Modifiable risk factors for cardiovascular disease: physical activity and body mass index

- Body mass index (BMI) and physical activity are considered to be two of the most important modifiable risk factors for cardiovascular disease.
- As BMI and activity have been collected repeatedly across life in the NSHD, we are able to study both of these factors and the inter-relationship between them in more detail than many other studies.

Maintaining a healthy BMI across life and dropping to a healthy BMI were both associated with a better cardiovascular profile at age 60-64 years.

These beneficial effects were found for cardiovascular disease risk factors including blood pressure, arterial structure (carotid intima-media thickness) and biomarkers of cardiovascular health including C-reactive protein, leptin and tissue-plasminogen activator.

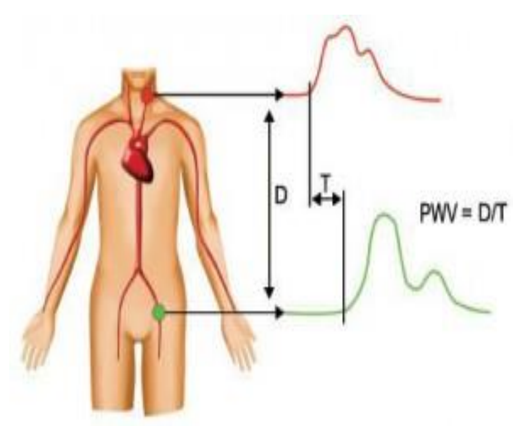
[Murray et al. 2015; Charakida et al. 2014]

Participation in recreational physical activity across adulthood was associated with better cardiovascular health as indicated by biomarker levels at age 60-64 years.

[Murray et al., In progress]

More time spent in moderate to vigorous intensity activity (as assessed by combined heart rate and movement sensing) was found to be associated with better (i.e. lower) pulse wave velocity at age 60-64 years.

[Elhakeem. PhD in progress]



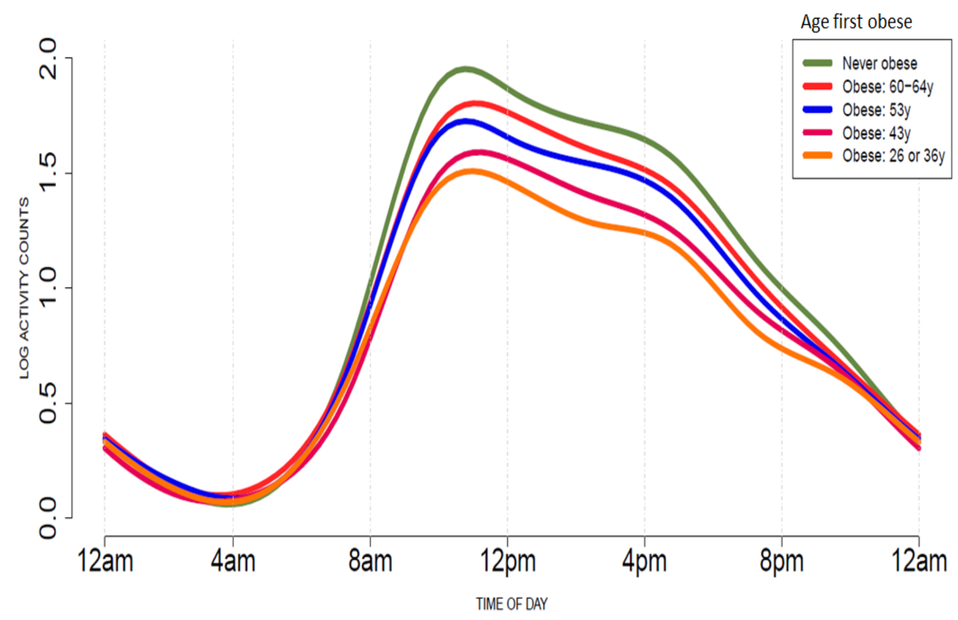
The carotid-femoral pulse wave velocity (see figure) is a gold standard measure of arterial stiffness and is a strong predictor of future clinical cardiovascular disease

BMI and physical activity

Greater levels of participation in physical activity across adulthood have been shown to be associated with a more favourable body composition at age 60-64 in the NSHD [Bann et al. 2014].

However, in later life, it is possible that the relationship between BMI and physical activity may operate in both directions.

Analyses undertaken in collaboration with Johns Hopkins University confirm this; higher BMI and younger age at onset of obesity (see fig) were both associated with lower monitored levels of activity across the day at age 60-64.



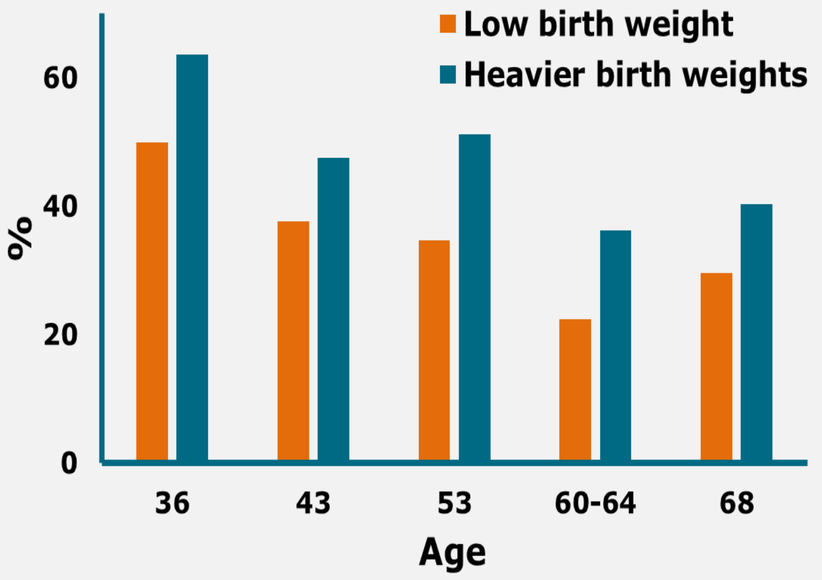
Smoothed curves of mean log activity counts at age 60-64 by obesity history in the NSHD

[Cooper, Huang et al et al. Under review]

Early life influences on recreational physical activity between 36-68 years

- Study participants with low birth weight (<5.5 pounds) and those who were later at reaching infant milestones of sitting, standing and walking unsupported tended to have lower teacher-rated ability in school sports at age 13 years.
- When compared with those with low birth weight (i.e. <5.5 pounds), study participants with heavier birth weights were more likely to report taking part in recreational physical activity at all ages from 36 to 68 years (see figure).
- Those who scored higher on finger and foot-tapping tests of motor coordination administered by a school physician at age 15 years were also more likely to report taking part in recreational physical activity across adulthood.
- The increasing long-term survival of those born at small size means the findings are of importance to the cardiovascular health of current and future generations. They also suggest that games/lessons that improve motor coordination in early life may promote physical activity across life.

[Elhakeem. PhD in progress]



Proportion who are physically active at each age across adulthood by birth weight