

Cardiovascular disease: Insight into the UK's biggest killer

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Cardiovascular disease is the leading cause of death in the UK, accounting for a third of all fatalities through illnesses such as stroke and heart disease.

The risk increases with age which is why researchers at Lancaster University have been studying how the [cardiovascular system](#) alters as we grow older.

Blood flow and other cardiovascular signals from 200 people of all ages were recorded and analysed using novel methods from physics and mathematics, which revealed the subtle changes which occur with age.

Professor Aneta Stefanovska of the Physics Department said: "The heart does not beat regularly, but varies in a complicated way which is linked to the action of the lungs. The whole cardiovascular system - the heart, lungs, arteries, veins and peripheral system interacts to create a non-linear dynamical system. These oscillations of the cardiovascular system can tell us a lot about the state of a patient's health."

There are now plans to develop a routine [diagnostic tool](#) called an "endotheliometer" which measures activity within the [endothelium](#), a layer of cells that coats the inside of every blood vessel in the body.

Professor Stefanovska said: "[Endothelial function](#) declines with age, and diseases such as [heart failure](#) and hypertension have associated endothelial dysfunction.

"We can use it to check that the state of ageing is within healthy limits and can try to prevent possible complications leading to serious impairment and cardiovascular disease."

The eight-year project has been funded by EPSRC, Wellcome Trust and, most recently, by ESRC under its New Dynamics of Ageing programme.

The research has led to several important discoveries about the ageing of the cardiovascular system including:

- the variability of the [heart rate](#) decreases with age and the heart becomes less and less able to coordinate its activity with the lungs
- the coordination between muscular movements in the heart and the [vessel walls](#) deteriorates with age
- the oscillations associated with endothelial activity contribute relatively less to blood flow regulation in older people.

Professor Stefanovska commented: "These results show that we now have methods in place to evaluate, not only the function of individual organs, but also the interactions that occur between them. These new methods promise to be particularly useful in evaluating the effect of drugs."

Provided by Lancaster University

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