A cross-cohort comparison of Cardiovascular traits in Childhood: a study in Generation XXI (Portugal) and Birth to Twenty (South Africa)

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Cardiovascular Health vs Disease

- Cardiovascular Disease (CVD) morbidity and mortality increasing in LMICs
- Outpacing many detection and treatment efforts
- Cardiovascular health (CVH) in contrast typically declines with age and other CVD risk factors
- Ideal CVH is common in childhood
- Should greater public health emphasis be placed on CVH preservation (primordial prevention)?

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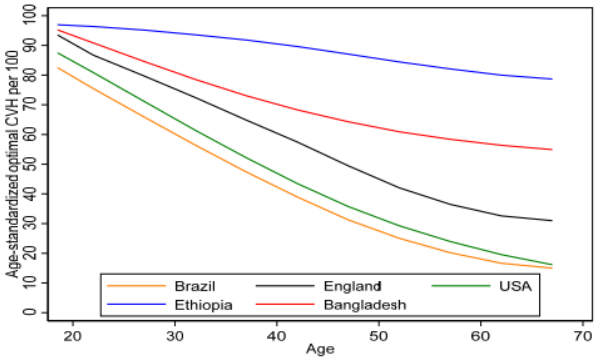
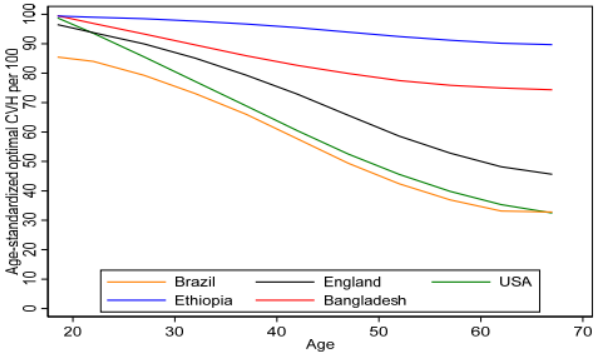
Measuring CVH across the lifecourse

Figure 3: Age-specific high CVH rates for the five countries (adults aged 18-69y)



3a. Based on six metrics (blood pressure, BMI, cholesterol, glycemia, smoking, physical activity)



3b. Based on five metrics (as 3a. but excluding physical activity)

CVH Scores available (LS7, LE8)

- BP, BMI, glucose, cholesterol, physical activity, tobacco use, sleep, diet

Applied to population survey data from five countries

Increased country income level

↓

Decreased prevalence of high CVH

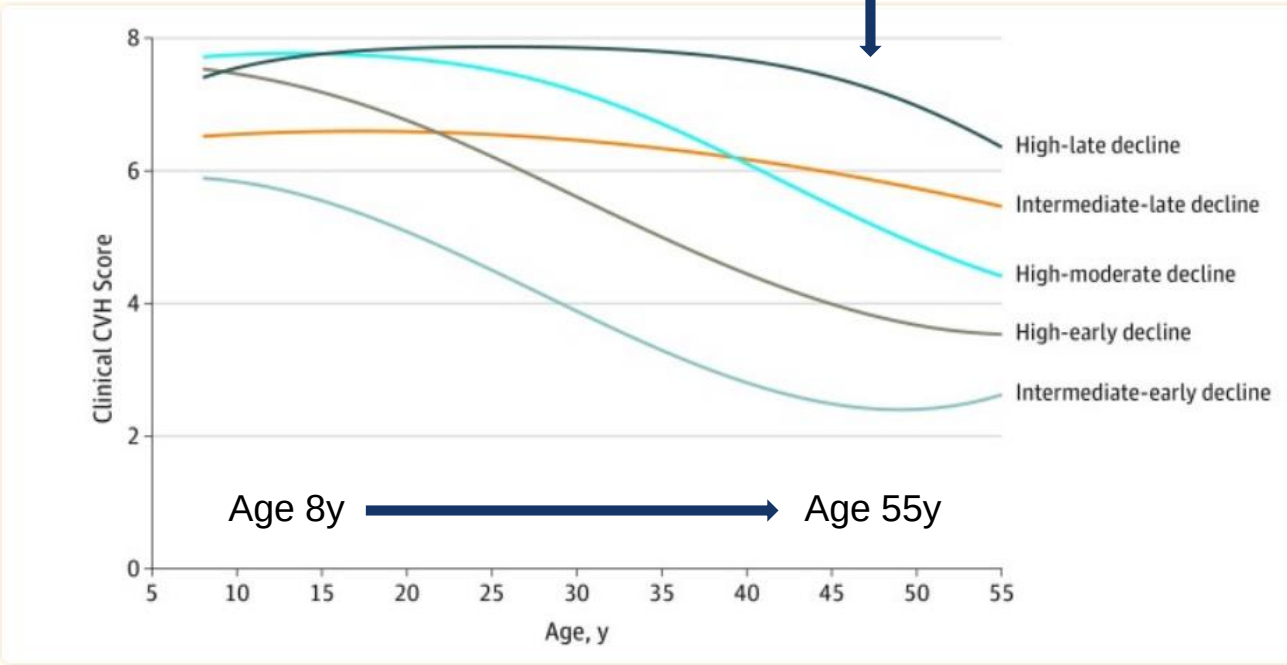
- Excess body weight driving poor CVH in HICs
- Current smoking higher in LMIC (Bangladesh)

Ware et al. Can J Cardiol Open. 2024

CVH decline starts in childhood

High income countries
Only **16%** exhibit high-late decline (**optimal**) profile in clinical CVH score

- 5 prospective cardiovascular cohort studies from the US & Finland (1973 to 2015; n=9388)



Allen NB et al. JAMA cardiology 2020

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Does childhood CVH differ by country?

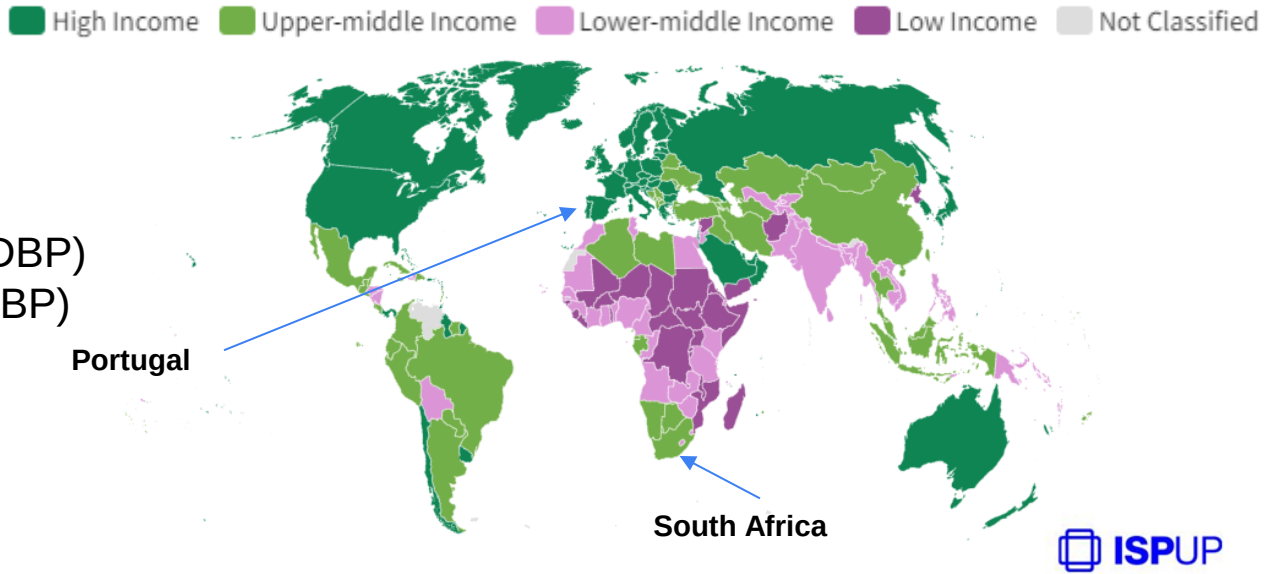
AIM:

- To evaluate childhood CVH in **Generation XXI** - Portugal (n=8647; age 4-10y)

- And compare with a small LMIC cohort (**Birth to Twenty** - South Africa, n=78; age 4-10y)

CVH indicators evaluated:

- Body mass index (BMI);
- Diastolic blood pressure (DBP)
- Systolic blood pressure (SBP)



World Bank Group country classification by income level

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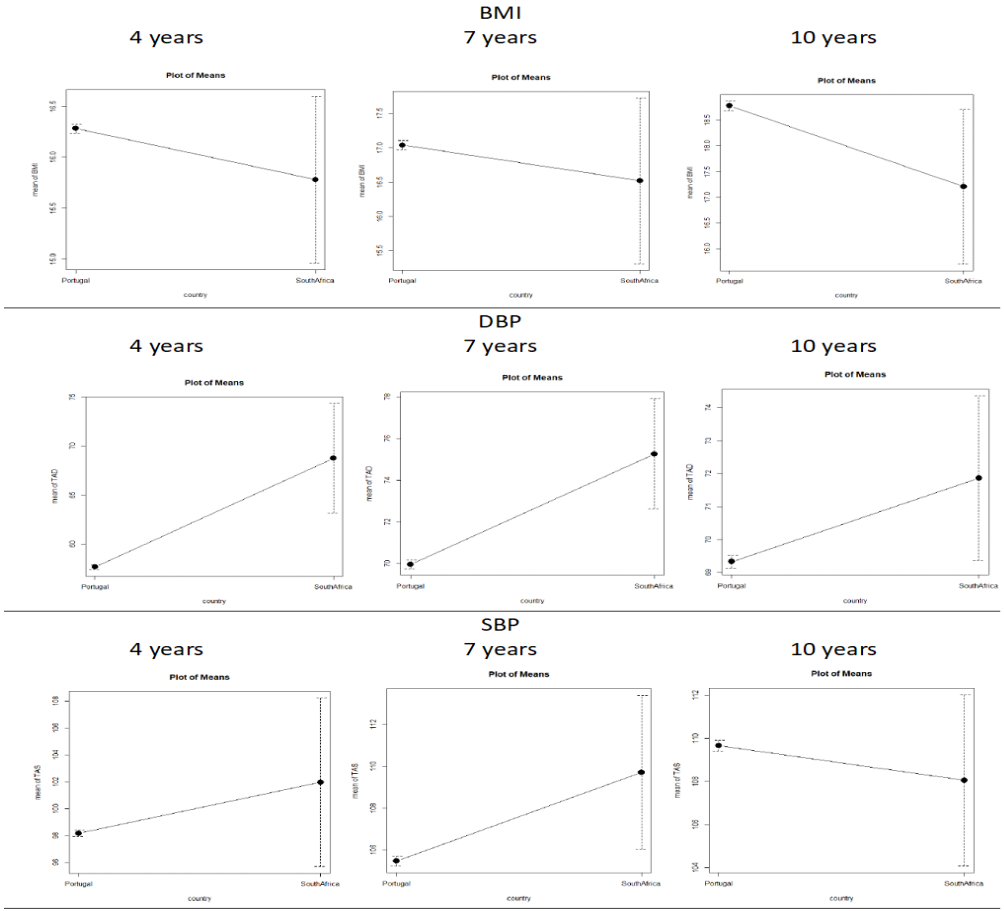
Results

SA children:

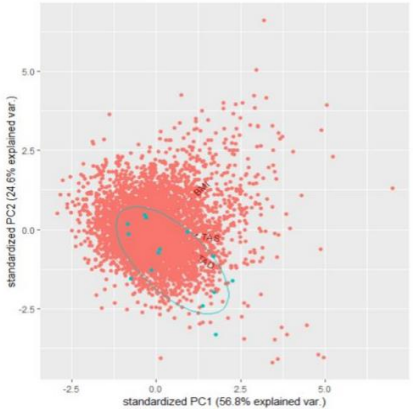
- Lower BMI
- Higher BPs

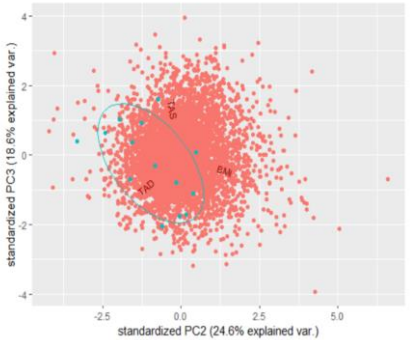


Plot of means difference in BMI, DBP, and SBP among countries based on children's age.

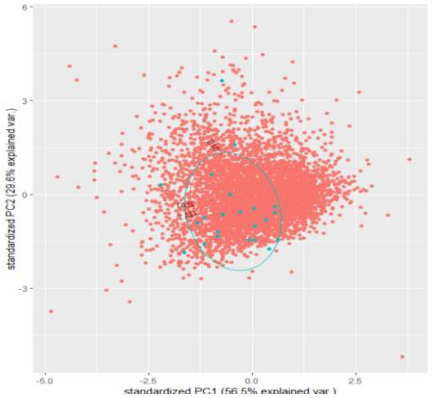
Results

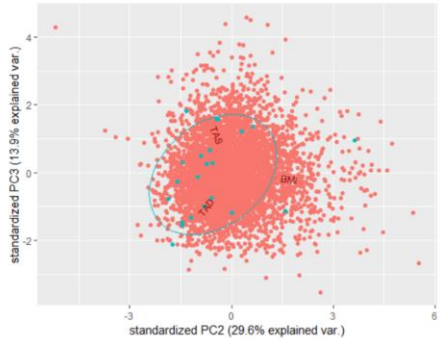
4 years



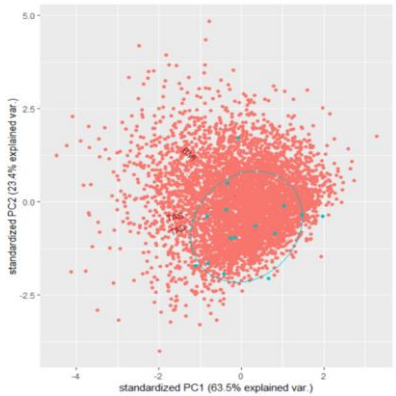


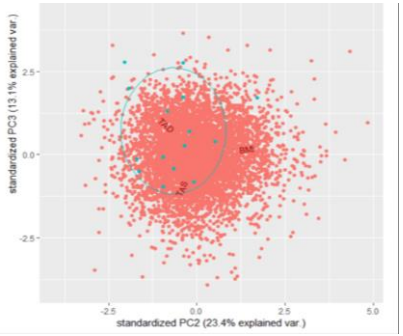
7 years





10 years





Three distinct groups of children:

PC1 - high BMI, SBP & DBP

PC2 – high BMI & SBP, but lower DBP

PC3 – lower BMI, SBP & DBP

SA children predominantly PC1

PC1 membership in Portuguese children predicted by parental SES

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Conclusions

- Socioeconomic disadvantage appears to set children on a path toward poor cardiovascular outcomes from a young age.
- Lends support to earlier vascular aging in South African children.
- Targeted strategies are critical to maintain **CVH** from childhood.
- Strengthen early childhood interventions to address **CVH** disparities.

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Further data and analysis needed

Severe limitations with recent SA data availability: need larger datasets and follow-up

CHCSA

Childhood Hypertension Consortium of South Africa

HeLTI

Healthy Life Trajectories Initiative

ISCEP

International Society for Cardiovascular Disease Epidemiology and Prevention

GenHeart

wellcome

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