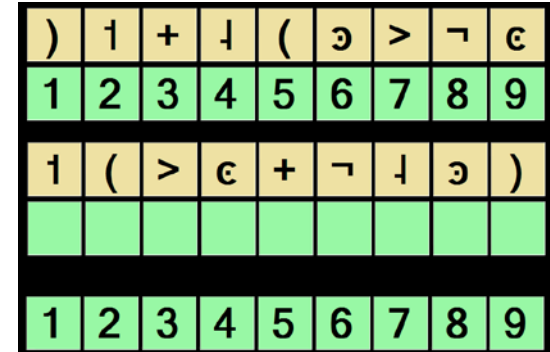
Motor screening task (screening)



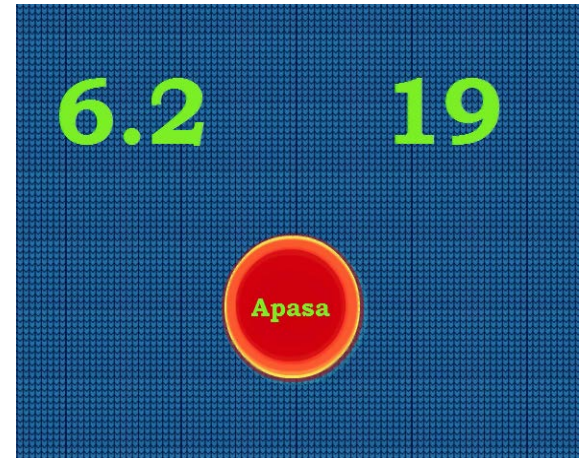
Stroop task (problem solving)

Total time to complete: 15-20 min. Every touch on touchscreen was recorded – precise measurements (milliseconds).

Two groups:  
A = HIV-negative (n=15)  
B = HIV-positive (n=10)



Symbol digit (attention)



Finger tapping test (motor function)

# Neurocognitive assessment

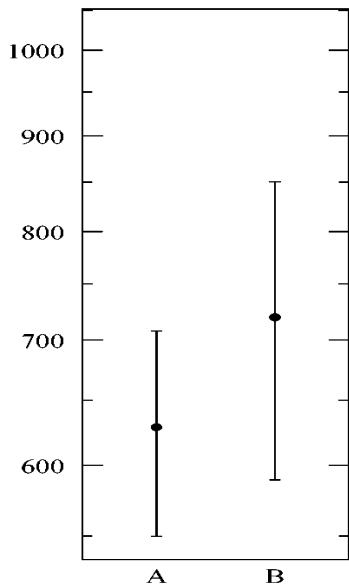
A = HIV-negative  
B = HIV-positive

ORAL PRESENTATION

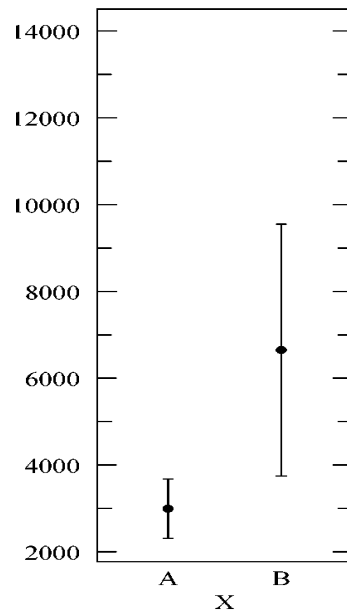
Open Access

## Computerized screening tools for neurocognitive impairment in patients with HIV infection

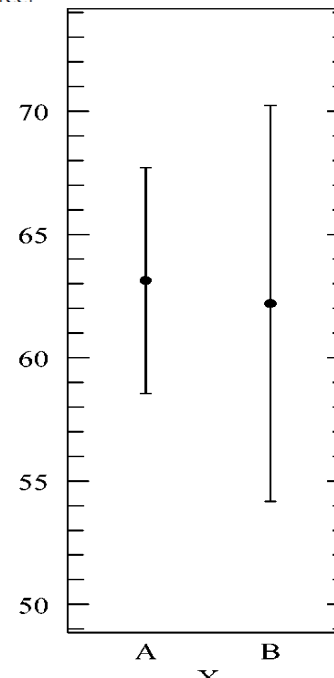
Ioana-Catrinel Cercel<sup>1\*</sup>, Șerban Polli<sup>1</sup>, Oana Streinu-Cercel<sup>1,2</sup>, Anca Streinu-Cercel<sup>1,2</sup>, Adrian Streinu-Cercel<sup>1,2</sup>



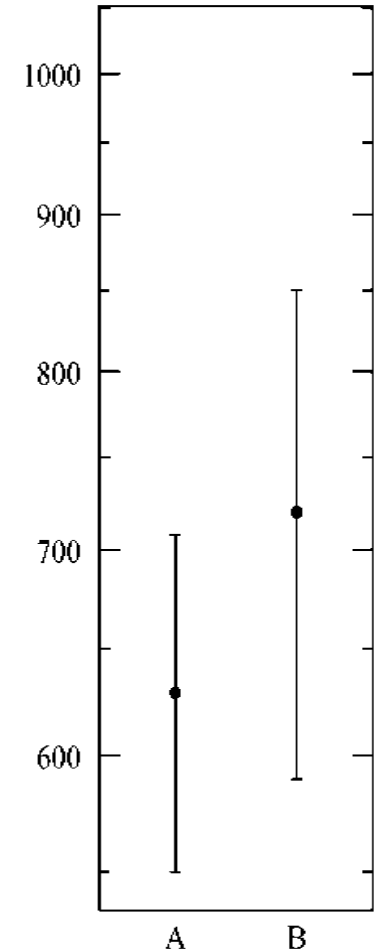
Motor screening



Symbol digit



Finger tapping



Stroop task

# Neurocognitive assessment

Cercel *et al.* *BMC Infectious Diseases* 2014, **14**(Suppl 4):O29  
<http://www.biomedcentral.com/1471-2334/14/S4/O29>



**ORAL PRESENTATION**

**Open Access**

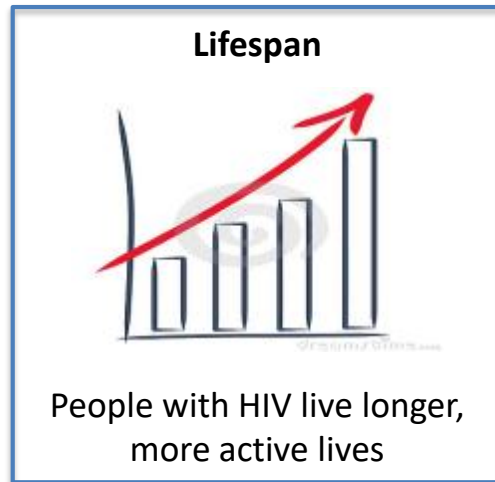
## Computerized screening tools for neurocognitive impairment in patients with HIV infection

Ioana-Catrinel Cercel<sup>1\*</sup>, Șerban Polli<sup>1</sup>, Oana Streinu-Cercel<sup>1,2</sup>, Anca Streinu-Cercel<sup>1,2</sup>, Adrian Streinu-Cercel<sup>1,2</sup>

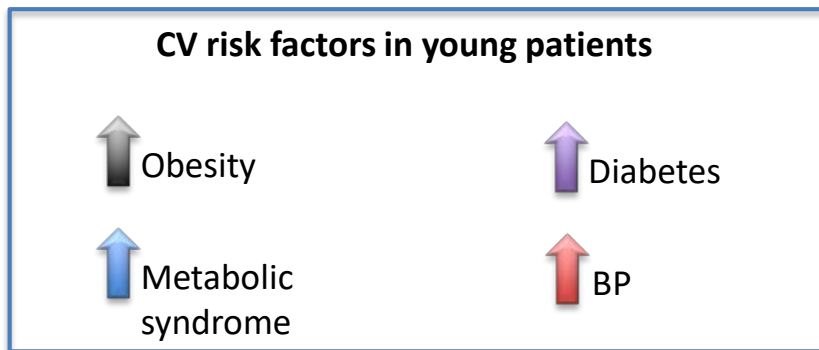
- Cognitive deficits appear earlier than motor deficits
- Underdiagnosed



# Cardiovascular and cardio-metabolic risk



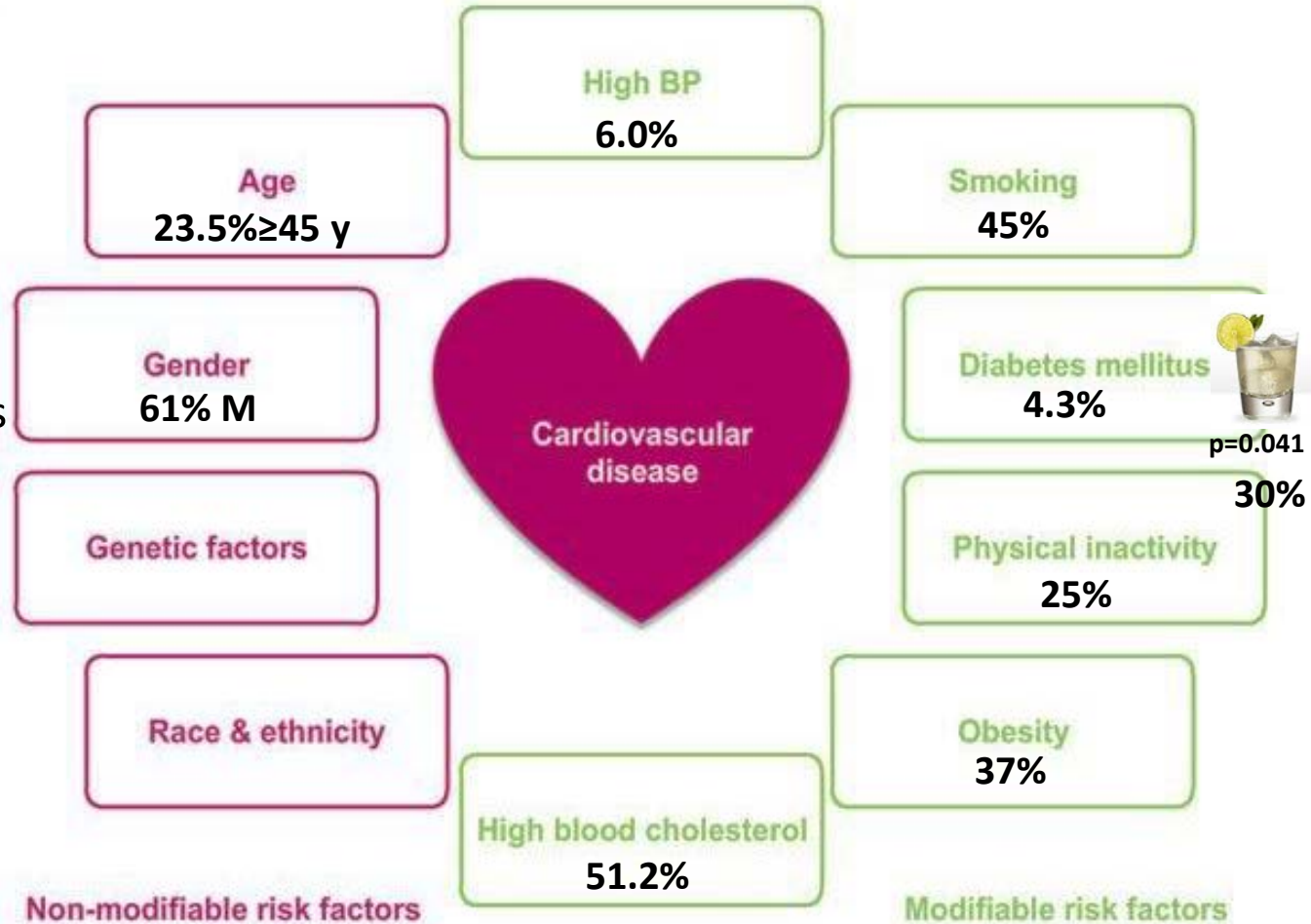
- Traditional risk factors:
  - Modifiable
  - Non-modifiable
  
- Accelerated atheromatosis:
  - Virus
  - Therapy
  - Chronic inflammation
  - Immune activation
  - Premature ageing



# Cross sectional study in Romania – 2016

- 119 HIV-positive patients
- 61% males
- Collected variables
  - History of HIV infection
  - History of ART
  - Comorbidities
  - CV risk factors
  - Diet and lifestyle
- Time of infection
  - 1988-1990 – children
  - 1988-1990 – adults
  - Recent infection (<10 years)
- Comprehensive laboratory assessment

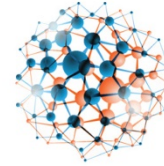
WHF 2025 GOAL  
PREMATURE MORTALITY FROM CARDIOVASCULAR DISEASE  
**25%**  
REDUCTION



- Age: 35 years
- 73% had comorbidities
- 96.6% on HAART
- Recent CD4: 518 c/uL
- Nadir CD4: 308 c/uL
- Age at infection **p<0.001**

# GERMS

enabling the future



Original article

## Cardiac involvement in HIV-positive patients

Efrat Daglan,<sup>1,\*</sup> Dan Yamin,<sup>2</sup> Bogdana Manu,<sup>3</sup> Anca Streinu-Cercel<sup>4</sup>

- 40 patients, “pediatric” cohort
- Framingham
- CV risk factors
- Median age 23 years (+ 10 y = 33 y)
- **Cumulated risk factors**

Risk factor	Odds Ratio	90%CI
Cholesterol AND smoking	5.75	1.263-26.169
Gender (male)	3.187	1.038-9.779
Cholesterol (>200 mg/dL)	2.666	0.804-8.842
Smoking (above 10 packs-year)	2.538	0.789-8.163
Low HDL (<40 mg/dL)	1.416	0.461-4.346
High LDL (>130 mg/dL)	1.454	0.409-5.170
High TG (>200 mg/dL)	1.454	0.409-5.170
Age >30 years	0.935	0.278-3.141
Alcohol consumption	0.687	0.232-2.028
Duration of ARV therapy (>15 years)	0.347	0.069-1.751

**Table 2. Multivariate analysis of risk factors for cardiac involvement in HIV-positive patients**

## Female patient, 28 years old

- HIV infection diagnosed at 7 y/o
- Romanian HIV cohort
- HIV C3
- On ART for 20 years
- Undetectable for the past 10 years
- CD4 ~ 350 c/ $\mu$ L for the past years

## Female patient, 28 years old

- HIV infection diagnosed at 7 y/o
  - Romanian HIV cohort
  - HIV C3
  - On ART for 20 years
  - Undetectable for the past 10 years
  - CD4 ~ 350 c/μL for the past years
  - Develops severe postprandial abdominal pain
  - Stops ART due to nausea, vomiting, abdominal pain
  - CD4 ↓ to 100 in 2 months
  - HIV RNA ↑
- Q1: What could be the most likely cause of postprandial pain?
- A. Infectious enteritis
  - B. Abdominal TB
  - C. Histoplasmosis
  - D. Pancreatitis
  - E. None of those above

## Female patient, 28 years old

- HIV infection diagnosed at 7 y/o
  - Romanian HIV cohort
  - HIV C3
  - On ART for 20 years
  - Undetectable for the past 10 years
  - CD4 ~ 350 c/μL for the past years
  - Develops severe postprandial abdominal pain
  - Stops ART due to nausea, vomiting, abdominal pain
  - CD4 ↓ to 100 in 2 months
  - HIV RNA ↑
- Q2: What would be the most relevant investigation?
- A. Stool cultures and microscopy
  - B. Abdominal ultrasound
  - C. Endoscopy
  - D. Abdominal CT
  - E. Abdominal angio-CT



## Female patient, 28 years old

- HIV infection diagnosed at 7 y/o
- Romanian HIV cohort
- HIV C3
- On ART for 20 years
- Undetectable for the past 10 years
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- Develops severe postprandial abdominal pain
- Stops ART due to nausea, vomiting, abdominal pain
- CD4 ↓ to 100 in 2 months
- HIV RNA ↑



- CT: abdominal aortic atheromatosis (1 cm left)
- Stenosis:
  - 61% stenosis of the celiac trunk
  - 93% stenosis of the mesenteric artery
  - 100% stenosis of the jejunal artery emergence
  - re-permeability through Riolan arcade
  - 43% stenosis of the right renal artery
- Subacute mesenteric artery thrombosis

**Case presentation: adding atheromatosis to the cardiovascular risk for a 28 year-old patient from the Romanian HIV cohort**

Ioana Andreea Dărămuș<sup>1\*</sup>, Alina Cristina Neguț<sup>1,2</sup>, Oana Săndulescu<sup>1,2</sup>, Gabriela Ceapraga<sup>1</sup>, Bogdana Manu<sup>1</sup>, Mariana Mărdărescu<sup>1</sup>, Adrian Streinu-Cercel<sup>1,2</sup>, Anca Streinu-Cercel<sup>1,2</sup>



# Bone

Streinu-Cercel *et al. BMC Infectious Diseases* 2016, **16**(Suppl 1):93  
DOI 10.1186/s12879-016-1397-2

BMC Infectious Diseases

RESEARCH

Open Access

## Prevalence of osteo-renal impairment in the Romanian HIV cohort



Anca Streinu-Cercel<sup>1,2</sup>, Oana Săndulescu<sup>1,2\*</sup>, Gabriela Ceapraga<sup>2</sup>, Daniela Manolache<sup>2</sup>, Monica Andreea Stoica<sup>2</sup>, Liliana Lucia Preoșescu<sup>1,2</sup> and Adrian Streinu-Cercel<sup>1,2</sup>

**Table 3** Bone-related tests results for patients screened in this study

Characteristic	Sub-category	n (%)
DXA scan result (n = 51)	Normal bone mineral density	23 (45.1)
	Lumbar osteopenia	17 (33.3)
	Lumbar osteoporosis	7 (13.7)
	Femoral osteopenia	19 (37.3)
	Femoral osteoporosis	4 (7.8)

Median age: 38 years

# Bone



Bone demineralization in HIV-positive patients – Streinu-Cercel et al. • Review

Table. Prevalence of osteopenia and osteoporosis in different cohorts of HIV-positive patients.

Country	Lumbar osteopenia %	Lumbar osteoporosis %	Femoral osteopenia %	Femoral osteoporosis %	Age, years	Duration of HIV evolution years	Nadir CD4 cell count cells/cmm	Number of patients	Reference	Comments
Romania	33.3	13.7	37.3	7.8	38	9	387	72	In press <sup>5</sup>	
Romania	43.3	5	43.3	6.70	34.6	4	202.5	60	In press <sup>19</sup>	
France	61 <sup>a</sup>	19.5 <sup>a</sup>	61 <sup>a</sup>	19.5 <sup>a</sup>	39.4	0.8		39	Rev et al. <sup>20</sup>	Only male patients
Italy	36.4	8.6	53.5	10.0	45.64	14.2	182	1204	Santi et al. <sup>7</sup>	Only male patients
Italy	19.6 <sup>a</sup>		19.6 <sup>a</sup>					163	Mazzotta et al. <sup>11</sup>	Osteopenia defined as Z score ≤ -2.0
Italy	45.0 <sup>a</sup>	29.7 <sup>a</sup>	45.0 <sup>a</sup>	29.7 <sup>a</sup>	51			131	Porcelli et al. <sup>12</sup>	
Spain	56.5 <sup>a</sup>	10.7 <sup>a</sup>	56.5 <sup>a</sup>	10.7 <sup>a</sup>	28	2	563	232	Negredo et al. <sup>21</sup>	
Spain			38.0	6.0	45.7	14.9	197	285	Casado et al. <sup>8</sup>	
Turkey	53.9 <sup>a</sup>	23.8 <sup>a</sup>	53.9 <sup>a</sup>	23.8 <sup>a</sup>	40.1		313.8	126	Aydin et al. <sup>22</sup>	

# Kidney

**Table 2** Kidney function tests results for patients screened in this study (*n* = 71)

Characteristic	Sub-category	<i>n</i> (%)	Median (IQR)	Percentiles 25, 75	Mean ± SD
Serum urea, mg/dL			N/A	N/A	30.2 ± 8.5
Serum creatinine, mg/dL			0.8 (0.3)	0.7, 1.0	N/A
eGFR, mL/min/1.73 sqm			108.4 (34.7)	89.5, 124.2	N/A
eGFR	Stage 1 > 90	49 (69.0)			
	Stage 2 60–89.9	21 (29.6)			
	Stage 3 30–59.9	1 (1.4)			
	Stage 4 15–29.9	0 (0)			
	Stage 5 < 15	0 (0)			
Positive proteinuria, <i>n</i> (%)		9 (12.7)			
Renal elastography, kPa			17.1 (11)	12.4, 23.4	N/A

eGFR estimated glomerular filtration rate, IQR interquartile range, N/A not applicable, SD standard deviation

eGFR was calculated by MDRD [7] and is expressed in mL/min/1.73 sqm. Renal stiffness was assessed for 19 patients by one trained operator through shear-waves elastography on Aixplorer (SuperSonic Imagine, Aix-en-Provence, France)

# Kidney

- 29.6 stage 2 CKD + 1.4% stage 3 CKD – Romania<sup>1</sup>

vs.

- 6% Danish HIV cohort study<sup>2</sup>
- 24% Nigeria<sup>3</sup>
- 2%<sup>4</sup> – 15.5%<sup>5</sup> USA<sup>4,5</sup>

<sup>1</sup>Streinu-Cercel *et al*, *BMC Infect Dis*. 2016;16(S1):93

<sup>2</sup>Ahlstrom MG *et al*, *Clin Epidemiol*. 2015;7:391-9

<sup>3</sup>Adedeji TA *et al*, *J Int Assoc Provid AIDS Care*. 2015;14(5):434-40

<sup>4</sup>Gupta SK *et al*, *Clin Nephrol*. 2004;61(1):1-6

<sup>5</sup>Wyatt CM *et al*, *AIDS*. 2007;21(15):2101-3

## Take home messages

- Ageing with HIV
- Modifiable vs. non-modifiable risk factors
- Cumulus of comorbidities