PWV – Pulse Wave Velocity

PWV, a significant indicator of CVD (Cardiovascular Disease) risk

An N of 1 anecdotal report

Tracking PWV data for 3 years

PWV and Me

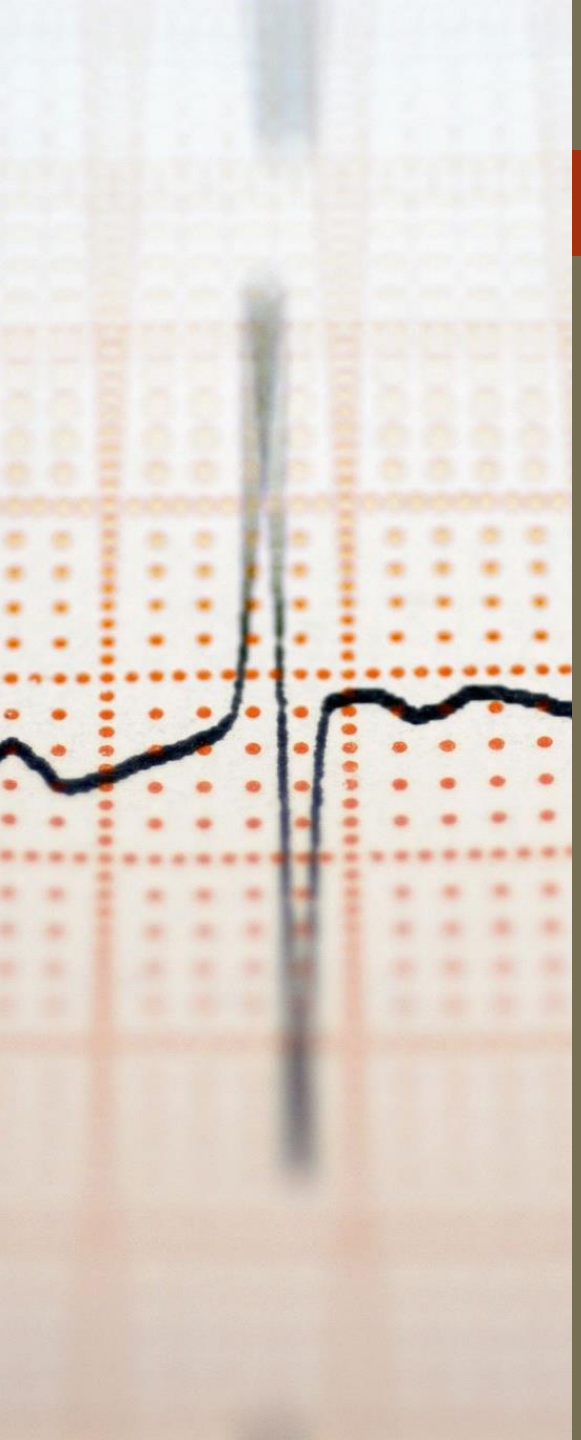
- As we age our biological systems are not operating at youthful levels.
- There are many contributing factors to the degradation of our health.
- One of those factors is body weight, specifically fat content or BMI, Body Mass Index.
- Having your fat content in a healthy range has many benefits, lower blood pressure, reduce risk of dementias, cancer, CVD and metabolic diseases like T2D, with the bonus of increased lifestyle enjoyment.
- One measure of this aspect of cardiovascular health is PWV, pulse wave velocity.
- I'm a firm believer in the old mantra, if you don't measure it, you can't manage it.
- And YES, PWV can be easily measured in your home.

PWV – What is it?

- Pulse wave velocity (PWV) is the velocity at which the blood pressure pulse propagates through the circulatory system, usually an artery or a combined length of arteries.
- This is measured in m/s milli-seconds.
- PWV is highly reproducible and predicts future cardiovascular events and all-cause mortality independent of conventional cardiovascular risk factors.
- It has been recognized by the European Society of Hypertension as an indicator of target organ damage and a useful additional test in the investigation of hypertension.
- https://en.wikipedia.org/wiki/Pulse_wave_velocity

PWV - increases mortality risk

- PWV measures aortic elasticity. Atherosclerosis is typically known as hardening of the arteries. This hardening increases blood pressure and PWV.
- High blood pressure is a significant risk factor for CVD.
- This study shows that aortic PWV is strongly associated with the presence and extent of atherosclerosis and constitutes a forceful marker and predictor of cardiovascular risk in hypertensive patients.
- **Aortic Pulse Wave Velocity as a Marker of Cardiovascular Risk in Hypertensive Patients**
- https://www.ahajournals.org/doi/10.1161/01.HYP.33.5.1111



PWV – can I measure it at home?

- The Withings Body Cardio scales measure PWV and this consumer device has demonstrated clinically acceptable accuracy for this function.
- The Withings' Body Cardio scale has the potential to improve the arterial health of consumers by providing accurate assessment of PWV in the home.
- https://www.withings.com
- If you don't measure it, you can't manage it.
- **Withings Body Cardio Versus Gold Standards of Pulse-Wave Velocity and Body Composition**
- https://www.mdpi.com/2075-4426/10/1/17

PWV – what is a "good" score

- PWV increases as we age.
- PWV normal and reference values do apply to the general population between 45 and 65 years.
- PWV values over 10 are considered a strong indicator of pending CVD (cardiovascular disease) risk.
- **Utility of estimated pulse wave velocity for assessing vascular stiffness: comparison of methods**
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9094741

Normal values for PWV

- Normal values for PWV stratified by age are presented in Table 2 on the next slide.
- PWV increased with advancing age, PWV increased on average 0.9 m/s every 10 years.
- The mean normal PWV for the age category 45 to 50 years old was 5.4 m/s whereas it was 6.8 m/s in the age category of 60 to 65 years
- There was no difference in PWV between men and women, overall mean of 6.0 m/s for men and 6.0 m/s for women.
- **Normal and reference values for cardiovascular magnetic resonance-based pulse wave velocity in the middle-aged general population**
- https://jcmr-online.biomedcentral.com/articles/10.1186/s12968-021-00739-y#Sec13

PWV – Normal Values

Table 2 Normal values for CMR-PWV in m/s stratified per age category (n = 397)

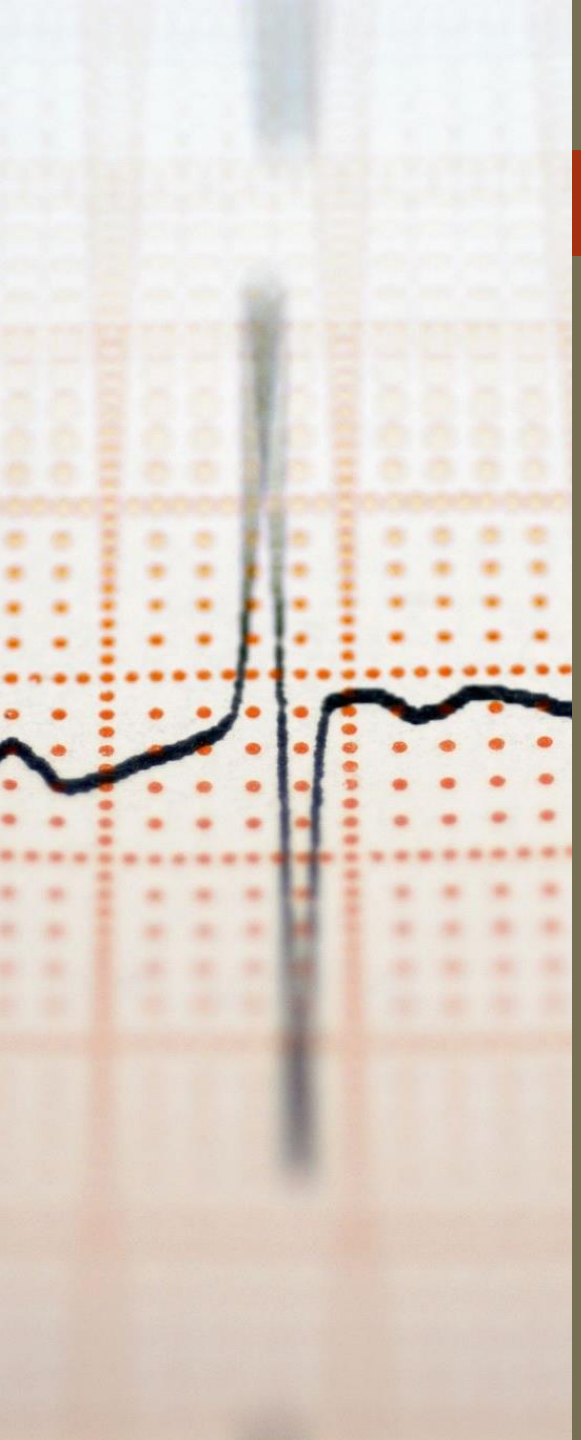
From: Normal and reference values for cardiovascular magnetic resonance-based pulse wave velocity in the middle-aged general population

Age (years)	Mean [95% CI]	Median [10–90th pc]
PWV (m/s)		
45 to < 50	5.4 [5.3–5.6]	5.4 [4.6–6.5]
50 to < 55	5.8 [5.6–5.9]	5.6 [5.0–6.5]
55 to < 60	6.1 [5.8–6.5]	6.0 [5.0–7.1]
60 to < 65	6.8 [6.5–7.0]	6.8 [5.7–7.9]

PWV pulse wave velocity

PWV – can you improve it?

- The following information is called an N of 1 anecdotal evaluation.
- N represents the number of participants. While 1 is not a truly definitive study size, N=1 evaluations offer insights that lead to further investigation and study.
- I've been measuring my PWV for over 3 years.
- In 2021 it was typically in the 7.5 to 8.0 range and over the next 2 years it went up into the 8.2 to 9.0 range.
- In 2023 I started getting my weight to a healthy level. As a genetic "non-responder" to conventional weight control, this aspect of my life has been a constant struggle.



PWV – success!

- On the next slide you will see a graph with 3 years of data acquired with a Withings Body Cardio Scale.
- My current PWV range is 7.1 to 7.5, a significant improvement and below the average for my age of 68.
- While the weight loss contributed to this improvement, weight loss is not the only process I've incorporated in my health span increasing routines over the past 4 years.
- My PWV reduction appears to be trending to a lower level which, over the next year will be interesting to see.
- If you have any questions, you can contact me Steve Matheson, steve@combilytics.com

PWV - May 2021 to March 2024