

Blood pressure at night is higher than previously thought

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(Medical Xpress)—Scientists at UCL have developed new technology which reveals that blood pressure measured close to the heart is much higher during sleep than previously thought. Night time blood pressure is a strong predictor of both heart disease and stroke, with previous studies establishing that blood pressure measured over the arm falls at night during sleep. However these new data indicate that the night-time decline in blood pressure may be less extensive than previously thought.

The research, published in the June edition of the journal *Hypertension*, could have significant implications for the evaluation of future therapies as drugs used to treat [high blood pressure](#) can have markedly different effects on pressure close to the heart, compared to that traditionally measured in the arm.

The team, led by Professor Bryan Williams at UCL's Institute of Cardiovascular Science, and supported by the National Institute for [Health Research](#) (NIHR), worked with a Singaporean technology company (Healthstats International). They developed a portable wrist watch-based device containing a sensor in the strap which detects the pulse wave at the wrist, rather than measuring the pressure directly. By mathematically modelling the pulse wave, the team was able to accurately measure pressure at the aortic root (i.e. close to the heart) over a full 24 hour period, without disturbing the person being monitored.

Lead author Professor Bryan Williams, who is also Director of the NIHR University College London Hospitals Biomedical Research Centre, says: "High blood pressure is a major risk factor in the development of cardiovascular disease ([heart attack](#), stroke). It affects over 12 million people in the UK and is the single most important preventable cause of [premature death](#)."

"This study provides the first ever description of the [natural variation](#) in blood pressure throughout the day and night in which measurements have been taken close to the heart. What we have shown is that pressures by the heart do not dip as much during sleep as we previously thought based upon conventional pressure measurements taken from the arm."

"We hope our findings will highlight the importance of reducing blood pressure at night, potentially rethinking our approaches both to measuring and treating high blood pressure."

By simultaneously measuring the patterns of brachial blood pressures (in the arm) and central aortic pressures (where blood exits the heart), the team found that despite similarities in the circadian rhythms of brachial and central aortic pressures, there was a significantly reduced night-time dip in central aortic pressure relative to the corresponding [night-time](#) dip in brachial pressure.

These novel findings suggest that nocturnal aortic pressures are disproportionately higher than brachial pressures during sleep; potentially crucial information for clinicians investigating the damage high blood pressure can cause the brain and heart.

Dr Peter Lacy (UCL Institute of Cardiovascular Science), a co-author on the paper, said: "The fact that the watch can be worn continuously means that we can programme the device to sample the pulse wave day and night and obtain measurements of the aortic pressure over a 24 hour period. This allows us to accurately measure aortic pressure in a non-invasive way."

More information: www.ncbi.nlm.nih.gov/pubmed/23630950

Provided by University College London

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