PRESS RELEASE

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The wearable ring on your finger could help assess your cardiovascular health while you sleep

Singapore, 8 April, 2026 – Consumer wearables have become everyday tools for monitoring sleep and physical activity. Researchers at the Centre for Sleep and Cognition at the NUS Yong Loo Lin School of Medicine (NUS Medicine) have now shown that their capabilities may extend further: pulse signals recorded overnight carry enough information to estimate vascular age, a key indicator of cardiovascular health.

Vascular age reflects how well or how poorly a person's arteries are ageing relative to their actual age. Someone in their 50s may have the arteries of a 70-year-old, and vice versa. That gap matters: when vascular age outpaces chronological age, cardiovascular disease risk rises. Measuring it has traditionally required specialist equipment confined to clinics and research labs. The process is costly, difficult to scale, and out of reach for most people.

The new study, published in PLOS Digital Health, takes a different approach. The researchers analysed photoplethysmography (PPG) signals (the same light-based pulse readings used by fitness trackers to measure heart rate), recorded overnight from the Oura Ring, a widely used consumer sleep tracker worn on the finger. These passive nighttime recordings, collected while participants slept, were then used to estimate vascular age using both traditional feature-based methods and a deep learning model.

Despite differences in how the ring and the clinical fingertip sensor capture pulse waveforms, the deep learning model predicted vascular age with similar accuracy from both devices, with a mean error of six to seven years and strong agreement with participants' actual ages. Importantly, ring-derived estimates were associated with blood pressure, a standard cardiovascular health marker.

"Signals collected passively during sleep can be translated into clinically meaningful insights about vascular health," said Dr Gizem Yilmaz, a research fellow and co-first author of the study. "This opens the door to scalable, longitudinal monitoring of cardiovascular health using devices people already wear in their daily lives."

Crucially, the team built and validated their own analytical pipeline rather than relying on proprietary algorithms inside the device. This independence makes the findings more scientifically transparent and reproducible.

“Our findings lend credence to moving cardiovascular monitoring out of the clinic and into everyday life. Wearable-derived vascular age could, in time, support earlier detection of

cardiovascular risk, reinforce positive lifestyle habits, and feed into large-scale population health studies" added Professor Michael Chee, Director at the Centre for Sleep and Cognition, NUS Medicine, and the study's principal investigator.

Future work will look at how well these approaches hold up across more diverse populations and whether wearable-derived vascular age can play a role in clinical decision-making and preventive care.

Article Reference:
Vascular age estimation using a consumer wearable sleep tracker G Yilmaz, S Ghorbani, JL Ong, HA Golkashani… - PLOS Digital Health, 2026
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For media enquiries, please contact:

Shaun YEE
Senior Executive, Communications
Yong Loo Lin School of Medicine,
National University of Singapore
DID: +65 9012 1928
Email: shaun.yee@nus.edu.sg

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Our multidisciplinary and real-world approach to education, research, and entrepreneurship enables us to work closely with industry, governments, and academia to address crucial and complex issues relevant to Asia and the world. Researchers in our faculties, 30 university-level research institutes, research centres of excellence and corporate labs focus on themes that include energy; environmental and urban sustainability; treatment and prevention of diseases; active ageing; advanced materials; risk management and resilience of financial systems; Asian studies; and Smart Nation capabilities such as artificial intelligence, data science, operations research, and cybersecurity.

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Through a dynamic and future-oriented five-year curriculum that is inter-disciplinary and inter-professional in nature, our students undergo a holistic learning experience that exposes them to multiple facets of healthcare and prepares them to become visionary leaders and compassionate doctors and nurses of tomorrow. Since the School's founding in 1905, more than 12,0000 graduates have passed through our doors.

In our pursuit of health for all, our strategic research programmes focus in innovative, cutting-edge biomedical research with collaborators around the world to deliver high impact solutions to benefit human lives.

The School is the oldest institution of higher learning in the National University Health System. It is one of the leading medical schools in Asia and ranks among the best in the world (Times Higher World University Rankings 2026 by subject and the Quacquarelli Symonds (QS) World University Rankings by Subject 2026).

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