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# Management of cardiovascular risk in HIV positive individuals in Europe

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on behalf of EuroSIDA in EuroCoord

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## BACKGROUND

- Antiretroviral therapy results in an aging cohort
- High prevalence of cardiovascular risk in people living with HIV
- Stepped approach to cardiovascular disease (**figure 1**)
    - Primary prevention
    - Screening for risk factors
    - Non-pharm management of modifiable risk
    - Pharmacological management of modifiable risk
    - Specialist care
- Long term conditions cluster and may require integrated care

## AIMS

Describe patterns of cardiovascular (CV) risk and successful CV risk modification in a European HIV Cohort.

*Specific objectives*

1. Describe the prevalence and incidence of CV risk
2. Explore factors associated with CV risk
3. Explore factors associated with successful CV risk modification

## METHODS

*Population*

EuroSIDA patients (from 1/1/2000) who had at least two time points for which CV risk could be measured were included in the analysis. Baseline was the first date CV risk could be measured.

*Outcome measures*

1. High CV risk was defined as 5-year CV risk > 5% using D.A.D. equation, which combines CV risk parameters with exposure to antiretroviral therapy.
2. Risk modification was defined as two consecutive measurements meeting EACS guidelines (**table 1**)

*Analysis*

Factors associated with risk development and modifications were investigated using Poisson regression. Individuals were followed from baseline until the outcome of interest, the month of their last modifiable risk factor measurement, or 31/12/2011, whichever occurred first.

## RESULTS

5719 individuals were included in the analysis. The majority were male (77%), white (89%), and acquired their infection through MSM (45%). **(table 2)**

Prevalence of CV risk was high: 1794 (31%) were hypertensive, 2714 (47%) had high cholesterol levels, 2733 (48%) were current smokers, and 1680 (29%) were overweight. 1140 (20%) had a 5-year CV risk of > 5%.

Of 4142 individuals with a baseline 5-year risk <5%, 1157 (28%) developed 5-year CV risk > 5% during follow-up, (6.6/100 person years of follow-up, 95% confidence interval [CI] 6.3-6.9). Patients who developed CV risk were more likely to be older, male and have a longer duration of treatment. There was no association with HIV treatment related factors (**figure 2**)

Of those clinically indicated for risk modification, 819/1533 (46%) successfully modified BP; 803/2709 (30%) stopped smoking; 172/910 (19%) modified cholesterol and 418/1663 (25%) reduced their BMI. Factors found to be associated with risk modification are shown in **figure 3**. Risk modification for BP and smoking improved over time (p<0.001)

## CONCLUSION

- Prevalence and incidence of CV risk is high
- Over 50% modified some of CV risk
- CV risk modification improved over time
- Geographical and gender variation

Figure 1

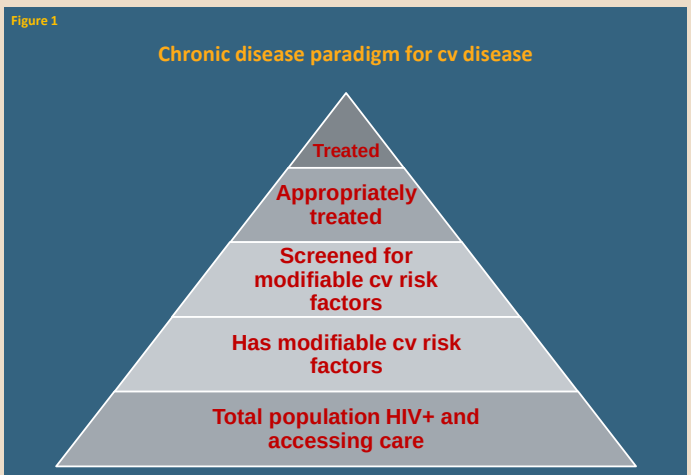



Table 1

**Definitions of modifiable CV risk factors & risk modification outcomes**

| Modifiable CV risk factors | Clinical indication for treatment of modifiable risk (EACS) | Successful risk modification (Two consecutive measures) |
|---|---|---|
| **Hypertension (systolic blood pressure (BP) >140 mm Hg, diastolic BP >90 mm Hg or on antihypertensive treatment)** | Treatment of BP (systolic BP >140 or diastolic BP >90 mm Hg) | Systolic BP <140 (130 if diabetic), diastolic BP <90 (<80 if diabetic) mm Hg |
| **High cholesterol (total cholesterol>6 mmol/l, cholesterol:hdl cholesterol ratio >5 or receiving statins)** | Predicted 10 year CV risk of over 20%, diabetic, or established CV disease | Lowering total cholesterol to less than 4 mmol/l |
| **Current smoker** | Current smoker | Stopped smoking |
| ***Overweight (Body Mass Index (BMI) over 25 kg/m²)*** | | *Lowering BMI to less than 25 kg/m² (marker of lifestyle change)* |

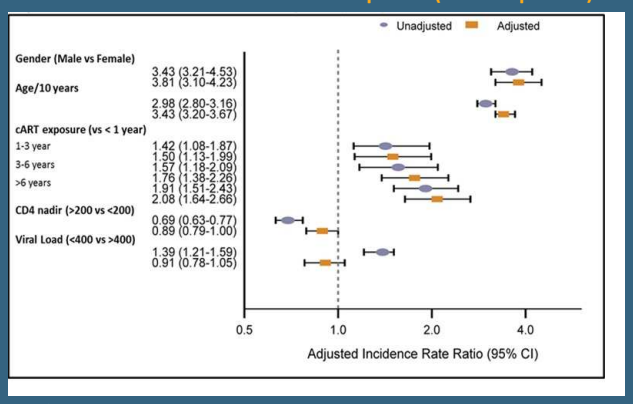
Table 2

**Baseline characteristics according to predicted CV risk**

| | | Total (n/N %) | | 5 year DAD risk > 5% (n/N%) | |
|---|---|---|---|---|---|
| ***Total (N)*** | | ***5719*** | | ***1140*** | |
| Age (Median ,IQR) | | 41 | (36-50) | 54 | (48-61) |
| Gender | *Male* | 4405 | (77%) | 1075 | (94%) |
| Ethnicity | *White* | 5080 | (89%) | 1055 | (92%) |
| Mode of Infection | *MSM* | 2589 | (45%) | 644 | (56%) |
| | *IDU* | 934 | (16%) | 88 | (8%) |
| | *Het* | 1726 | (30%) | 281 | (25%) |
| Region | *South* | 1613 | (28%) | 254 | (22%) |
| | *Central* | 1623 | (28%) | 386 | (34%) |
| | *North* | 1138 | (20%) | 353 | (31%) |
| | *East* | 1215 | (21%) | 131 | (11%) |
| | *Argentina* | 130 | (2%) | 16 | (1%) |
| Framingham risk | *5 year > 5%* | 1725 | (30%) | 1040 | (91%) |
| Hypertensive | *Yes* | 1794 | (31%) | 616 | (54%) |
| Smoking Status | *Current smoker* | 2733 | (48%) | 669 | (59%) |
| High Cholesterol | *Yes* | 2713 | (47%) | 838 | (74%) |
| BMI over 25 | *Yes* | 1680 | (29%) | 416 | (36%) |

Figure 2

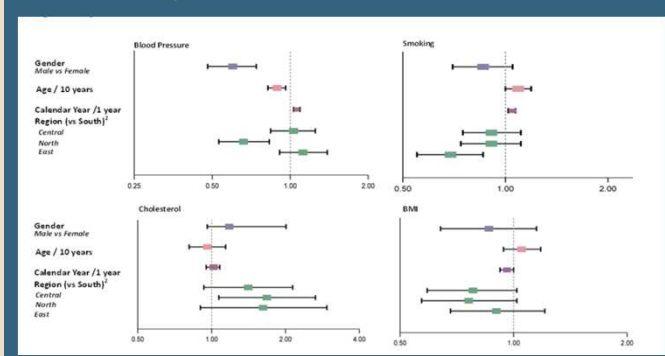
**Factors associated with risk development (D:A:D equation)**




*Adjusted for gender, ethnicity, risk group, region, calendar year, CD4-cell count, CD4 nadir, prior AIDS diagnosis, prior AIDS or non-AIDS event, cumulative cART exposure, viral load supression, hepatitis B and C*

Figure 3

**Adjusted Rate Ratios for risk modification**




*1. All adjusted for age, gender, calender year, ethnicity, mode of infection, geographical region, CD4 count, CD4 nadir, Undetectable VL, Prior AIDS Diagnosis, Prior non-AIDS events, cummulative cART exposure, hepatitis B + C, prior CVD event, family history of CVD and diabetes. Adjustments per figure: 2) BP at baseline, overweight, lipid-lowering drugs, high cholesterol and smoking status; 3) BMI and cholesterol at baseline, antihypertensive drugs, smoking status, hypertension; 4) BMI, hihg cholesterol, antihypertensive drugs, lipid-lowering drugs, hypertension, overweight; 5) cholesterol and BMI at baseline, antihypertensive drugs, smoking status, hypertension.*
*2. Patients from Argentina considered separately.*

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CHIP COPENHAGEN HIV PROGRAMME

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