

HOW MUCH DOES A HUMAN LIFE COST?



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If a bandit jumped out from behind a bush during a health walk in the woods and shouted „money or life!“ at you, how much money would you give? And how much if he jumped on your daughter? How much on a neighbour? And what if he jumped on a complete stranger, but demanded money from you?

Fortunately, we don't have to deal with such straightforward dilemmas in life. But unfortunately we live in a world of limited resources, where using a resource for purpose A means that we cannot use it for purpose B. And that chosen purpose in a complex world is of course not always just the protection of life and health.

It works the same way in political decision-making. Every kilometre of highway built means fewer innovative medicines and more mould in hospitals. At the same time, it is clear to everyone that we cannot put the entire public budget into health care.

Firstly, because we also want to be speeding on the roads, argue in the courts or stitch ourselves up in the schoolroom. Secondly, healthcare makes only a small contribution to prolonging human life and to better health. The quality of diet, the environment and the amount of stress contribute more. Many of these factors are subordinate to wealth - the richer we are, the longer we are healthy.

On what basis, then, should we distribute public resources? Can this even be „expertly“ decided? The answer is yes and no. We need to assign a price to each public good or service and compare alternatives according to priorities. Therefore, a necessary and straightforward tool is to assign a price tag to a year of healthy life and make decisions based on that. For example: will saving 5 years of life cost us less than 200 000 euros? If so, the expense will occur. If not, unfortunately it will not.

There are two significant problems associated with this that cause this approach not to be used much in reality. First, it is not always easy to measure how many years of healthy life a measure will save. In the world of medical technology, such measurement is called Health Technology Assessment (HTA), and in developed countries it is carried out by specialised agencies and institutes (the creation of a Slovak one was widely discussed before the elections). It works reasonably well for medicines, for example. For large-scale social phenomena, it works less so. How many years of healthy life will the closure of florists during the COVID19 pandemic generate? And what will be the cost? You don't have to be an economist to understand the practical problems involved in calculating such a task.

The second problem is more prosaic - politics. Stand in front of the electorate and explain to them that for one year of their lives, the government is willing to pay a maximum of EUR 41 533! Such politicians are scarce like saffron, and information about the value of life is artfully hidden from the electorate in a tangle of acronyms such as QALYs (quality-adjusted life-years), DALYs (disability-adjusted life-years) and complex formulas. Nevertheless, such a “value of life quantification” exists in Slovak legislation. It is used when new medicines enter the market and it is the aforementioned EUR 41 533 per quality life year ¹.

The cost of saving a life in the light of COVID19

The absence of firm rules about the value of life does not mean that such decisions do not occur. A euro that is spent on highways, courts or nurseries is a euro that could have paid for better medicines or ventilators. However, it is not just about money. Complications caused by smoking kill 8 000 Slovaks a year, alcoholism kills 1 200 - 1 400 people, car crashes kill 200 - 300 people and maim about a thousand every year. Yet cigarettes, alcohol and cars have not been banned, even though such a ban would mean tens of thousands of years of quality life saved. Society „understands“ that achieving zero „losses“ would be extremely difficult, restrictive, or downright impossible. In the case of cars, for example, what would be needed is not even a ban, but a restriction that a car capable of a top speed of 25 kilometres per hour can be driven on the road, thereby virtually eliminating the risk of a fatal accident for the crew. However, the price we would pay for the lives gained would be a significant reduction in quality of life and economic activity.

However, there are examples where the resources invested do not imply limitations and costs in terms of loss of enjoyment of life... For example, in 2017, 19 027 patients were hospitalised in Slovak hospitals with diagnoses of „J18 - Pneumonia caused by unspecified microorganism“ or „J15 - Bacterial pneumonia not elsewhere classified“ and of these 2 605 died. A reform of long-term care (in many cases these are nosocomial - hospital-acquired - infections) at a cost of a few tens of millions of euros would have prolonged the lives of hundreds of them - but it did not happen. Untreated atrial fibrillation contributes to at least 2000 strokes a year, and a third of people do not even know they have the condition. It could be detected by a trivial and inexpensive test, but it doesn't happen. And we could go on like this for a long time, listing, for example, the reasons for more than 9 000 deaths a year that could have been averted by timely and effective healthcare.

An infectious disease pandemic with a relatively high mortality rate and many complications is a novelty for modern society. Decision-making is influenced by the huge degree of uncertainty that is associated with novelty, but also by the association with a different set of emotions. Unlike the anonymous victims of car crashes, smoking, or old women dying quietly with pneumonia, the COVID19 pandemic affects everyone. A son can infect his father, a neighbour can infect his neighbour, and it poses a mortal danger to a category of people for whom contagious diseases have posed no threat in the world of modern health care until now. Switzerland, for example, has so far recorded 100 times more deaths from COVID19 than Slovakia.

At the same time, however, large potential pandemic threats trigger huge expenditures on pandemic prevention. The currently estimated cost of EUR 1.5 billion per month (which may be far from final) is not just an accounting item. It is a sum that has the potential to cripple Slovakia economically in a matter of months - and lives are being paid for the economic deterioration. The downturn in the economy will result in a dramatic deterioration in the care of chronic patients, the elderly or people with psychiatric illnesses. Health expenditures will also increase due to the health consequences of the stress that sudden impoverishment will cause for many people.

This is why the search for ‚value for money‘ makes more sense in the COVID19 pandemic than anywhere else. In the initial phase, when the threat of an uncontrolled wave of infection with tens of thousands infected and thousands dead is imminent, the uncertainty is enormous and the ability to judge the cost-effectiveness of actions is minimal. However, as the situation gradually stabilises, the options expand. Catastrophe has been averted, but achieving zero infections is extremely expensive.

World and domestic calculations

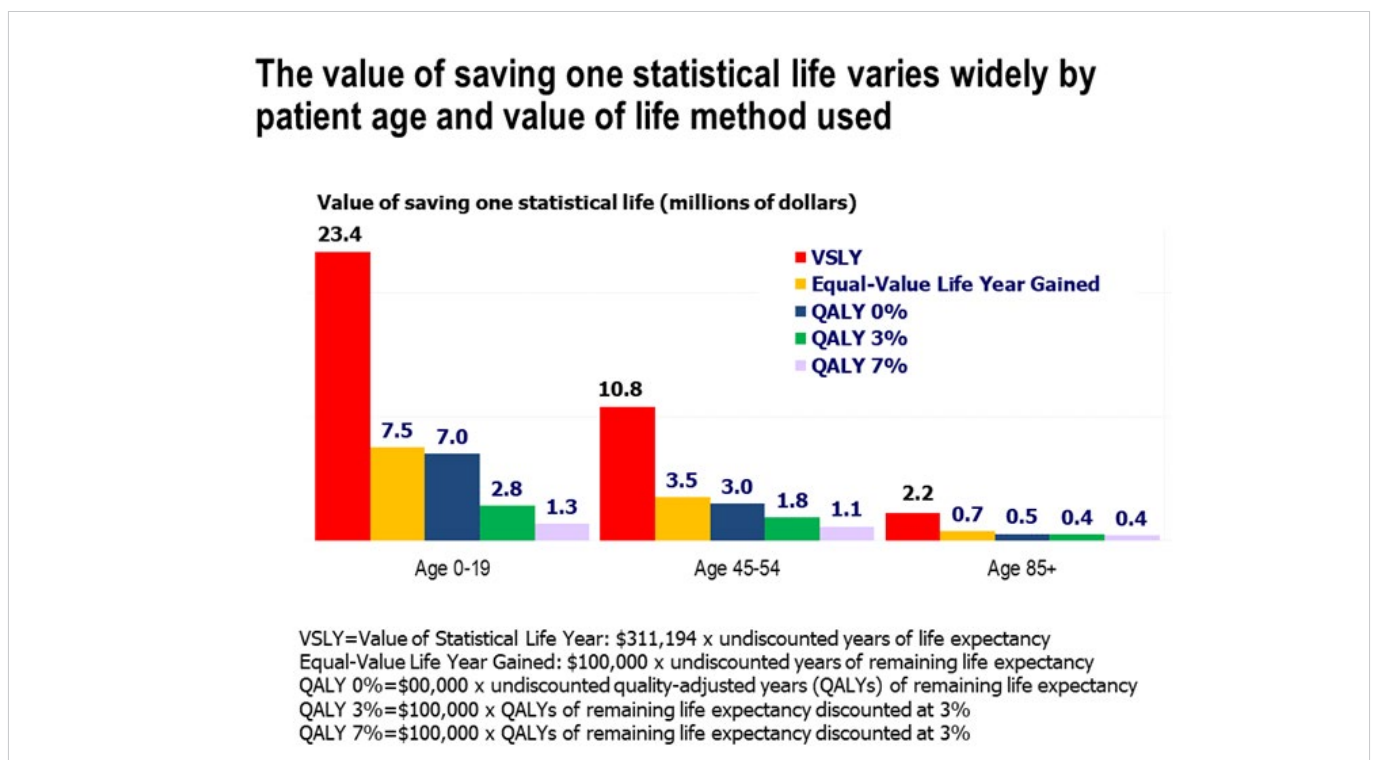
At this point in time, we do not find a large number of rigorous attempts to quantify the cost of intervention against COVID19. Reasons for this are mentioned above - too little information on years of life lost, as well as financial costs. However, the first swallows have already flown.

The very straightforward calculation allows the use of an unadjusted value-of-statistical-life (VSL), i.e. regardless of age or previous health status. In the Western world, a **value of 2-4 million dollars** is usually considered. In the case of the US, this would mean from \$400 billion (200,000 deaths x \$2 million) to \$6.8 trillion in value that could be saved by interventions ².

The problem with these calculations is that the statistical value of life can be used at a small total cost. And it is often calculated backwards. For example, stricter emissions rules are imposed on steel producers at an annual cost of \$2.5 billion. Lower emissions save 500 lives, so the cost per life saved is \$5 million. With huge pandemic numbers, such a calculation ceases to make sense. If, for example, in Slovakia, we set an acceptable cost of saving 1 life at EUR 5 million, we would exhaust the **entire public budget** by trying to save 7 000 people. That is why this value is used, for example, in compensation for an accident or for misconduct, i.e. when considering isolated cases.

Therefore, in this case it makes more sense to consider weighted values. A popular blog dealing with health economics has done a **tentative recalculation** for the US. They estimate that each death from COVID19 represents a loss of 7.8 QALYs, or nearly 8 years of quality life. They used estimates of the US National Centers for Disease Control and Prevention (CDC) of the spread of the virus and arrived at a potential loss of 1.6 million to 13.3 million QALYs. Since the cost of the economic recovery is also very unclear (\$1-4 trillion, including Fed-supplied liquidity), they came up with a very wide range of \$75,000-\$2,400,000 per QALY saved ³. In the US, a QALY value of roughly up to **\$150,000** is considered standard. If the median number of years saved is 8, the cost per „average person saved“ can thus be as high as \$18.7 million for COVID19.

There are other methods of assessing the cost of living (for example, discounting by a fixed percentage for age). A chart from **Forbes magazine** shows that, for the US, the average value of a life saved ranges from \$400 000 to more than \$23 million at different ages.



The QALY indicator was also the focus of a [Danish study](#) by CEPOS. They counted 1 680-5 600 deaths in Denmark per COVID19 with an average loss of 8 QALYs per death. They did two versions of the calculation with different deaths and different costs of preventing them. **Based on this, they estimated that Danes pay 350 000 - 1.4 million euros for each quality life year saved.** The standard in Denmark is EUR 67 000 per 1 QALY. However, the authors had no model of how many lives the measures should save, so again this was more of a theoretical exercise.

There is also a problem with the QALY indicator itself in the Danish calculation - it only calculates the costs incurred by deaths. However, costs are also incurred by infected survivors (hospital stay, possible organ damage after overcoming the infection). They calculate the cost of mortality but not morbidity (disease).

Therefore, we will conclude with a look at the Slovak cost model. It was prepared for the needs of the Office of Public Health for the GDPR assessment of the eligibility of interference with human rights and the authors from the company Lewik provided it to us for consultation. Instead of QALYs, this model calculates [DALYs](#), which is simply QALYs „upside down“, calculating the cost of lost years of life and lost health. It counts deaths, hospitalizations, home quarantine, and even social isolation. It applies them to the Health Policy Institute's epidemic [spread model](#). The monetary value of DALYs was set according to the Slovak law that determines the QALY value for medicines (the authors conservatively used a lower QALY threshold of €37,380).

This model shows what the economic value of health is, which the epidemic will destroy in its current state. Applying the version of the first Office of Public Health (OPH) model from March 18, 2020 (we can call it „no-intervention“, but in the calculation they stuffed the model with the more optimistic of the three versions of OPH, which assumed about 0.5 million infected), the authors arrived at a value of 2.7 billion euros. This would be the value of lost health if the disease had a relatively free course and roughly half a million people were infected. Applying the OPH model from March 31, 2020, i.e. the model with preventive interventions included, the authors arrived at a figure of EUR 1.08 billion. The measures taken in the second half of March have thus managed to ‚save‘ health to a total value of around EUR 1.6 billion.

But how much did this saving cost us? The estimated monthly cost to the public finances of the economic recovery measures is € 1.5 billion. A further increase in restrictions (e.g. the blackout) would no longer be able to protect more than the remaining € 1.08 billion.

This is just the immediate cost to public finances (including bank guarantees). The Lewik authors themselves point out that the costs do not include other costs, such as the effect of delayed health care (delayed surgeries, delayed CT scans, sonograms, worsening outpatient care-the Lewik analysts estimate 8,500 delayed cancer diagnoses-worsening care for psychiatric patients), and many others. We add that many of the costs will be in the private sector as well, as public finances will fall far short of recovering all the losses.

It looks like the prevention measures only make sense for one month and then their cost will exceed the cost of an epidemic. Of course, even here we have to state that this is only a form of hint, not a bulletproof tool for decision-making. A large part of the aforementioned costs of the measures (1.5 billion a month from public finances) depend not only on developments in Slovakia, but also on developments abroad, since it is more important for our economy when the situation stabilises abroad than at home. The results of the OPH model have also been subjected to considerable public criticism because of the high degree of pessimism. For example, while applying the latest OPH model leads to an estimate of 1131 deaths, the American Institute for Health Metrics and Evaluation gives a range of [13 - 2015 deaths](#) for the ‚first wave‘ of the disease for Slovakia, with a median estimate of 251 deaths. If current prevention measures are working better than the model suggests, further increases in restrictions would have the potential to save much less than the billion mentioned. In other words, e.g., an economic lockdown could theoretically save health at a maximum value of 1.08 billion (much less in reality; it would not prevent the spread in homes, settlements or hospitals), but could cause economic damage at a higher value.

The QALY/DALY concept itself can be subjected to extensive criticism. Leaving aside the fact that the financial value of a year of quality life is more or less politically determined, the very concept of objectively assessing (poor) quality of life on the basis of missing limbs or non-functioning organs is problematic.

Don't cling on the numbers, but let them be your consultant

The purpose of this text is not to convince the reader or policy makers that decision making in the event of a COVID19 pandemic should be strictly guided by mathematical calculations of the value of health. That is neither possible nor desirable. However, with this text we wanted to show that the **fight against a pandemic is far from costless, and at some point we will reach a situation where the damage (including health damage) from further measures will exceed the lives and health saved. Given the scale of the pandemic, the damage from a hands-off approach to stopping the pandemic could lead to the complete economic and social disruption of the country.**

Fortunately for politicians and the rest of us, it is not necessarily an either-or decision. The whole world has turned into a testing ground from which more or less successful measures to control the spread of the epidemic are constantly falling out. If our politicians are inspired, follow a transparent plan, follow quality indicators, we will be able to classify COVID19 even before a vaccine or a drug is produced as an unpleasant and dangerous but manageable threat, just as we classify car crashes, cancers and strokes.

Reference List

¹ This is very simplified. This value ranges from 35-41 times the average wage two years ago, according to the fulfilment of various criteria in Decree 93/2018 Coll. and Act 363/2011 Coll. This assessment is applied when replacing existing treatments with new ones. However, if the only available treatment exceeds this threshold, it is applied. There are chronic patients in Slovakia whose annual treatment costs are close to EUR 1 million.

² Other „quick for numbers“ from the US calculate values in the order of \$5-10 million per life saved.

³ The lower limit is 1.6 million QALYs with a cargo of 4 trillion, the upper limit is 13.3 million QALYs with a cargo of 1 trillion

About author



Martin Vlachynský works as an INESS analyst since 2012. He earned MSc in economic policy from Masaryk University in Brno and MSc in economics, management and international relations from Business School at the University of Aberdeen. He mainly focuses on business environment, competitiveness and state interventions.

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