

# Cardiovascular disease burden in HIV positive patients: an analysis of the rate of increase of CT coronary calcium scores after a five year interval

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## 1. Background

- HIV positive patients have an increased risk of cardiovascular disease (CVD), compared to the non-HIV population.<sup>1</sup>
- The degree of stable, calcified atherosclerotic plaque can be assessed using CT coronary calcium (CorCa) scoring (Fig. 1).<sup>2</sup>
- American Heart Association: CorCa >100 Agatstons, consider statin therapy, aspirin and ACE inhibitor.<sup>3</sup>
- **Aim:** To further our understanding of the burden of CVD in HIV positive patients by analysing the rate of increase of CorCa scores after a five year interval.

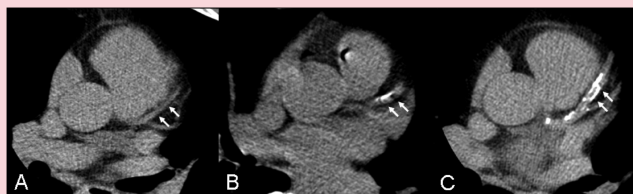


Fig. 1: Coronary artery calcium score measurements of the left anterior descending coronary artery. (A) Coronary Artery calcium score of 0, (B) Coronary artery calcium score 31, (C) Coronary artery calcium score of 690. (Images from Scholte *et al.*, 2011).

## 3. Results and Discussion

- Forty-seven patients had CorCa scores at Y1 and Y5.
- CorCa scores ranged from 0 to 916 Agatstons, median 13.5.
- Twenty-two (46 %) of patients had CorCa score of zero at year 1.
- Twenty-nine (62 %) of patients had an increase in their CorCa score with the largest increase being 454 Agatstons (doubling).
- Twenty patients (year 1) and 29 patients (year 5) were predicted to have moderate to extensive atherosclerotic disease (Table 1).

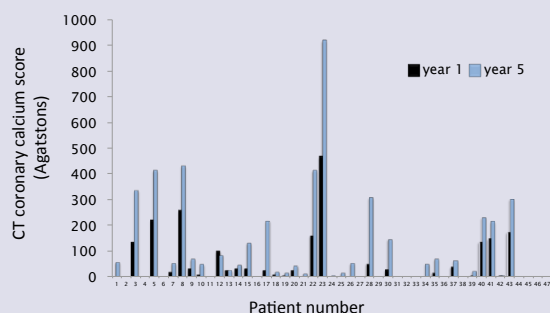


Fig 2: CT coronary calcium scores for 47 patients at year 1 and at year 5

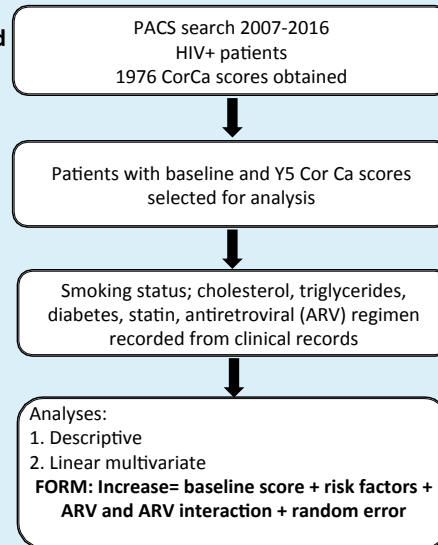
**Table 1:** Classification of risk of cardiovascular disease predicted from CT coronary calcium scores for 47 HIV positive patients at year 1 and at year 5. Table based upon Rumberger model (1995).<sup>4</sup>

CT CorCa score	Plaque Burden	Clinical interpretation (likelihood of CVD)	No. patients year 1	No. patients year 5
0	none	Very low risk CVD Likelihood CAD < 5%	22	16
1-10	minimal	Significant CAD very unlikely	5	2
11-100	mild	Likely mild/minimal coronary stenosis	12	17
101-400	moderate	Moderate non-obstructive CAD highly likely	7	8
Over 400	extensive	High likelihood of at least 1 significant coronary stenosis (> 50 % diameter)	1	4

## 4. Conclusions

- Typical members of this HIV positive population seem to be at significant risk of increases in CorCa score and therefore of CVD.
- Baseline CorCa score was greatest predictor of 5 y CorCa score.
- ARV choice does not seem to affect the rate of increase of CorCa score, although the large number of ARV's combined with the small sample, limit interpretation.
- Although preliminary, this study represents a starting point for further assessing the burden of CVD in the HIV population as a large number of patients are due to be re-scanned in the next 3-5 years.

## 2. Method



## 3(b). Multivariate analysis

Baseline CorCa score was greatest predictor of 5 y CorCa score (Table 2)

*Noteworthy relationships between covariates:*

- **Age + >in CorCa :** largest increase occurs at age 50-55 (Fig. 3)
- **Smoking status:** no evidence of effect on CorCa increase.
- **Baseline score and statin status:** for 23 patients on statin therapy, median increase in CorCa was high: 55, IQR (4.7,184.2).
- **No evidence that any ARV's** were associated with increase in CorCa.

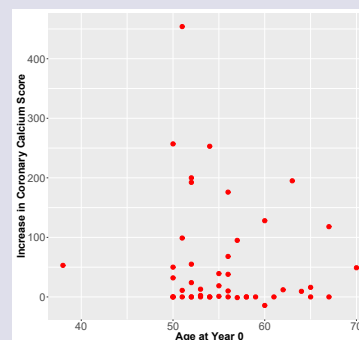


Fig 3: Increase in CorCa scores for patients of different ages

**Table 2:** Examples of co-efficient estimates in reduced model.

Co-efficients	Estimate	Std. Error	P-value*
Y1	0.85781	0.08199	7e-13
Age	-2.69319	1.16815	0.026543
Total Cholesterol	-17.02493	6.07097	0.007820
nostatinTRUE	-52.30191	15.96052	0.002209
tenofovirTRUE	24.08417	15.84790	0.136651
lamivudineTRUE	34.27528	18.43665	0.070572
Y1:nostatinTRUE	-0.68478	0.28121	0.019564