Precision global health for real-time action

Precision global health, augmented with artificial intelligence, has the potential to address transnational problems (eg, outbreaks of emerging infectious diseases, diabetes, addictions, ageing, or mental health) and deliver targeted and effective interventions through integrated approaches which combine life sciences, social sciences, and data sciences with public support. More than half the global population are connected to the Internet, mainly through mobile phones, and several countries in sub-Saharan Africa are leading the annual growth of active mobile social users with over 17% in 2018. Thus, the role of local populations and civil society is more important than ever, to identify challenges and work together to address some of the most pressing global health issues and sustainable development.[1]

Undoubtedly, major public and global health achievements have resulted largely from generic public health interventions such as the eradication of smallpox with large-scale vaccination campaigns, the iodisation of salt, improved access to clean water and oral rehydration salts, and mass drug administration to control and eliminate neglected tropical diseases. However, so-called one size fits all interventions tend to neglect the idiosyncrasies of social-ecological systems and the heterogeneity of populations, including underlying health determinants.[2] In view of growing complexities in global health challenges, there is a need for increased precision and adoption of more tailored strategies.

We believe that precision global health can transform approaches to reduce the burden of infectious diseases in low-income and middle-income countries to a similar extent that it has been achieved in high-income countries.[3] For example, Rift Valley fever is a zoonotic arbovirus transmitted to humans through direct contact with blood or tissue of infected livestock, or through mosquitoes.[4] In 2006, the response to an outbreak in Kenya was facilitated by the early predictions of risk of Rift Valley fever, due to heavy rainfall based on remotely sensed environmental data.[5] Demographic, ecological, environmental, and socio-economic predictors can help identify Rift Valley fever hotspots and target surveillance at the right time and location.[6] With Rift Valley fever joining WHO's Blueprint list,[7] Kenya has been moving towards an integrated surveillance and response system, based on cross-sectoral collaboration and community participation (eg, cattle herders) through digital tools. The Kenyan governmental Zoonotic Disease Unit has favoured data sharing across sectors and joint prioritisation for targeted control of zoonoses.[8] In collaboration with mHealth Kenya, mobile phone technologies have improved the country's capacity to detect, prevent, and control zoonotic diseases such as Rift Valley fever more quickly and precisely. The Kenyan approach is promising and could be extended and further developed regionally to aim for the control of Rift Valley fever in the Horn of Africa (ie, Ethiopia, Somalia, Eritrea, and Djibouti).

In 2012, WHO and the International Telecommunication Union launched *Be he@lthy, be mobile*, an international initiative working with governments to scale up mobile health and access to health services to improve prevention, management, and control of non-communicable diseases and their risk factors. With non-communicable diseases being the leading cause of death globally, the opportunities in precision global health must be leveraged and developed in equitable ways to improve people's health and wellbeing in high-income, middle-income, and low-income countries.

The government of Rwanda has used drones since 2016 through the drone company Zipline, to deliver blood to 21 district hospitals at a relatively low cost, reducing the average blood delivery time from several hours to less than 45 minutes. This blood product delivery has to date made more than 25 000 life-saving deliveries, contributing to a reduction in preventable deaths. In April 2019, Zipline launched the world's most extensive drone delivery network in Ghana, with a revamped fleet of larger and faster drones. Drones are being tested for a number of other health applications, including support for tuberculosis control, and delivery of snakebite antivenoms or contraceptives. Although in its infancy, and curbed by currently restrictive national air regulations, the field of deploying drones for medical delivery has passed the proof-of-concept stage in different settings and appears ready for targeted scale-up in the precision global health agenda.

Data access and sharing in global health have been recurring challenges attributed not only to privacy concerns, but also to unaligned incentives, ambiguous data ownership, and attribution of credit. Adhering to principles of research partnership,[9] innovative data governance models, and oversight mechanisms that promote accountability can help overcome such challenges and prevent the exploitation of privacy or data ownership claims that obstruct legitimate and ethically justified data access for global health purposes. Such governance models are rooted in partnership principles and data fairness, with the latter prescribing the utilisation of data for the promotion of public good.

To achieve precision in the detection, prevention, control, and surveillance of diseases, countries need data intelligence: the capacity to pick up and understand data signals from multiple interoperable sources for near real-time analysis. Such data intelligence should be converted into usable tools that prevent and control the effects of diseases and disease outbreaks.[10]

We declare no competing interests.

*Antoine Flahault, Jürg Utzinger, Isabella Eckerle, Danny J Sheath, Rafael Ruiz de Castañeda, Isabelle Bolon, Nefti-Eboni Bempong, Fred Andayi
antoine.flahault@unige.ch

Institute of Global Health, Faculty of Medicine, University of Geneva, 1202 Geneva, Switzerland (AF, DJS, RRdC, IB, N-EB); Swiss Tropical and Public Health Institute and University of Basel, Basel, Switzerland (JU); Division of Infectious Diseases, Center for Emerging Viral Diseases, University Hospitals of Geneva and Faculty of Medicine, Geneva, Switzerland (IE); Division of Global Health Protection, National Center for Immunization and Respiratory Diseases, US Centers for Disease Control and Prevention, Kenya Medical Research Institute Headquarters, Nairobi, Kenya (FA); and Centre for Clinical Epidemiology, Division of Infectious Diseases, Lady Davis Research Institute for Medical Research, Jewish General Hospital, McGill University, Montreal, Canada (FA)

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