Advance Market Commitment for Broad-Spectrum Antivirals

Pandemics remain a threat

With the Covid-19 pandemic estimated to have been responsible for over 27 million deaths globally, and cost nearly $14 trillion in reduced economic output, pre-planning for subsequent viral outbreaks could be a life-saving endeavor. Yet, despite indications that future pandemics will be a once every 30 to 50-year event, with an estimated annual average death toll of 2.5 million according to the Centre for Global Development, there is a clear need for more robust pandemic preparedness strategies.

Global vulnerabilities in pandemic preparedness were exposed with COVID-19, as the development and regulatory approval of antiviral pills in response to the new pathogen, such as Paxlovid (nirmatrelvir/ritonavir), took almost two years from its onset. These novel therapeutics thus played a limited role in fighting the pandemic. With future outbreaks still a significant risk, quickly available antiviral drugs that can combat a wide range of pathogens, i.e. platform-based broad-spectrum antivirals, will be fundamental to a swift pandemic response. In addition, the capability of that drug to prevent follow-on infections, called transmission blocking, can effectively reduce the spread of the pathogen and contributes to ending a pandemic early on (see Figure 1).

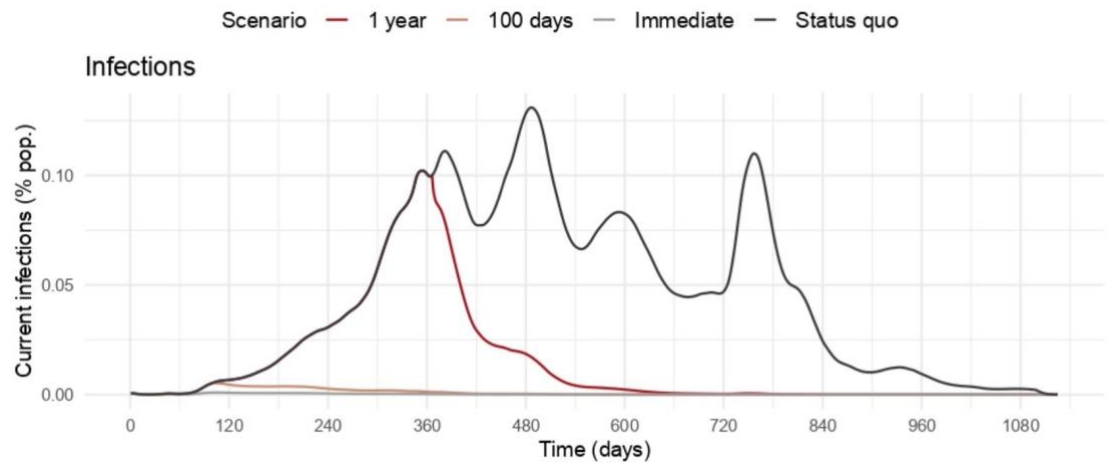

Figure 1: Simulated infection numbers in the Covid-19 pandemic. Status quo (black line), intervention with antiviral drugs after 1 year (red line), intervention with antiviral drugs after 100 days (yellow line) and intervention with antiviral drugs immediately at the start of the pandemic (grey line).

Insufficient incentives to develop countermeasures

During the 2002 Sars-CoV outbreak Pfizer developed a lead candidate for an antiviral drug but shelved it when the outbreak ended. It was only after the Covid-19 outbreak occurred that Pfizer continued development which turned into nirmatrelvir 2 years later. However, to generate large societal value, antiviral drugs need to be available from the start of the pandemic and therefore need to be developed beforehand.

Several aspects of market failure prevent sufficient investments into the relevant drug development ahead of a pandemic. Firstly, the attributes of “broad-spectrum” and “transmission blocking” provide public health benefits beyond the patient receiving treatment – there are positive externalities which commercial markets neglect.

Secondly, unpredictable timing and misaligned incentives undermine the commercial incentives for preparatory pandemic innovation. As pharmaceutical firms earn profits predominantly during market exclusivity and patent protection periods, the risk of demand for a broad-spectrum antiviral materializing after those protections expire makes commercial development financially unattractive. This risk is particularly high for these drugs as major sales would only occur during pandemics, whose arrival is uncertain. The socially desirable outcome of having the drug available on day one of an outbreak to prevent a pandemic from occurring would inherently limit commercial sales compared to bringing the treatment to market once millions are already infected during a full-blown pandemic. In addition, by the time an outbreak creates demand for their products, their patent may have expired and there will be pressure to keep prices low. There is little upside for firms taking on the risk that comes with breakthrough innovations.

The Advance Market Commitment

A guaranteed demand for antiviral drugs ahead of a pandemic would restore commercial incentives for broad-spectrum antivirals. As a consequence, the market risk of an investment by pharma companies and investors is substantially reduced, unlocking needed private investments.

An Advance Market Commitment (AMC) would reward successful firms for developing a qualifying antiviral, maintaining some production capacity and producing for a stockpile. Committing to reward successful drug development gives firms “skin in the game” and would attract innovators with truly promising ideas. It would enable the government to incentivize investment in a breakthrough technology without risking billions of taxpayers’s money on ideas that do not pan out.

Benefit-cost estimates

Based on extensive estimates the award size needed to incentivize the necessary investments in novel drugs amounts to $3.5 billion. This includes costs for R&D as well as costs for the initial installment of production capacity, the supply of 20 million doses with 5 year shelf life over 20 years as well as 60 million additional doses once as outbreak response over the 20 year timeframe.

While this is a sizable investment, the benefits far outweigh the costs. Based on the methodology in Glennerster et al (2023) and our own modeling the expected discounted benefits amounts to $3.7 trillion. Therefore, the ratio of benefits to costs is about 1,000 to 1.

Funding options

Governments committing funds to the AMC will receive doses for their national stockpiles as well as doses in outbreak response as a share of their contribution to the AMC. A country committing 10% of the AMC funds, for example, would receive 10% of the 20 million doses for the stockpile as well as 10% of the 60 million doses scale up after an outbreak occurs.