

Public-Private Partnerships Provide Hope in the Fight Against AMR

Antimicrobial resistance (AMR) represents a serious and growing threat to human and animal health worldwide. It already kills 700,000 people globally, and that figure could rise to 10 million by 2050. Current efforts to tackle AMR focus primarily on promoting the responsible use of antibiotics, and on developing new antimicrobials capable of defeating multi-drug resistant infections.

In addition to this, there is now growing recognition that vaccines could play a stronger role in the fight against AMR. The Innovative Medicines Initiative (IMI) is a EUR 5 billion (USD 6 billion) European public-private partnership between the European Union and the European pharmaceutical industry (represented by EFPIA, the European Federation of Pharmaceutical Industries and Associations). We strive to incentivise both private sector investment in areas of public health importance (which may not be the most profitable for the industry), and public sector investment, which is focussed on the most urgent clinical needs and those that

challenges:

1. Fundamental issues regarding the flux of anti-microbial agents into pathogenic bacteria;
2. The dearth of new antimicrobial agents entering the drug development pipeline;
3. The lack of coordinated clinical trial infrastructures and clinical laboratory testing facilities;
4. The need for new economic models that address the market failure inherent to the field of AMR.

All of these challenges are being positively addressed through the IMI program entitled New Drugs for Bad Bugs (ND4BB).

Already, significant contributions have been made on all four challenges through IMI projects. New mechanisms of action of anti-microbials have been elucidated and

new chemical entities are currently undergoing preclinical testing. Through the IMI project ENABLE, new anti-microbials are being tested via a rigorous assessment programme where many European biotechs are able to quickly and robustly assess new assets. A pan-European network of hundreds of clinical and laboratory testing facilities

has been set up in order to ensure that sites are available in real time, allowing new anti-microbials to be tested against the most relevant microbes and clinical indications as soon as they come available. Earlier this year, some American sites were incorporated into this network. Finally, in the DRIVE-AB project, multidisciplinary teams from the public and private sectors have worked on economic models to incentive both push and pull mechanisms that reward those who develop new antibiotics while also promoting their responsible use.

In addition, the topic of vaccines for AMR-related pathogens is being considered



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for future investments at IMI.

Vaccine research also features in the European Commission's 2017 One Health action plan on AMR to support the development of new preventive vaccines but also of new economic models and incentives.

This is a topic with specific associated challenges. For example, many AMR associated cases are hospital based (nosocomial), and it is not at all obvious how to predict those who will visit

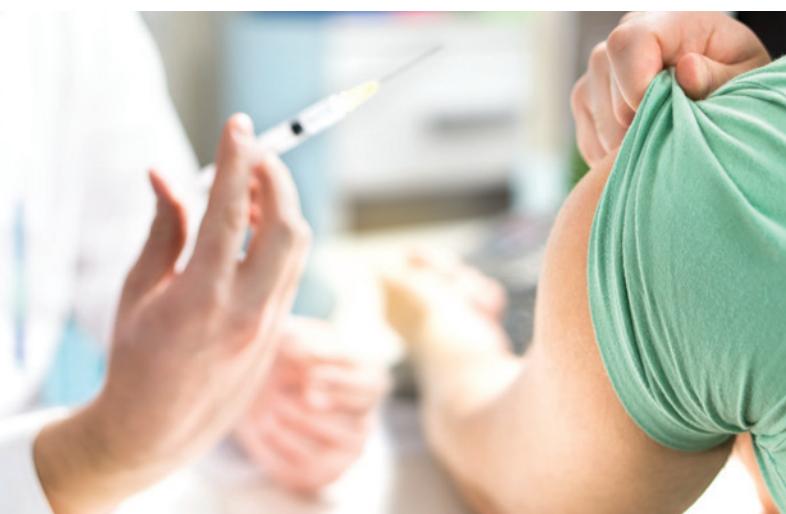
the hospital in order for them to be vaccinated in time for protection to be assured.

Secondly, it is uncertain that vaccines can be developed in a timely and efficient manner given the diversity of pathogens that are involved in the AMR arena, such as Escherichia coli, tuberculosis, Klebsiella, Pseudomonas, Staphylococcus, and Campylobacter.

Last, but not least, we know that existing vaccines, for example those against influenza and pneumococcal infections, are somewhat efficient at preventing some secondary infections that include many respiratory illnesses caused by both bacteria and viruses.

On a positive note, although we have yet to prove that vaccination could reduce dramatically the use of antibiotics in the human population, the proof of concept for this strategy has already been documented in the Norwegian salmon aquaculture industry where the use of antibiotics has been reduced by over 95% through vaccination campaigns against several of the major pathogens for Atlantic salmon.

AMR is one of the biggest threats facing the world today, and solving it will require a multi-pronged, multi-stakeholder approach involving the wise use of existing antibiotics, the development of new antibiotics, and the prevention of infections (including through vaccines). Having worked in public-private partnerships on both sides of the Atlantic, I have seen just how much can be achieved when diverse groups invest and work together on shared challenges, including AMR. I am convinced that this collaborative approach will deliver results on AMR vaccines and help to not only save lives, but prevent people from falling ill in the first place. 



impact most on our financially-constrained health systems.

We now have over 100 projects in our portfolio, involving some 600 academic teams, 61 EFPIA members and 200 smaller companies, as well as many patient groups, regulatory authorities, health technology assessment (HTA) bodies and other stakeholders that are integral to a productive translational research ecosystem.

In this context, it is no surprise that a significant portion of the IMI budget is devoted to AMR. Indeed – to date –, EUR 650 million (USD 785 million) is allocated to this field in order to address the following specific