

Commentary: Lars Rebien Sørensen

Time for action against antimicrobial resistance

The antimicrobial resistance crisis continues to worsen. 700,000 people die from drug-resistant infections every year. And while the novel antibiotics needed to combat superbugs are either not being developed, or companies that develop and market them – most recently Melinta Therapeutics and Achaogen – are going bankrupt, resistance is increasing.

Thus, the death toll is set to rise considerably, before we come up with a sustainable solution for providing the needed novel antibiotics.

This is the sad backdrop for the Novo Nordisk Foundation and Novo Holdings' decision to convene an expert panel at the recent annual meeting of the World Economic Forum in Davos, Switzerland to discuss solutions to the crisis. To be honest, it was never a heated debate.

After the hour-long session, it was clear that all parties in the panel agree on the problem at hand: the business model for developing novel anti-infectives is broken. Also, they agree on the solutions: find new incentives for the private sector to resume making new antibiotics for patients in need. Furthermore, the solutions are both affordable and represent an absolute bargain for society, compared with the value that an effective antibiotic armamentarium delivers. To keep the threat of antimicrobial resistance at arm's length, experts assess that the world needs one or two new antibiotics annually. Given that the expense of developing a new therapy is roughly \$2 billion, we need incentives to generate \$3 billion annually.

Fortunately, three different models for funding antibiotics are being piloted today, and countries that aren't currently involved are free to adopt any of these.

The first is a subscription model based on a health technology assessment. The UK National Health Service announced a pilot subscription model in July 2019. The model relies on health technology assessments conducted by the National Institute for Health and Care Excellence to determine the value of the antibiotics. This makes for a very straightforward and fair way to value novel treatments, which fully delinks revenue and volume of use. However not all countries in the world have such an agency.

Another option is a subscription model that does not need a health technology assessment and which Swedish public authorities are piloting. The Swedish model is not designed as a market entry reward but as an incentive for companies to launch their novel products in Sweden. As a small country, Sweden is concerned that cash-strapped companies will not bother to register or sell their products there. All countries outside the US should be similarly concerned. The model, now in pilot phase, can easily become a direct financial contributor to the global market entry reward. The model works by establishing a minimum revenue for the pharmaceutical company, and the difference between what hospitals buy and that minimum will be covered by the national government. Pretty much all single-payer healthcare systems in the world could adopt the Swedish model very quickly.

Finally, we have the national stockpile model, which

is being piloted in the US, which does not have a single healthcare payer, although the Centers for Medicare and Medicaid Services do cover more than 40% of healthcare expenses. Also, there is not yet an official "US anti-infectives pull incentive model"; however, in December 2019 the government agency BARDA announced a stockpiling purchase of the antibiotic Nuzyra from Paratek Pharmaceuticals worth up to \$285 million. The US government stepped in and guaranteed that Paratek would sell a certain amount, providing greater financial certainty for Paratek investors.

By conducting their own pilots, these three countries acknowledge that antimicrobial resistance is a huge problem, and this is very commendable. The three models are being implemented and further steps are needed to roll them out more broadly in the respective countries. However, even when these programmes are fully implemented, it is not nearly enough to have three countries engaged in the effort to find a workable reward model for antibiotics. All other large and wealthy nations need to step up now.

Pharmaceuticals is a global business and the development of novel antibiotics calls for a much more vibrant market. The established pharmaceutical companies have both the capabilities and the manufacturing sites. Some of them also have the research capabilities. They also need to be a part of the solution; a broad public-private coalition that will need to join forces to resolve the problem.

We, as modern societies around the world, have long agreed that building certain basic infrastructure such as clean water supply, roads, and fire stations is a good use of common resources. Similarly, effective antibiotics are a prerequisite for modern medicine, including most surgeries, immunology treatments, caesarian sections and pacemakers, in addition to the benefit of reducing the number of deaths related directly to antimicrobial resistance.

To solve the business problem surrounding the alarming growth of antimicrobial resistance, action is needed from the responsible players in national health systems around the globe, from pharmaceutical manufacturers, and research-based biotech organisations. We know the outline of the solutions, and we need this diverse field of stakeholders to come together and agree on the details. If we fail, we have only seen the beginning of the human suffering and societal problems that antimicrobial resistance will cause.

The Novo Nordisk Foundation and Novo Holdings will continue to push this agenda, seek out new alliances and collaborate with all relevant players to secure value-based reimbursement of novel antibiotics. This is the only way to unleash the vast potential of modern biology and create the next generation of life-saving antibiotics and the other innovations they will pave the way for.

This article was written by Lars Rebien Sørensen, Chairman, Novo Nordisk Foundation and Novo Holdings.