# How long do we want to live and at what cost?

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How much would you pay for an extra year of life? What if it was only a few months or even a few weeks? How much would you pay to stop a myocardial infarction (MI) happening to a close family member? As healthcare expenditure tries to grow faster than gross domestic product, these are questions increasingly being faced, incredible though it may seem, leaving difficult decisions.

Cardiovascular disease (CVD) will be an integral part of all of these decisions in an age of improved global infrastructure and industrialisation. It is good news that people are living longer but this comes with an increased likelihood of suffering from an acute coronary event. Not only is CVD dubiously distinguished as the leading killer across the European Union (EU), it is also a significant contributor to morbidity as more people survive index events. By 2020, ischaemic heart disease will not only be the leading cause of mortality, it will be the single most important cause of disease-related grief, pain and suffering globally.[1]

Improving health status as it relates to CVD would be one of the most significant changes that our money could buy. How can we spend our money to avoid CVD for a longer and healthier lifespan? Unfortunately, this need sits under an uncertain canopy where healthcare spending is escalating out of control and spending on cardiovascular disease is top of the list. Healthcare spending naturally wants to grow 2.5 percentage points above gross domestic product (GDP) manifest from overwhelming demand and, in some countries, past underinvestment in infrastructure. This cannot be sustained. By 2050, in industrialised nations if this is left unchecked, healthcare spending could make up as much as 40% of GDP, led by the US.



**The escalating cost of cardiovascular disease**

The cost of CVD in Europe is approximately £116 billion annually; £15 billion is spent in the UK.[2] This includes the silent cost of CVD outside healthcare delivery. Health economists are frequently told that the most cost-effective patient is a dead patient but this is clearly untrue. In the UK, CVD-related premature deaths and morbidity cost money to society, totalling £10 billion annually.

Turning to healthcare costs, per capita spending on CVD in the eight largest EU countries ranges from £66 to £290 per annum. There are even larger variations in secondary care, ranging from £27 to £195, with the UK heading the list. So there is no standard approach to spending on the individual components of cardiovascular care, sparking the search for the optimum mix in maximising health status in cardiovascular disease.

Increasingly, the more that is spent on healthcare, the smaller the yield per pound. This is what economists call diminishing marginal returns. A good example is a US study[3] that shows an astounding inverse correlation between per-capita spending and adherence to process quality metrics in each state. Other research[4] suggests that even in the same hospital, death rates for high-cost physicians are found to be higher than those for low-cost physicians, even when data are standardised for severity level. Remarkably, better quality care can cost less provided the spending has hit a fundamental quality level.

The NHS is a pioneer in addressing this by integrating bonus payments to physicians who hit specific quality targets in the General Medical Services (GMS) contract. This departure from funding according to numbers treated is becoming increasingly popular with healthcare policy makers across the world and these pay-for-performance (P4P) criteria are beginning to influence outcomes in cardiovascular care. Spending can only stretch so far in achieving high-quality cardiovascular care. How and when it is spent is as

important as how much. But do these healthcare P4P payments go far enough?

**When and how to invest**

What has the biggest impact on health status relative to CVD? As far back as the 1970s, health economists found that health status is more dependent on infrastructure, nutrition, sanitation, education and smoking status and, surprisingly, less dependent on healthcare delivery. For CVD, the majority of healthcare spending occurs in the last few years of life. We need to find a way of investing each pound effectively into healthcare delivery to change the latent conditions that lead to an index event. Across an individual MI patient's lifetime, we intervene at the acute point where we make the least impact. In essence, what is being invested in CVD is not working as hard as it should.

The manufacturing industry uses the classic 1-10-100 rule, suggesting that a quality problem discovered in 'the field' is 10 times more expensive than if it is discovered in an 'in-house design review' and 100 times more expensive than it would be to prevent in the first place. An ounce of prevention is worth a pound of cure and never more so than with CVD. As we move closer to understanding the genetic causes and predisposition of CVD, this will lead to a fundamental change in how it is prevented, diagnosed and treated.

The most significant feature contributing to cardiovascular risk and its inevitable cost, however, is our own behaviour. The most effective time to influence this is in the formative child and teenage years – a period that some experts refer to as the 'window of hope', after which all healthcare behaviours become entrenched. Educationalists might consider adding an 'H' for health to the classic schooling disciplines of reading, writing and arithmetic. This would go a long way to protecting our greatest asset and resource. Much energy is spent studying the incremental differences between drug treatments of the same class, which are certainly important, but the bigger impact on health status comes much earlier. Focused efforts in prevention, effective and increased access to screening and earlier and improved diagnosis are the keys to halting the development of this deadly disease in its tracks.

Considering the widespread migration to P4P, a natural extension of this is to offer incentives for "early health" within healthcare provision – that is, empowering physicians and patients to take ownership for cardiovascular health, not just for acute symptoms but also for targeting patients who are at risk now. To be truly effective, incentives for early health in cardiovascular disease can also occur outside healthcare delivery. With so many financial incentives for other behaviours in the UK, why not offer financial incentives to people for healthy behaviour? The key to this approach is that it would allow clinicians to better impact care and also enable them to empower patients to take control of their own cardiovascular health.

**Investing for the future**

Moving towards earlier investment in cardiovascular health will mean facing barriers that are not insignificant. We are caught in a CVD spiral characterised by a relentless annual increase in cases and costs. Stopping the growth in these cases requires extra funding and resources to intervene earlier whilst still funding the necessary treatment for acute cases: but by intervening, it is possible to reduce cases. This is likely to happen incrementally within five years and the outcomes will continue to improve but such spending will generally be too late to benefit current generations. The needs of acute sufferers of 'late disease' dominate over untouched generations but it is necessary to start considering future generations now. Investment in exceptional, holistic, primary care – with strong attention to lifestyle, environment, early diagnosis and intervention – stand the best chance of limiting the development of costly, debilitating late stage CVD.

It will take courage to make difficult, innovative choices around prevention, earlier diagnosis and treatment of CVD. In a similar way to the world looking at the harsh aspects of global warming, society must look at the changing nature of our own internal biological environment. Finding the right balance between late investment in the acute care of CVD case and earlier diagnosis and prevention will be the key challenge in extending life and reducing CVD morbidity over the next 30 years.

Earlier investment in CVD care can be cost-effective where there is:

- better creative and effective education at the most influential point in an individual's lifetime
- an extremely accurate capacity to detect vulnerable patients and the best tools to select more accurately patients who will respond to treatment
- a holistic approach that allows detected diseases and disease potential to be modified, increasing the time to an event or avoiding that event altogether
- powerful information systems that track and modify educational, screening/diagnostic and treatment approaches to ensure best practice for healthy patients, as well as those identified as vulnerable patients.

**Conclusions**

The model of healthcare delivery is changing. By actively engaging at the front end of care, we can truly impact health status with a much lower resulting cost. The starting point is a fuller understanding of individual risk, outcomes and cost. Enhancing the knowledge of modifiable and non-modifiable risk factors and moving from a population-based approach to

an individual-based approach will go a long way towards addressing this. If it is possible to change the survival rate for acute sufferers of CVD from 43% to 85% with much earlier detection, this represents a £5.4 billion annual saving in productivity and informal care costs alone. Instead of just considering the £15 billion being spent in the UK on cardiovascular care, consider the expenditure over the next 30 years during which time, even conservatively, the UK will spend approximately £1 trillion on cardiovascular care. How can we invest now in our future to change this?

The beginning of this article asked how much you would be willing to pay for an extra year of life. Perhaps that question should be rephrased. How much would you be willing to pay today to delay an MI by 10 years or to avoid one altogether versus how much you would have to pay in the future for just one extra year of life post-MI?

These two values could be similar but the former is clearly better value for money. More appropriate spending across different stages of our lives should allow us to re-imagine a future where earlier intervention significantly reduces premature deaths from stroke and MI, allowing those with a predisposition towards CVD to live more productive and meaningful lives.

## Conflict of interest

Lisa Kennedy is a Head of Health Economics at GE Healthcare.

## References


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