The Challenge
Cardiovascular disease (CVD), which affects the heart or blood vessels, affects over 5 million people in the UK. Treating this disease costs the NHS more than £30 billion a year. New medications can be expensive and may only provide moderate health benefits to patients compared to treatment that is already available. However, for patients who are at high risk of developing CVD these treatments may still be worthwhile. A special method developed by professionals known as health economists can help work out which patients are most at risk of developing a disease which is then balanced against the cost of treatment and benefits for patients.

The Research
A team of researchers from University College London, University of York and University of Leicester used this method to develop what is called a "lifetime health economic (cost and benefit) model". The model involved analyzing data on 100,000 real patients who were allocated to different groups (from no risk to most risk) depending on their likelihood of getting CVD, determined from information such as their age and other clinical information. The health economists then estimated the kinds of treatments that were likely to be worthwhile for each group. By putting people in the dataset into different groups based on their risk of developing CVD, the researchers were able to estimate the maximum price that the NHS should pay to reduce their risk of disease, based on the estimated benefit for each group. Powerful ‘supercomputers’ were needed to run the model because of the size and complexity of the model – on standard computers it would have taken about two years to do this.

The Results
The work provides a model that can be used to explore the effectiveness of treatments for certain patients and target new treatments to patients according to the cost of treatment and likely benefits for patients. Results are presented in an easily interpretable way. For example, if a medicine reduces the risk of having a heart attack by 20% and there were no side effects, it would be worthwhile (or “cost-effective”) if the medicine cost less than £72 each year for patients with least risk of developing the disease, but for patients with highest risk of getting CVD a much higher cost, e.g. £646 each year would be worthwhile because of the lives it would save in people with the most risk.

The Impact
The study is an important step towards using data that is already collected as part of usual patient care by the health service to make sure that people who would benefit most from a treatment receive it, while also controlling costs. The approach also allows researchers to determine what would be best for patients without having to run expensive and time consuming randomised controlled trials. The study has already been embraced by doctors and nurses who have written a summary of the value of this research in shaping future policy to manage patients with CVD.

For more information about heart attacks visit: www.nhs.uk/conditions/Heart-attack

Enquiries to Natalie Fitzpatrick, Data Facilitator, The Farr Institute of Health Informatics Research, n.fitzpatrick@ucl.ac.uk