EDITORIAL

Health Economics of COVID-19

31st January 2020 Sweden receives its first confirmed COVID-19 case. 1st February the Swedish government classifies the coronavirus as a generally dangerous disease. 2nd March the Swedish Public Health Agency raises the risk of the spread of infection in Sweden from low to moderate. 10th March the Swedish Public Health Agency raises the risk of the spread of infection in Sweden to a very high level. On the same day, meeting restrictions were introduced in Sweden, where gatherings of 500 people or more were prohibited. 11th March the first death in COVID-19 was reported in Sweden. On the same day, the World Health Organization (WHO) classifies the virus outbreak as a pandemic. Within two weeks, almost all EU and OECD countries had banned public gatherings, closed schools and workplaces, and restricted travel within the country.

The situation at the beginning of the pandemic was very uncertain and researchers disagreed. On 19th March, one of the world's leading epidemiologists, Stanford professor John Ioannidis, published an article in the *European Journal of Clinical Investigation* in which he warned that decision-makers may feel compelled to impose severe restrictions without knowing what effect they have, Ioannidis (2020). He writes that we have known for 150 years that it is very important to wash your hands. Maybe we also know that distance helps, but otherwise we know nothing.

His message was that it can then be dangerous to hit the drum too hard for things we know nothing about, and which can have other serious consequences. When the first wave of coronavirus swept through Europe, outliers United Kingdom and Sweden had ignored the clamor to lock down.

However, three days earlier, on 16th March, Neil Ferguson, another reputable epidemiologist, and his colleagues at the Imperial College COVID-19 Response Team in London had presented a report with model calculations of how the pandemic could develop, Ferguson et al (2020). It received a much greater attention. According to Ferguson's estimates, the pandemic could lead to 250,000 deaths in Britain and 1.2 million in the United States if communities were not shut down to completely stop the spread of the disease. Without restrictions in Sweden it could have meant 85,000 deaths. Ferguson's team concluded that one type of measure is not enough but several together, and they stressed that it was important to close schools. This led to a change in strategy by the United States and the United Kingdom.

Unlike many other countries, Sweden did not introduce a national lock down to suppress COVID-19. Instead, different types of mitigation strategies were implemented, such as recommending limitations for social gatherings and travelling. Sweden is among the countries with the highest COVID-19 death rates, as measured in terms of deaths with a COVID-19 diagnosis per million people, (European Centre for Disease Prevention and Control). The number of cases, however, does not always serve as the best way to measure the burden of a disease as it does not take life expectancy, lost life-years, or the quality of life-years into consideration. Health economists have therefore suggested to use the concept of life expectancy and Quality-Adjusted Life-Years (QALYs) lost to estimate the health-related quality of life loss associated with COVID-19, Briggs (2020).

The outbreak of the Covid-19 pandemic has resulted in closed borders, travel bans, school closures, and general social distancing and lock down. These measures have resulted in a sharp decline in economic activity, rising absenteeism, rising unemployment, and impact on stock markets. This behavioural response is stronger than what has been

anticipated by previous research, Jonung & Röger (2016). Moreover, previous research has anticipated that the pandemic would be short-term, while the measures in response to COVID-19 have been in place for several months and have now been reintroduced in second waves. The extent and length of the current interventions have an unknown magnitude and duration. The recovery of the economic activity depends on future measures that will be taken to stimulate economic growth, i.e. the price of lock down and other non-medical activities is still not set.

Comparing the Covid-19 pandemic to the Spanish flu is of limited value, as the current economic context is very different from 1918-1919. Both internationalization – with increasing international trade, tourisms and travel – and digitalization, may lead to an entirely different macroeconomic impact. The epidemiological impact also differs, where deaths are found in a much older part of the population for Covid-19 compared to the Spanish flu. Consequently, previous research on the economic impact of a pandemic are of limited value for drawing any conclusions with respect to the outbreak of Covid-19 pandemic, Jonung & Röger (2016).

Unlike many other countries, including its neighbours Denmark, Norway and Finland, Sweden has chosen to apply a less restrictive strategy, relying on the voluntary self-imposed restriction of individuals. The variation in mitigation strategies, presents a unique opportunity to analyse and learn about the consequences of different mitigation strategies. Two types of studies could be conducted, descriptive and normative.

Example of descriptive studies address the following question:

What are the health and economic consequences of Covid-19 in the Nordic countries? This question should include an estimation of the total loss of health and of the economic burden of COVID-19 in the Nordic countries. This would include estimations of the health care cost, production loss, costs of non-pharmaceutical interventions (NPI), (e.g. social distancing), impact on quality-of-life (QoL) and mortality, including health loss due to crowding out in health care and suicide following the economic crisis.

The data needed must be collected from national registries, statistics and surveys. To assure that the net outcome of mitigation/suppression strategies to the society is positive, future research is needed to provide a more complete picture of the QALYs lost during the pandemic.

Example of normative studies address the following questions:

What would be the epidemiological and economic consequence of COVID-19 under different NPI strategies? What is the optimal preparedness level for meeting potential future pandemics?

We can never know counterfactually what health outcomes and cost consequences would have occurred had decision-makers chosen a different set of actions. However, economists can use modelling tools to simulate and explore the potential consequences of alternative policies to inform decision-making for future pandemics. Two types of models are needed. First, epidemiological models are needed for translating policy decisions into health and health care resource consequences. Second, macroeconomic models are needed that can translate these health outcomes and the different NPI strategies into impacts on the broader macroeconomy.

There is a rapidly growing number of initiatives to develop vaccines that can prevent covid-19, drugs for the treatment of the disease and diagnostic methods for the identification of the new coronavirus and antibodies in patients who have been infected and recovered.

The state of knowledge about the ongoing research is changing rapidly. In November 2020 we learn that:

Vaccines typically require years of research and testing for demonstrating safety and effectiveness. In early November 2020 there are 52 vaccines in clinical trials on humans, according to New York Times, (November 11, 2020). Of these 11 vaccines are in the so-called third phase, i.e. the last test phase, which involves a large test group. For example, more than 40,000 people participate in Pfizer's and Biontech's studies and the companies are the first to announce results from the third phase. Three of the vaccines are currently under assessment by EMA, the European regulatory authority, according to Life.time (11th November 2020).

There are different types of vaccines. Classic vaccines contain small amounts of the virus itself, often in inactivated or attenuated form. The pharmaceutical company Astra Zeneca is developing one and, has also come a long way with the tests. Pfizer and Biontech, on the other hand, are developing a so-called mRNA vaccine, which only contains genetic material from the virus to activate the body's immune system, but not the virus itself. The big difference is that you cannot get COVID-19 from such a vaccine.

However, there are several attributes and aspects to consider when understanding a vaccine's value. Traditionally, value drivers for vaccines have been limited to "only benefits in terms of improved health, reduced health care costs and resource use (and improved quality of care) and short-term productivity increases to patients and their caregivers" WHO (2019). However, vaccines often generate externalities (indirect effects on third parties) that are not necessarily observed for other types of medical interventions Mauskopf et al. (2018). In addition, these could be benefits and costs beyond the health care system perspective, vaccines might also have social and economic externalities which are important to society. Consideration of these broader benefits could be relevant, for consistent decision-making particularly in the case of vaccines for COVID-19, where the avoidance and reduction of macroeconomic costs associated with non-medical interventions are substantial.

Based on insights from a Roundtable with academic and health technology assessment experts in several countries, the Office of Health Economics in London have published results from work on how to recommend (pragmatic) use of the newest and most advanced evidence and analytics to consideration the broader value of new vaccines. Future work on this so called 'BRAVE narrative' might be disseminated as a science and policy paper, Bell et al (2020).

Another interesting question is the distribution of vaccine. For example, Finland has begun preparations for a mass vaccination against covid-19, reports Hufvudstadsbladet, HBL (2020, November 6). A national group of vaccination experts has recommended that vaccination should be voluntary and that everyone who wants to take the vaccine should receive it.

More research is needed to understand what happens in practice when different types of mitigation strategies are implemented and long-term evidence of their impact on health outcome as well as macroeconomic consequences are lacking. It might be that the whole issue of differences between countries can only be assessed retrospectively after a few years when the pandemic has subsided. The Spanish flu had three major waves in many countries, and it may take years of summing up facts to be able to correctly assess the overall effect of COVID-19. However, NJHE encourage manuscripts that examine the issue of COVID-19 from different perspectives.

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