DRIVE AB
RE-INVESTMENT IN R&D AND RESPONSIBLE ANTIBIOTIC USE

Policy Brief

The Role for Non-Profit Antibiotic Developers

DRIVE-AB: **TRANSFORMING THE WAY POLICYMAKERS STIMULATE INNOVATION, RESPONSIBLE USE AND GLOBAL ACCESS OF NOVEL ANTIBIOTICS TO MEET PUBLIC HEALTH NEEDS**

The challenge

Multiple incentives are needed to stimulate antibiotic innovation

Today's antibiotic innovation is perilously insufficient.[1] Dangerous bacteria are becoming resistant to antibiotics faster than new antibiotics are being developed to stop them.[1,2]

To effectively stimulate greater antibiotic innovation several new economic incentives are needed in order to encourage different types of innovation across the many different phases of research and development. DRIVE–AB (i.e., Driving reinvestment in research and development for antibiotics and advocating their responsible use, www.drive-ab.eu) is a collaborative public-private research project focused on developing detailed economic policies to stimulate antibiotic innovation that meets global health needs.

While it may be possible to use innovative models such as market entry rewards[3] to stimulate greater innovation for novel antibiotics against predefined high-priority pathogens, [i] such models are not suitable to stimulate all necessary types of antibiotic innovation. For instance, they may be too expensive to be used exclusively and might not succeed in the face of excessive commercialization uncertainty. Therefore, multiple incentives are needed to stimulate different types of antibiotic innovation.

There are several types of desirable antibiotic R&D activities that can be classified as incremental. Typically in these cases patents have expired and, therefore, the additional R&D results are more difficult to protect from competition. For example, screening for optimal combinations of existing, older antibiotics may offer increased efficacy and overcome specific resistance mechanisms. Combination therapy is already widely used, but not systematically and often without an evidence base.[4] Research is needed to find the most effective drug combinations and optimize their use.[5,6] Another area is reformulations of existing antibiotics, for example modifying an antibiotic to tolerate higher temperatures or to create oral pediatric formulations. Lastly the private sector may have stopped development of an antibiotic candidate years ago and now the patent has expired and the regulatory exclusivity periods are too short to recoup the development cost. All of these are examples where R&D investments are needed and may be considered "low hanging fruit".

Other types of desirable antibiotic R&D activities can be classified as those with an exceptionally high development risk. Some new antibacterial products may be considered too risky for a number of reasons, such as no clear regulatory pathway to market. In these cases, the private sector may simply choose not to develop these technologies since the market entry reward is only paid upon successful commercialization. Alternative technologies like utilizing the gut microbiome (i.e., the microorganisms living in the intestines) fall into this category, since treatment may need to be specialized from person to person.

i Market entry rewards are a series of payments to an innovator that achieves regulatory approval for a novel antibiotic that works well against a predefined high-priority pathogen. These payments are designed to be large enough to give the private sector a favorable return on investment. In the geographical areas covered by these contracts the revenues are not tied to sales volume. The innovator is paid for the innovation, not the number of treatments sold. In exchange for the payments, the innovator will be contractually required to follow a set of provisions regarding making the new antibiotic equitably available on a global level at a set price(s) and supporting its sustainable use. This incentive is designed to stimulate the private sector to research and develop new antibiotics specifically targeted against the most pressing bacterial public health threats. Only antibiotics meeting stringent, predefined requirements would be awarded these payments. This incentive should also stimulate traditional, private sector financing mechanisms, like venture capital, used to pay for the actual research and development (R&D) costs.

The opportunity

A Non-Profit Antibiotic Developer could fill some of these gaps

A Non-Profit Antibiotic Developer is an independent organization that manages and finances a portfolio of antibiotic discovery and development projects through to commercialization, ensuring that the resulting antibacterial products are used sustainably and available equitably. It is not a profit-seeking organization but one that would reinvest any profits back into its development work. However, it may partner with and finance profit-seeking companies to further develop specific antibiotic candidates. It is thereby a Product Development Partnership (PDP), similar to those established for neglected diseases.

PDPs, like Drugs for Neglected Disease initiative (DNDi) and The Medicines for Malaria Venture, are non-profit R&D organizations with a focus on developing new medicines, vaccines, or diagnostics for the needs of patients in low and middle income countries. They are often virtual R&D organizations, pursuing portfolio management through investments in R&D projects at universities, research institutes and with the private sector. PDPs are historically grant funded through development aid or by philanthropies, and the resulting technologies are priced to ensure accessibility.

Non-Profit Antibiotic Developers may be well suited to address some of the gaps identified above. PDPs have already demonstrated success for innovations not protected by intellectual property rights or covered by low-value patents. The PDP DNDi and the pharmaceutical company Sanofi developed and commercialized a fixed dose combination therapy for malaria as a non-patented public good.[7] DNDi has developed pediatric dosing regimens and formulations against, for example, Chagas disease, HIV, and malaria.[8] PDPs to date have not commercialized "blue skies" innovations. Yet they are performing R&D on novel molecules. DNDi is researching and developing novel compounds for, among other diseases, Sleeping Sickness and Chagas disease.[8]

Non-Profit Antibiotic Developers could provide much needed complementary approaches to those incentivized by, for example, market entry rewards, for the reasons highlighted above. They can also implement some smaller incentives and can play a role in sustainable access to treatments.

DRIVE-AB welcomes the launch of The Global Antibiotic Research and Development Partnership (GARD).

About DRIVE-AB

Driving reinvestment in research and development for antibiotics and advocating their responsible use

DRIVE–AB (www.drive-ab.eu), is a consortium of 16 public sector partners and 7 pharmaceutical companies supported by the Innovative Medicines Initiative (IMI) Joint Undertaking (www.imi.europa.eu), resources of which are composed of financial contribution from the European Union's Seventh Framework Programme (FP7/2007-2013) and EFPIA (European Federation of Pharmaceutical Industries and Associations) companies' in kind contribution. DRIVE-AB is tasked with defining responsible use of antibiotics, identifying the antibiotic-related public health priorities, calculating the societal value of having new antibiotics available for these priorities, developing and costing new economic models to promote the desired antibiotic innovation, and sustainable use of the resulting, novel antibiotics. The purpose of the project is to transform the way policymakers stimulate antibiotic innovation and to ensure that these new antibiotics are used sustainably and available equitably.

DRIVE-AB will present its preliminary findings on June 2, 2016 in Amsterdam, and the final report and recommendations will be delivered in September 2017. Results will also be continuously published in peer-reviewed journals.

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