Vascular function in participants of the CareHigh registry.

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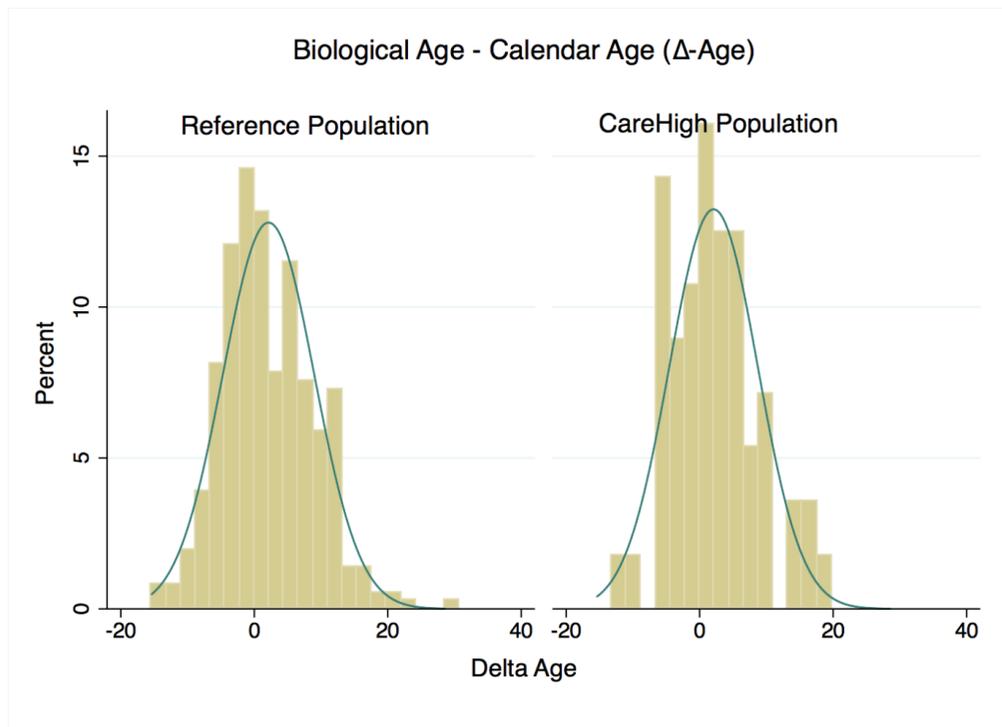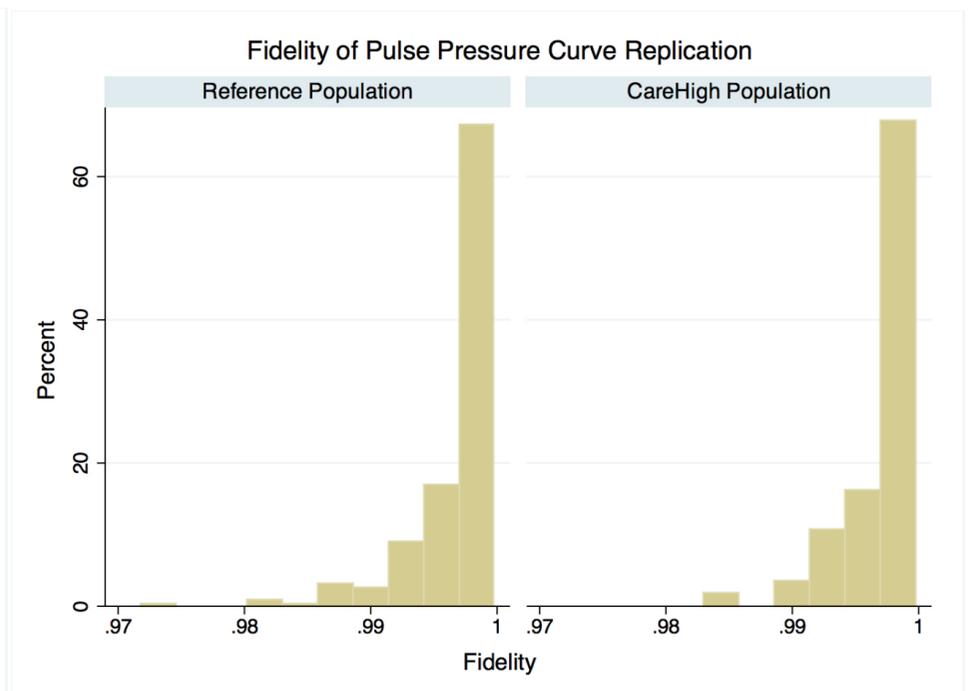
Figure 1: Biological Age - Calendar Age

Figure 2: Fidelity of Pulse Pressure Curve Replication

Highlight:

- Vascular function in otherwise healthy patients with familial hypercholesterolemia is not different from healthy controls

Background:

Endothelial dysfunction is a necessary component cause for the development of atherosclerotic vascular disease, irrespective of cholesterol levels. This view is supported by the observation that more than half of all patients hospitalized for CAD have admission levels of LDL cholesterol in the normal or ideal range 1. Thus it is important to develop tests which measure the effects of endothelial dysfunction, specifically the physical parameters which describe arterial function. A novel system (Vasometrix, iSYMED GmbH) elucidates all relevant paramters of arterial function through electronic high-fidelity replication of non-invasively acquired pulse pressure curves. These parameters are translated into clinical vascular age as a global score with the aim to disentangle chronological from pathological aging.

Method:

We applied the Vasometrix system to acquire and evaluate the pulse pressure curves of 59 consecutive probands of the CaReHigh study population and compared this population with a population of 407 adults (reference population) free from familial hypercholesterolemia.

Results:

Difference between calendar age and clinical vascular age (Δ-Age) showed a normal distribution and was similar to that of the reference population (M=1.8 years; SD=6.7 years) (figure 1). Replication fidelity was very high (M=0.997; SD=0.003) and showed a near identical mean and distribution with the reference population (excluding those probands with cvd endpoints) (figure 2). Comparing Δ-age of the CaReHigh subpopulation with no cvd endpoints with the equivalent group of the Vasometrix reference population showed nearly identical mean Δ-age (M=0.2 vs. M=0.25) and variance (SD=5.5 vs. SD=5.7) for the CaReHigh population and the reference population respectively (figure 3). Resistance was slightly but significantly higher in CaReHigh probands $F(1, 308) = 5.19$, $p<0.02$ whereas all other functional parameters were nearly identical (figure 4).

Conclusion:

Individuals with familial hypercholesterolemia who are otherwise apparently healthy do not appear to present with significantly different vascular function from the general population.

Reference

1 Sachdeva, A. et al. Lipid levels in patients hospitalized with coronary artery disease: an analysis of 136,905 hospitalizations in Get With The Guidelines. Am. Heart J. 157, 111–117 e2 (2009).
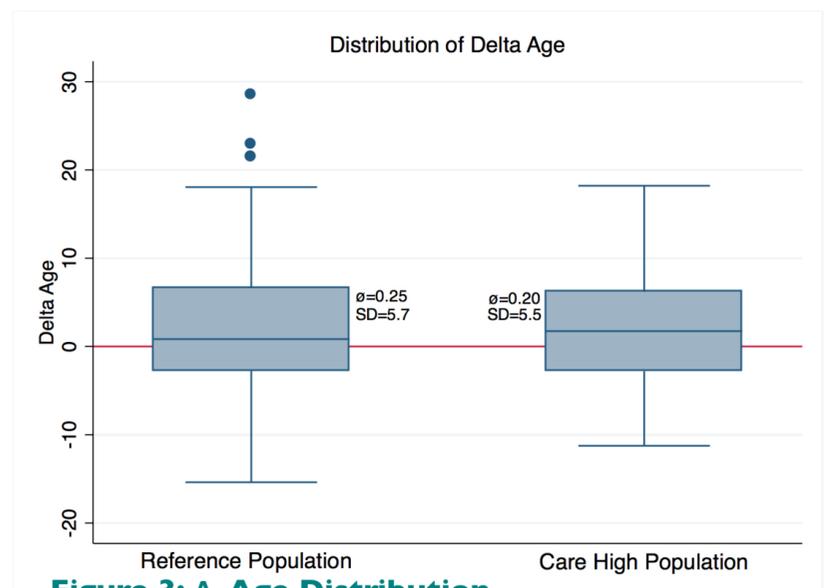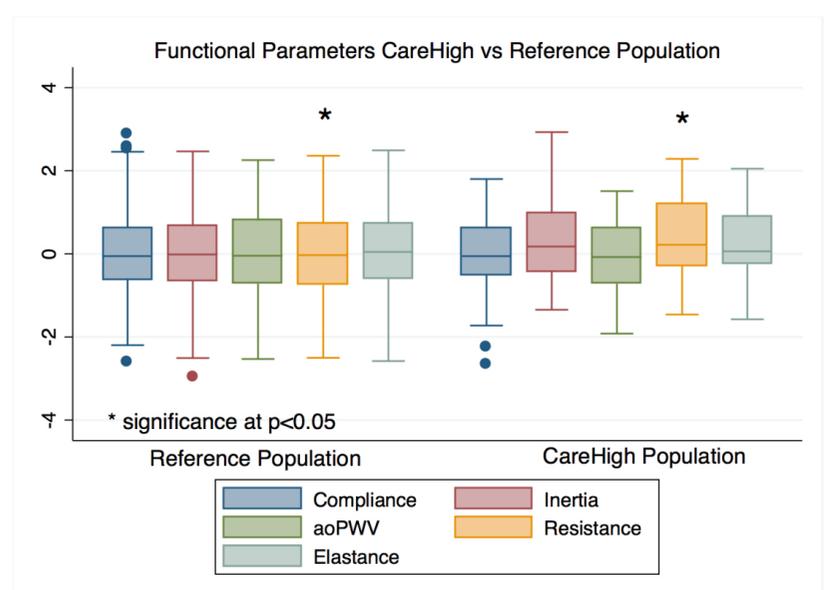
Figure 3: Δ-Age Distribution

Figure 4: Functional Parameters