



ESH SUMMER SCHOOL WORKSHOP REPORT

**HYPERTENSION AND ARTERIAL STIFFNESS:  
HOW TO MEASURE ARTERIAL STIFFNESS,  
PWV, CENTRAL BP**



Strictly confidential - ESH Summer School 2024

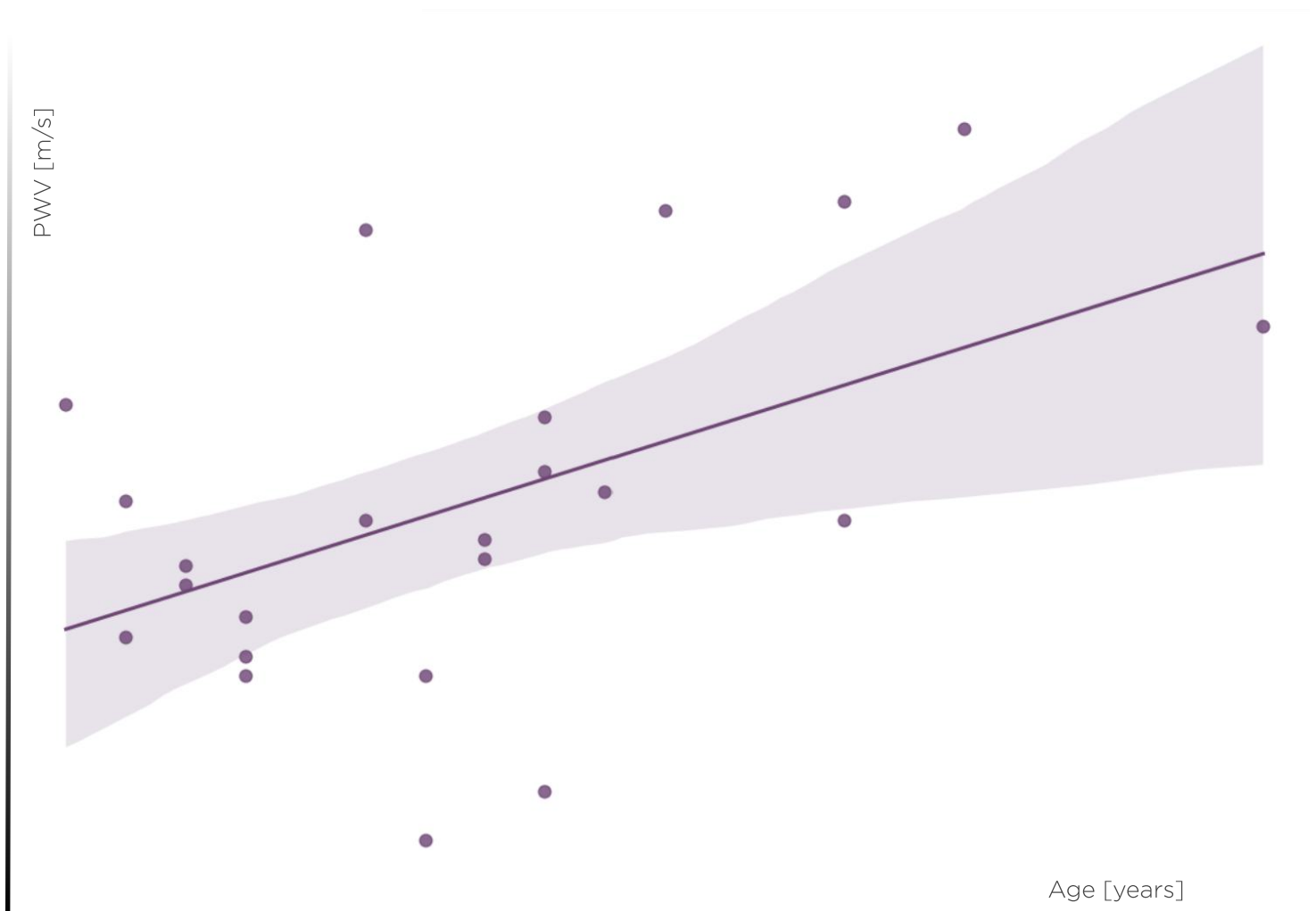
# PWV FOR CARDIOVASCULAR PREVENTION

Arterial stiffness is a significant marker of cardiovascular disease, resulting from structural changes like collagen buildup and elastin degradation in arterial walls. It is commonly measured using pulse wave velocity (PWV), with higher PWV indicating reduced arterial elasticity. This stiffening leads to increased systolic blood pressure and pulse pressure, elevating the risk for conditions such as myocardial infarction, stroke, and atherosclerosis. Factors like hypertension, inflammation, and aging contribute to arterial stiffness. Early detection and management are crucial for reducing cardiovascular risk, especially in older adults and those with metabolic disorders.

# “A man is as old as his arteries.”

Thomas Sydenham

- PWV naturally increases with age as arterial walls lose elasticity and become stiffer.
- Elevated PWV in older adults is a key predictor of cardiovascular events.
- Age-related increases in PWV are accelerated by factors like hypertension and metabolic disorders, elevating cardiovascular risk.

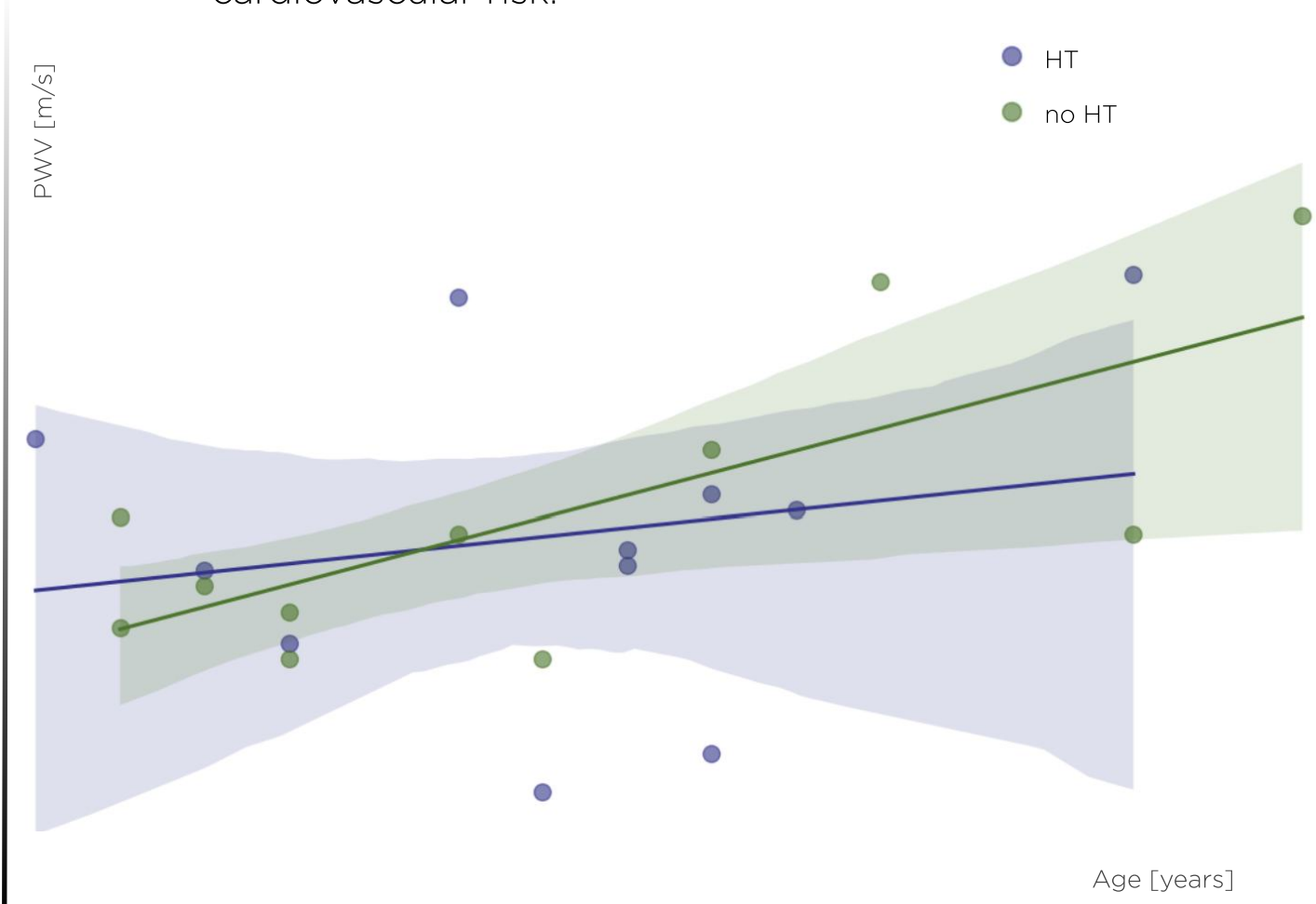


Analyses resulting from pOpmètre, a class IIa medical device.

# HYPERTENSION

is strongly associated with increased pulse wave velocity (PWV), a key measure of arterial stiffness and cardiovascular risk.

Elevated PWV, in turn, augments systolic and pulse pressure, creating a feedback loop that exacerbates hypertensive damage.



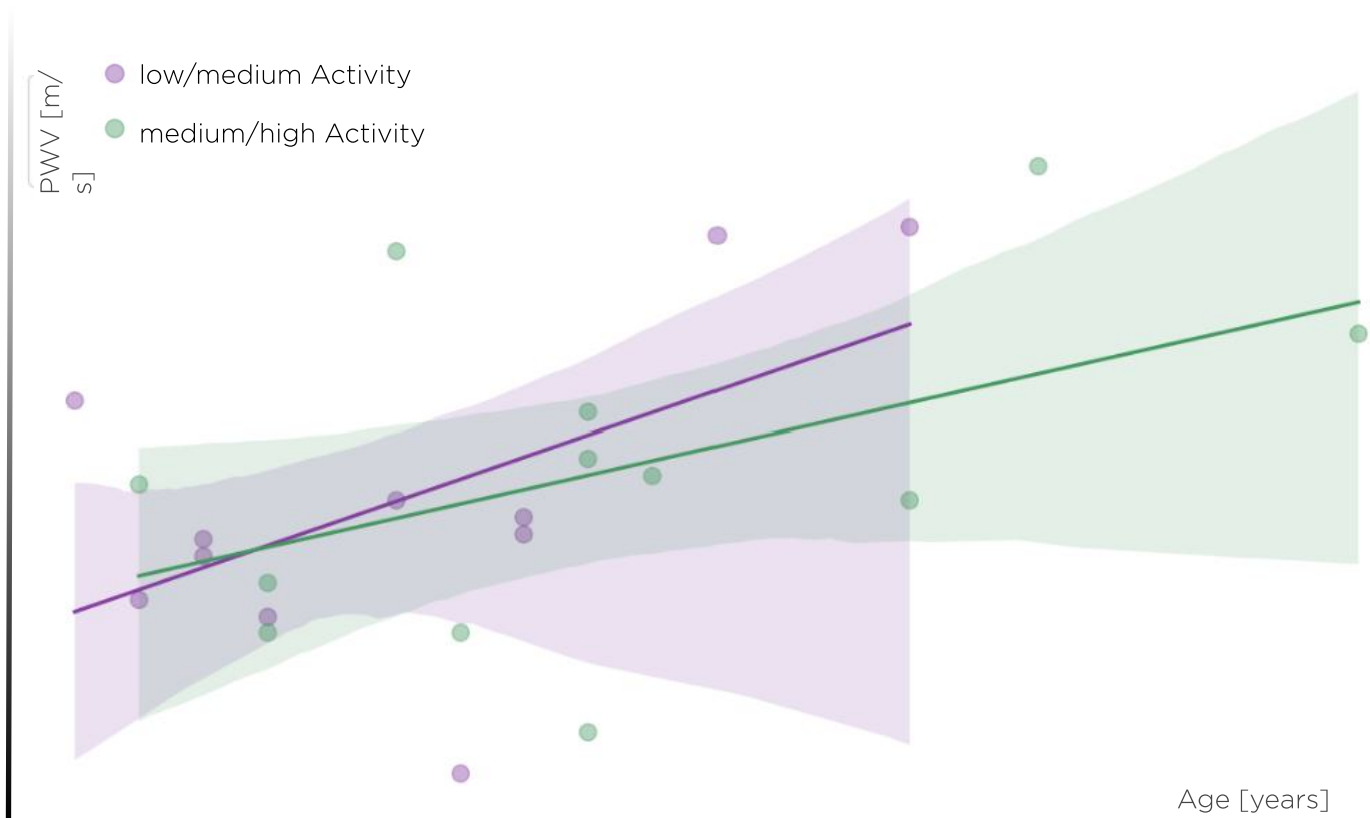
Analyses resulting from pOpmètre, a class IIa medical device.

Chronic elevated blood pressure induces structural changes in the arterial walls, including increased collagen deposition, smooth muscle cell hypertrophy, and elastin degradation, which contribute to reduced arterial compliance. This stiffening of the arterial wall leads to higher PWV, particularly in large elastic arteries such as the aorta.

Clinically, PWV serves as a valuable marker for early vascular damage in hypertensive patients, offering predictive insight into the risk of cardiovascular events such as myocardial infarction, stroke, and heart failure. Early management of hypertension can slow the progression of arterial stiffness, reducing PWV and overall cardiovascular risk.



Regular aerobic **EXERCISE** has been shown to decrease PWV, suggesting that it can slow down or reverse age-related arterial stiffening, contributing to better heart and vascular function.



Analyses resulting from pOpmètre, a class IIa medical device.

# Informing patients about their CVD risk expressed as the new heart age tool results in a reduction in their CVD risk higher than the one observed when the Framingham REGICOR risk score was used.

Lopez-Gonzalez et al., Effectiveness of the Heart Age tool for improving modifiable cardiovascular risk factors in a Southern European population: a randomized trial. *Eur J Prev Cardiol* (2015)

