Using all avenues to eradicate infectious disease

Communicable diseases remain one of the biggest killers worldwide. Eliminating them will require innovation beyond the laboratory

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We have achieved unprecedented progress in controlling communicable diseases since the adoption of the Millennium Development Goals (MDGs) in 2000. We have almost halved the global incidence of HIV, reduced tuberculosis (TB) cases by 17 per cent and cut global malaria incidence by 41 per cent. Today, 21 per cent fewer people require treatment for neglected tropical diseases than at the turn of the millennium.

Much of our progress is the result of innovation: not only technological, but also in governance, organisational structures and financing. The MDGs themselves were an example of an innovative approach to global convening and goal-setting that focused the political consensus on the needs of the poorest. They also prompted changes in official development assistance commitments. Countries aligned their institutional commitments and targets to MDG strategies and established relevant organisations and institutions that made them more likely to deliver on them.

The Global Fund – an innovative funding mechanism that pools resources from governments, private sector and civil society – has disbursed more than $50 billion in the fight against HIV, TB and malaria, saving more than 22 million lives as of 2016.

◀ **Vaccinators give the oral cholera vaccine to Rohingya in Thainkhali refugee camp Cox's Bazar, Bangladesh. To maintain the progress made against communicable diseases, all parties and all stages of health provision will need to be adaptable and innovative**

While gains since the turn of the century have been remarkable, inequalities persist. Our celebrated progress against communicable diseases hangs in the balance.

More people are living with HIV than ever before. Most of these individuals are in sub-Saharan Africa, and require complex care from fragile health systems. A youth population bulge on the African continent will require sustained HIV prevention and education measures. Progress on TB is similarly touch-and-go. Under-diagnosis, lack of adherence to medication regimens and the growing burden of multidrug-resistant TB all threaten to throw progress off track. Hopes of eradicating malaria also seem distant at times as waning political commitment and decreasing health budgets – historically associated with massive malaria resurgences – are compounded by climate change. Ongoing variations in temperature and rainfall threaten to expand malaria zones and reverse hard-won gains.

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Innovation is therefore required not only for us to take further steps towards eradicating communicable diseases. It will also be essential for us to prevent slippage.

At the Institute of Global Health Innovation, we have been researching, documenting and advising on innovative evidence-based practices and policies that achieve the best health outcomes, both at national and international levels. We have learned that we do not lack the ingenuity to solve stubborn problems. What is lacking, rather, is the recognition of innovative solutions' systemic value, and to scale and integrate them into everyday practice.

We recently faced institutional reluctance in the UK when we suggested that sterilised mosquito netting could provide a cost-effective and safe option for hernia repair that would save the NHS millions of pounds. Both the public and the medical establishment were confused by the proposition that this frugally designed innovation, pioneered in low-resource settings, could offer an effective solution. Uptake was hampered by preconceived notions about the research process, safety, procurement and quality assurance.

While the principle of technology transfer is well established in international development, it is still too often envisaged as a one-way street: from rich to developing countries, not vice versa. To overcome such inertia, medical systems themselves will need to become more open to experimentation and change.

This is especially important as many of the most promising innovations now come from non-traditional sources, and progress is slow in recognising their value. Online gamers have collaborated with researchers

to provide new insights for the design of antiretroviral drugs. They are providing a case for encouraging and scaling up such crowd-sourced, multidisciplinary research practices. National surveillance data, which enable machine-learning simulation algorithms to forecast malaria epidemics and calculate the resources required to stop them, have yet to be fully utilised. Prominent scientists who worked on the Ebola outbreak have called for rapid and responsible data-sharing between governments, non-governmental organisations and academic institutions, which could allow faster responses. The use of similar models could be employed for other epidemics.

Innovative solutions

A pipeline of innovative technologies – such as a new vaccine for malaria, new biomarkers for diagnosing tuberculosis in low-resource settings, and a new subdermal implant that provides sustained antiretroviral drug delivery – will be essential to combating communicable diseases. But focused effort will also be required to ensure that innovative solutions are safe, accessible and acceptable to local communities and patients. Innovative research and engagement models with communities, providers and governments will ensure effective, safe and patient-centred delivery of such technologies.

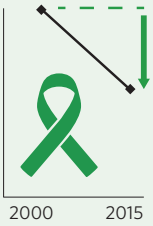
UN Member States will be expected to use the MDGs' successors, the Sustainable Development Goals (SDGs) and their targets and indicators, to frame their agendas and political policies from now to 2030. The SDGs ambitiously mix quantitative and qualitative measures of progress, encouraging innovative and systemic problem-solving. They recognise the interconnectedness of health, economic and social inequalities; the consequences of disruptions in peace, development and the environment; and they advocate for a cross-sectoral collaborative approach to prosperity that leaves no one behind. The complexity of delivering on these 17 goals represents the challenge for our generation. Innovative thinking will be a central part of the solution. ●

3 GOOD HEALTH AND WELL-BEING

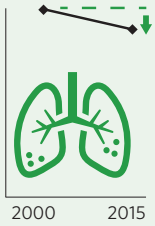
Ensure healthy lives and promote well-being for all at all ages

The period between 2000 and 2015 saw a:

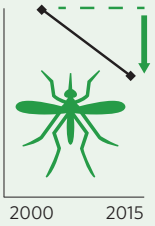
46% reduction in HIV incidence



17% decline in the incidence of tuberculosis

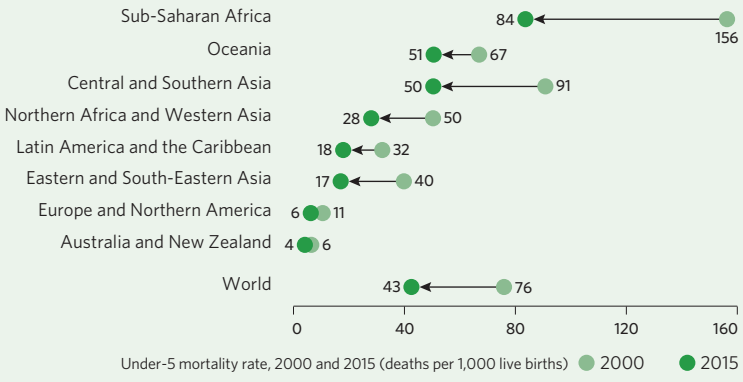


41% decrease in the incidence of malaria



21% drop in people requiring mass or individual treatment and care for neglected tropical diseases

Child mortality has declined rapidly since 2000, but reductions in neonatal mortality need to accelerate



3 million deaths

due to ambient air pollution from traffic, industrial sources, waste burning and residential fuel combustion in 2012

4.3 million deaths

due to household air pollution from cooking with unclean fuels and inefficient technologies in 2012

In order to achieve SDG 3 it is estimated that an additional 18 million health workers will be needed by 2030. Over 40 per cent of all countries have less than one doctor per 1,000 people, and around half have fewer than three nurses or midwives per 1,000 people

Source: The Sustainable Development Goals Report 2017, United Nations