Annual Report of the Chief Medical Officer, 2019

Health, our global asset – partnering for progress

This is my final annual report as Chief Medical Officer (England) and Chief Medical Advisor to the UK Government as I will soon take up a new role as master of Trinity College Cambridge. In this report, I have chosen to address the UK's engagement with health at a global level.

My experience over the last decade has shown me that the health of people in the UK is increasingly interconnected with the health of those in other countries. Infectious diseases do not recognise borders but neither do the other things that affect our health. To improve health, we need to look outside of the traditional health sphere and recognise the role of factors such as pollution, the spread of health-endangering misinformation, antimicrobial resistance (AMR), and commercial activities (such as the creation and promotion of unhealthy foods). And yet, ideas and knowledge move too – the UK should embrace others' ideas and ensure that other countries are supported to develop their own research and innovation capacities. Everyone benefits from genuinely mutual learning.

In the UK, we have political commitment to the International Development Act and spending 0.7% of gross national income on UK aid. We need to ensure this commitment continues and that support across the health and science sector is valued and increased.

Finally, the good health of all people in the world, both now and in the future, is dependent on our capacity to maintain and build upon modern advances in medicine. Much of the progress we've made in medicine over the last century is due to antimicrobials, specifically antibiotics. AMR poses a grave threat to our global capacity to continue to deliver modern medicine and develop modern health systems in low-and middle-income countries. I am delighted to move to my new role and as the UK Special Envoy on AMR I will build on the global momentum on AMR.

Professor Dame Sally C Davies

Editors

Editor in Chief

Catherine Falconer, Editor in Chief, Chief Medical Officer's Annual Report 2019

Catherine is a speciality registrar in public health, with a range of experience in academic and service settings. Catherine is particularly interested in the intersections between evidence and policy and how this can be applied at a local and national level, with a particular interest in non-communicable disease, global health and strategy. Catherine has a PhD and 6 years of post-doctoral academic experience in non-communicable disease epidemiology and health policy at London School of Hygiene and Tropical Medicine and the University of Bristol. Since joining the public health training scheme in 2015, Catherine has worked in a number of settings including local government, an NHS Acute Trust and Public Health England. Catherine has maintained close links with academic colleagues and continued to contribute to research projects while training in public health led public health programmes of work in a range of settings including local government, NHS Acute Trusts and Public Health England. Catherine has maintained her research expertise and continued to contribute to research projects and teaching while in training.

Catherine is currently on a 1-year placement attached to the Office of the Chief Medical Officer (England) where she has primarily supported the Chief Medical Officer in delivery of this year's annual report. Catherine's role has included scoping, stakeholder management, drafting and editing. Catherine also provides ad-hoc policy support and contributes to policy development across the Department of Health and Social Care.

Project Manager and Editor

Orla Murphy, Chief Medical Officer's Independent Annual Reports Manager, Department of Health and Social Care

Orla joined the Office of the Chief Medical Officer in 2011 and has project managed and edited each of Professor Dame Sally Davies' annual reports as Chief Medical Officer (England). This includes the high profile "Infections and the Rise of Antimicrobial Resistance', published in 2012. In 2015, Orla was seconded to the Foreign and Commonwealth Office (UK) to join a cross-government unit providing support to UK victims of the terror attacks in Tunisia 2015.

Prior to joining the civil service, Orla spent 5 years with a national charity in the UK (Royal National Institute for Deaf People) as a Project Manager, modernising audiology services in the NHS. She worked as Project Manager for Compass Partnership, a management consultancy, providing services to voluntary and non-profit organisations.

Orla has a particular interest in evidence-informed policy making and is currently undertaking a Department of Health funded Masters' degree in Health Policy at Imperial College London.

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Health as a global asset

In my 2018 annual report 'Health 2040 - Better health within reach' I made the case for health as our nation's primary asset, contributing to our economic growth and happiness. Health is global, and we need to recognise it as a personal, national and global asset. Health contributes to the development, and productivity, of all countries, leading to a world that is more equitable, sustainable and secure.

Framing health as a global asset should ensure that the interdependencies of health, wealth and education are recognised. The links between health and education should not be overlooked. Access to education is a primary intervention for reducing poverty, lowering child and maternal mortality and increasing the future productivity of an individual and nations.[1]

We have come a long way in improving health and, as demonstrated by Hans Rosling, further than most people recognise, but we must not stop now. Horrifically there remain examples such as:

- a 40-year gap in the life expectancy between a woman born in Sierra Leone compared to one born in Singapore[2]
- 10 million people newly diagnosed with tuberculosis (TB) per year, of whom 35,000 will have a form of TB that is resistant to all drugs[3]
- 731 million people worldwide living in extreme poverty,[4] and
- 263 million children, adolescents and youth not in school.[5]

The UK as a global leader

The UK has a long and proud history as a global leader in improving health and education; from our government commitment to spending 0.7% of Gross National Income (GNI) on Official Development Assistance (ODA); to world-class research and development; responding to emergencies, both national and international; education and training of health professionals; bilateral arrangements, engagements and contributions as well as support to and through multi-lateral bodies, including the United Nations (UN).

But the job is far from done. The whole UK Government worked from 2008 to 2015 to a shared strategy and outcomes framework 'Health is Global'.[6] The framework was developed to focus efforts and drive forward the global health agenda. Progress has been made. The Global Health Oversight Group, co-chaired by the Department for International Development (DFID) and Department of Health and Social Care (DHSC), has since worked hard to engage other government departments and work to a shared ambition for global health. This needs to be both built upon and renewed. My recommendations are aimed at helping the UK Government focus going forward.

I am pleased that all major political parties have recently recommitted to the International Development Act and pledge to continue to spend 0.7% of GNI on ODA. I, on behalf of the benefactors, thank them for this. Although UK aid is only one of the ways in which the UK contributes to improving the health of the world, I have seen first-hand that this commitment is an extremely important part of our global influence and engagement. It is essential this endures, and I believe this report makes that case.

The reputation of the UK as a global lead in science, technology and research is well-recognised and I am in no doubt that this will play a key role in providing solutions. The UK must continue to be at the forefront of research. To do this, our systems have much to learn from others around the globe. We need to recognise the interface between different disciplines and think about what we can learn at the global level from the local context and on a local level from the global context.

The UK played a pivotal role in the negotiation of the UN Sustainable Development Goals (SDGs) which provide an agreed, shared blueprint for peace and prosperity for people and the planet, now and into the future, committing to "leave no one behind". A total of 193 countries signed up to these 17 goals and the shared agenda, but to date, domestic and international progress towards the health-related goal 'Good health and well-being' (SDG 3) has been inadequate. We are leaving the poorest people behind.

In September 2019 we will see the launch of the 'Global Action Plan'; a coordinated effort from 12 global health organisations including World Health Organization (WHO), Global Fund, Gavi the Vaccine Alliance (Gavi) and World Bank to align, accelerate and account for global action and SDG 3.[7] Meanwhile, the UK has undertaken its own 'voluntary national review'[8] of which domestic and international programmes and policies are contributing to progress against these goals which has been published and will be presented to the UN in July. These two events offer an opportunity to reinvigorate our efforts and clarify our responsibilities towards these aims. I urge the UK Government to make a visible commitment and strategic plan for how they will contribute to achieving these global goals. It is also important that the UK Government avoids complacency and continues to recognise and focus domestically on those goals which the UK may not be on track to achieve, particularly for our most deprived.

Societal shifts

The world is changing, and we are seeing increasing global similarities in the health challenges we all face, offering the possibility of sharing and learning from each other while demanding collaborative approaches and global solutions. In the words of Bill Gates, "progress is not inevitable" and now is the time to face the challenges head on. As more countries develop and transition from low to middle-income status, we must maintain a relentless focus on the most vulnerable in all our societies, making true our pledge to "leave no one behind". This is also true in England where women born in the most deprived areas have a healthy life expectancy which is 21.5 years less than for women born in the least deprived areas.[9] This gap shows no signs of narrowing, which is not good enough.

On a global scale, development has made great strides, contributing to an increase in life expectancy of over 20 years since 1950.[10] While better economic conditions can contribute to improved health, it is also associated with a rising prevalence of noncommunicable diseases (NCDs), such as obesity and heart disease. In 2021, NCDs, including mental health, will overtake all others as the leading causes of death worldwide, demonstrating this global shift.[11]

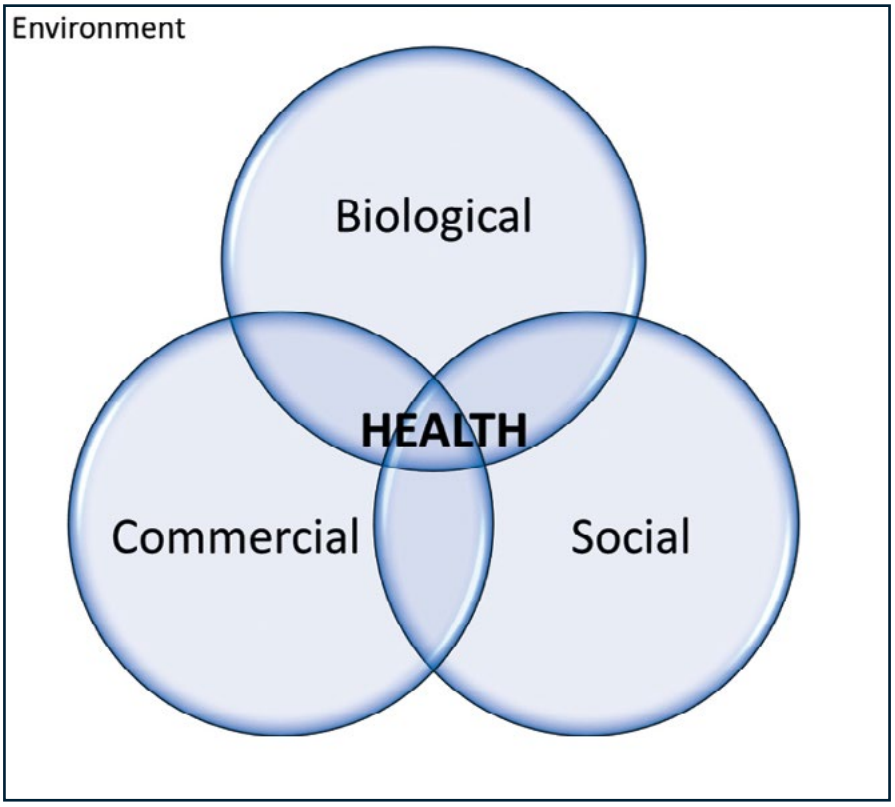
Over my nine years as Chief Medical Officer (CMO) I have come to recognise that we need to expand our current thinking of health as being the absence of 'ill-health' and to acknowledge the complex interactions in society that affect our health as individuals, both physical and mental. Health is affected by many things including the homes we live in, the food we eat, the air we breathe, the medicines we can access, and the parents we are born to.

I frame the determinants in three main categories:

- biological (including genetics, health interventions and infections),
- social (such as poverty, housing, pollution and education), and
- commercial (for example advertising, production and sales).

All are experienced within the local structural environment.

Figure 1 Wider determinants of global health



Most of these determinants do not adhere to traditional boundaries of state but they are impacted by politics, consumer demand and globalisation. Increased movement of people, goods, companies and services pose additional challenges for health. Intergenerational issues such as antimicrobial resistance (AMR) and climate change, as well as obesity and pollution are all multi-factorial issues impacted by human action that will require personal, local, national and transnational action. Gains in health are becoming harder to achieve. Indeed, some health problems are increasing and we all know there is no magic bullet. Tackling these complex issues will require mutual learning, innovation and cooperation.

One of the most effective ways for us to globally tackle the multiplicity of health challenges we face is through strengthening local, regional and national health systems. Universal Health Coverage (UHC) is a key target within the SDGs and a priority work area for the WHO. UHC can help vulnerable communities to prepare, adapt and respond to changing global threats such as climate change, AMR and pandemics. Since the founding of our National Health Service (NHS) in Britain in 1948, the UK has played a lead role in developing the concept of UHC. The UK has also been a consistent and firm supporter of the right of women and their families to comprehensive reproductive, maternal, newborn, child, adolescent and health services as part of UHC. In September 2019 the UN will hold a high-level meeting on UHC and it is important the UK is represented at Ministerial level.

Mutual benefit of global engagement

I have heard the views of many at home and abroad and consequently I see global engagement on health as encompassing three main areas:

- equity (equal opportunity for good health),
- sustainability (planning for a sustainable future), and
- security (keeping our population safe from threats to their health)

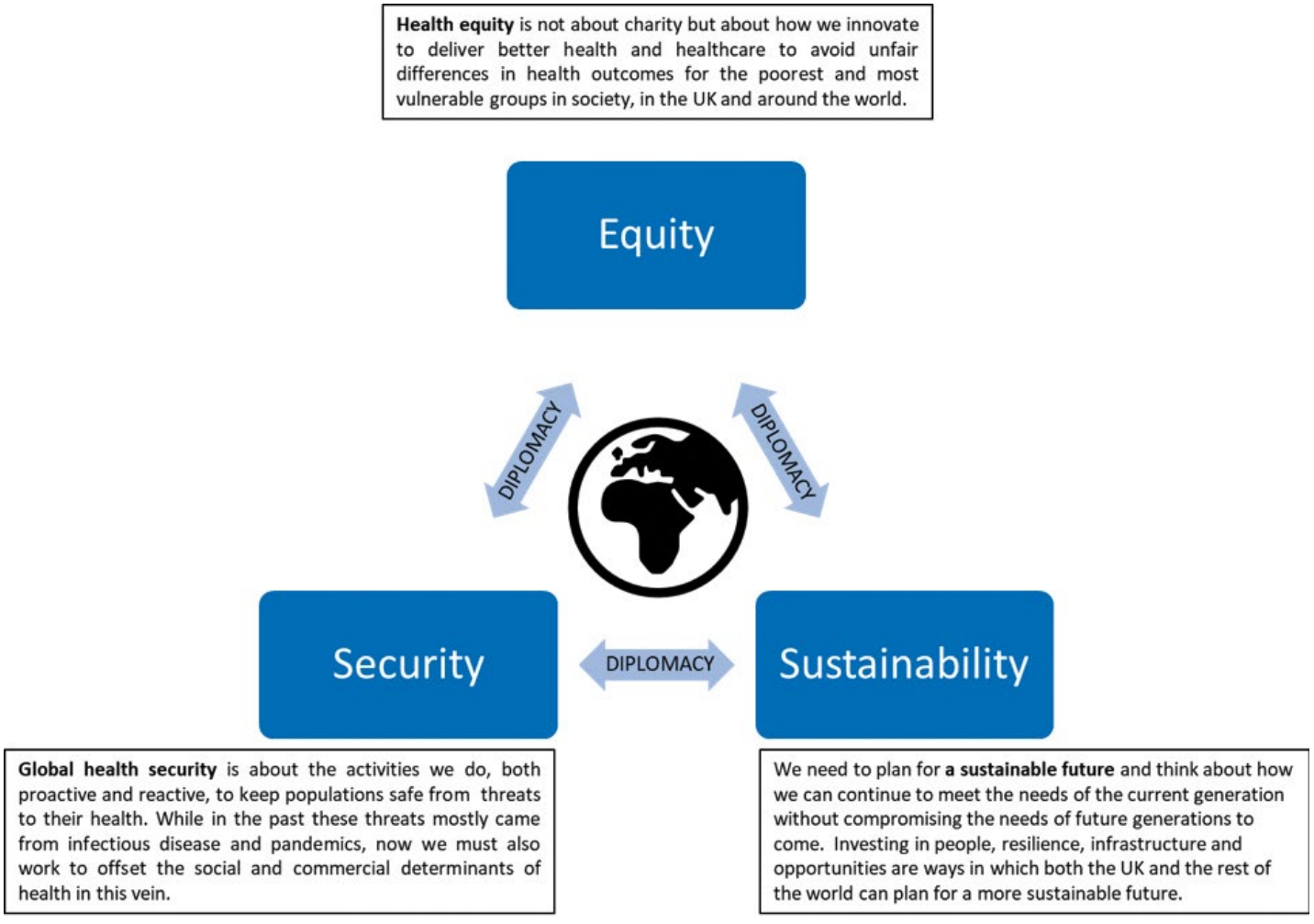
Importantly, these areas matter as much to us domestically in the UK as they do to the rest of the world.

Equity

Although in the UK, we are fortunate to have generally very good health outcomes and access to one of the most advanced health systems in the world, alarming health inequalities in health outcomes persist. Recent data reports that in 2018 babies born in the most deprived areas of England experienced a mortality rate almost double that of babies born in the least deprived areas (5.2/1000 deaths compared to 2.7/1000 deaths).[12] This is neither fair nor should anyone find it acceptable.

There is much the UK can learn from countries delivering high-quality, equitable health services in resource-poor settings. For example, the success of Rwanda which, with the support of Gavi, has achieved human papillomavirus (HPV) vaccine coverage rates that exceed 90%,[13] almost 10% higher than in the UK.[12]

Figure 2 Wider determinants of global health



Sustainability

Our health and care systems are under strain as are most others across the globe and keeping up with growing demand and expectation is going to require innovative thinking, starting with finance, workforce and technology. After all, the WHO estimates that by 2050 we will be short of 18 million health workers worldwide.[14]

A sustainable future is one where we have the necessary resources to meet the needs of future generations, including natural, healthcare and financial resources. The health impacts of climate change are already being felt with reduced food and water security, an increased number of extreme weather events and changing patterns of infectious disease. The WHO estimates that 250,000 additional deaths each year will arise between 2030 and 2050 due to heat exposure, diarrhoeal disease, malaria and child malnutrition,[15] disproportionately affecting the most poor and vulnerable.

Security

We need to be responsive going forward to the changing nature of public health threats such as emerging infectious diseases, whilst remaining vigilant of other threats including suboptimal vaccination rates. The opportunities and challenges to health posed by the commercial determinants of health (consumer and environmental changes that are driven by profit) must also be considered.

Infectious diseases are never constrained by international borders, and health security can only be achieved through partnership and collaboration. The importance of this was highlighted recently when the first cases of monkeypox outside of the African continent since 2003 were diagnosed in the UK. UK collaboration with the Nigerian Centre for Disease Control helped to contain and manage the situation and minimise the public health impact.

Diplomacy

Whether engaging within the UK or globally, I see these three areas as being underpinned by diplomacy, both diplomacy for health gain and using health for broader diplomatic aims. Diplomacy is essential for international engagement and the UK's reputation in International Development and health to date has afforded us considerable influence on a global scale. Indeed, I am very much looking forward to my new role as UK Special Envoy on AMR where I will use the lessons learned as CMO to continue to galvanise coherent and sustained international action.

Monitoring progress

Data is a global public good. As Chris Murray highlights in his letter to me, "the measurement of health and its determinants is essential for better health policy". We need effective methods to monitor and demonstrate progress for all activities that we do to improve health, whether strengthening health systems, implementing fiscal policies or developing new antimicrobials. Expanding our current thinking of health to include consideration of the wider determinants of health will require creative thinking about metrics and indicators to demonstrate progress and galvanise action.

In my 2018 annual report I highlighted the interdependencies of health and wealth and framed health as the nation's primary asset. I asked for the development of a composite health index to sit alongside gross domestic product (GDP) so that we can monitor progress on health inequalities and the wider determinants of health across the UK. I am delighted Government work has now started on this, led by the Office for National Statistics. I encourage other countries and supranational organisations, such as the World Bank, to work with the UK on this as we develop health indices to promote health as an asset.

Looking to the future

To inform my thinking, and our UK offer to the world, I invited global leaders to lay out in letters the major challenges facing health now and in the future. These authors were also asked to reflect on their experience of engaging with the UK. I am extremely proud to read of the multitude of ways that we, the UK work to improve the health of people around the world based on research, innovation, evidence, pragmatism and professionalism. The willingness of these leaders to contribute to my report is a testament to how the UK is perceived and the desire for continued engagement.

"Looking to the future, my fellow Elders and I hope the UK will continue to fulfil its role as a global leader in achieving health for all, both for its own population and people across the world."
Ban Ki Moon, the Elders

All of us in the UK should be proud of our national commitment to tackling global poverty and helping to ensure that every person has access to an equal opportunity for health. Investing in health is the smart thing to do; it helps to keep our populations safe and creates a better world for us now and for future generations. We must, however, ensure that we are investing in the right way, spending UK money on systems and solutions that contribute to making health more equitable, secure and sustainable. We should get maximum value for money in our investments. And we must also step up our domestic efforts to ensure that in the UK too, "no one is left behind".

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Recommendations

Governance and funding

I am delighted to see the commitment across the political spectrum to the International Development Act and of 0.7% of gross national income (GNI) spend on official development assistance (ODA).

In our own interest we should facilitate shared learning and exchanges with other countries across the spectrum of disciplines. We need to continue UK engagement as diplomats, as partners and for development. All work across government should be transparent and effective to ensure maximum impact and value for money.

The UK is a trusted global partner and has built strong relationships with multi-lateral partners, working closely with organisations such as the Organisation for Economic Co-operation and Development (OECD) and World Health Organisation (WHO), World Bank and others to ensure accountability and governance of global health spend. I welcome the DFID performance agreements with multilateral organisations.

Ambition

For the UK Government to have a visible and co-ordinated cross-government approach to all global health work managed through the Global Health Oversight Group (GHOG)

Recommendation 1

I recommend that the UK Government publish a set of shared global health objectives as soon as possible and publish a renewed shared global health strategy by the end of 2019. In drafting this strategy, a similar approach should be taken to that taken when drafting the counter-terrorism (CONTEST) strategy.

Recommendation 2

I recommend that the UK Government create a reporting mechanism to measure progress against the implementation of the UK aid strategy. The mechanism should dovetail with Her Majesty's Treasury (HMT) and Department for International Development (DfID) mechanisms.

Recommendation 3

I recommend that Department of Health and Social Care (DHSC) develop guidance to assist all government departments to a 'health (including antimicrobial resistance) in all policies' approach to all future UK aid spend and future trade agreements. The guidance should prompt;

a. systematic consideration of the health implications of decisions and negotiating mandates;

b. consideration of whether action supports or assist targeting of the wider determinants of health (including commercial determinants);

c. consideration of synergies between health and other core objectives, such as avoiding harm and reducing inequality.

Additionally, I recommend that the UK Government enforce the use of this guidance.

Ambition

For the UK to be a global leader in its engagement with, and support for, the global health system; driving reform, and progress towards universal health coverage

Recommendation 4

I recommend that the UK Government continue to work with multi-lateral partners in global health to encourage greater collaboration between funds and institutions, enhanced alignment behind national plans and priorities, and greater integration into country level systems and mechanisms.

Recommendation 5

I recommend that DfID and other government departments need to continue to use UK aid to support countries to strengthen health security, including work on preparedness, international health regulations (IHR) and the Global Health Security Agenda (GHSA).

Recommendation 6

I recommend DfID ensure that countries' own priorities continue to be supported through regular ongoing review and two-way accountability processes.

Mutual learning

Health professionals

I know from my time spent working as a doctor in low- and middle- income countries (LMICs) how beneficial it can be to visit overseas countries, see different health systems, learn innovation and new skills that can then be brought back to the UK. I saw this first hand when sent by Tropical Health Education Trust (THET) to Enugu, Nigeria to work on my speciality, sickle cell disease.

I recognise the NHS is busier than ever but some of the brilliant existing health partnership schemes such as the THET and Fleming Fund 'Commonwealth Partnerships for Antimicrobial Stewardship scheme' are examples of the mutual benefits and learning these opportunities offer.

Ambition

For the UK to facilitate the necessary movement of students, health and care workers and academics so that the UK and other countries can benefit from mutual learning

Recommendation 7

I recommend that the UK Government ensure the UK visa system becomes one that supports scholarship and learning in the UK and permits the ingress of health and care workers. This system must be easy, quick, smooth and affordable for those applying from LMICs;

a. to ensure scholars, visiting academics and health policy experts can attend meetings, conferences and workshops;

b. to provide opportunity for long-term learning at undergraduate, postgraduate and post-doctoral level;

c. to enable the movement of health and care workers at all levels operating within the UK Code of Practice for International Recruitment.

Recommendation 8

I recommend that the UK Government ensure that its policies and partnerships for health and care workers adhere to the WHO Code of Practice on International Recruitment of Health Personnel.

Ambition

For the UK health system to develop and support a culture of global learning including working, internships, short- and long-term experience and volunteering overseas.

Recommendation 9

I recommend that the General Medical Council (GMC) should accelerate its efforts to establish an improved revalidation system. This system should enable UK doctors working overseas to revalidate those skills maintained and acquired overseas in order that they may return to the UK fit to practise within the NHS without delays.

Recommendation 10

I recommend that NHS England (NHSE) and Health Education England (HEE) work together to put in place a system so health professionals can continue to contribute to their NHS pension while working abroad.

Recommendation 11

I recommend that HEE work with NHS England and NHS Improvement to develop a policy toolkit for overseas experience for healthcare professionals. This toolkit should be designed specifically for local NHS trusts to help them facilitate volunteering and work experience opportunities.

Recommendation 12

I recommend that HEE, DfID and the Faculty of Public Health (FPH) together develop and fund a global public health specialist training programme. The programme should include the facility to spend time in LMICs, in programme.

Additionally, HEE and NHS England must increase global health opportunities and placements within general training programmes for health professionals.

Ambition

For the UK to establish itself as a welcoming provider of high-quality training and work opportunities for overseas health care workers

Recommendation 13

I recommend that DHSC establish a working group with HEE, NHS England, DfID, Foreign and Commonwealth Office (FCO), NHS Improvement, DHSC, Royal College of Nursing and The Academy of Medical Royal Colleges to widen access to UK Health partnership 'train and return' schemes. They should consider ways to increase the range of countries of origin, and variety of professions, of those participants from LMICs.

Scholars and universities

Here in the UK we have many of the best universities in the world but students and researchers from LMICS have multiple barriers to overcome if they want to benefit from them. Yet this is always a two-way benefit. The London School of Hygiene and Tropical Medicine is an example of the potential for global reach with students and alumni represented from 180 countries around the world. We need to break down these barriers in our national interest and to increase the opportunities for health professionals and scholars to spend time in the UK learning from our system.

We should build on the experiences of the successful Commonwealth and Chevening Scholarship Programmes. These recommendations should improve skills and expertise in LMICs and are also important for health and science diplomacy. There are lessons to be learnt from small pilot programmes but we need a clearly visible scholarship programme that can compete with those offered by other countries.

I also want to see more high quality, home grown talent developed in LMICs.

Ambition

That UK aid support LMICs to develop research capacity in both people and infrastructure (including governance), according to their own own agendas and priorities

Recommendation 14

I recommend research funders promote the growth of equitable partnerships between researchers in the Global North and Global South, including in lower-income countries.

Recommendation 15

I recommend the Department for Business, Energy and Industrial Strategy (BEIS), UK Research and Innovation (UKRI) and Department for Education (DfE) facilitate selected universities (e.g. Medical and Nursing Schools) to receive UK aid funding for collaboration and support to universities in LMICs to ensure the educational quality of their graduates, promote shared learning and collaboration.

Recommendation 16

I recommend BEIS, UKRI and DfE develop approaches for research students in LMICs to have study periods in the UK, funded by UK aid, for example, schemes where study grants are awarded such that they can be used flexibly over a five-year period.

Recommendation 17

I recommend BEIS, UKRI and DfE develop UK aid funded university scholarships for students from LMICs to study in the UK. These should be at all levels; undergraduate, postgraduate and post-doctoral. They should not be restricted to medicine and allied health professionals but need to include a broad spread of disciplines that can improve health for example digital technologies, computing, engineering, philosophy/ethics, anthropology and architecture.

Research and innovation

I am proud of the UK's reputation as a global leader in science, research, innovation and development. We have been at the forefront of many breakthroughs for example the application of genomics into our health sector through development of Genomics England. UK science, research and innovation has also played a lead role in addressing many of the problems faced by developing countries. We have strong networks and partnerships such as the links between the Royal Society and the African Academy of Sciences and the Science and Innovation (SIN) network. These networks are very valuable for fostering global collaboration and capacity building.

I welcome the development of UKRI and the increasingly strategic approach taken to cross research council funding.

Ambition

For the UK to maintain its reputation as a world-leader in research and development by recognising and responding to the changing burden of disease and its determinants

Recommendation 18

I recommend the UK Government continue to prioritise research and development in the UK aid strategy and provide UK aid for the cross-government Global Challenges Research Fund and National Institute Health Research (NIHR) Global Health Research.

Recommendation 19

I recommend the FCO, in collaboration with DfID and DHSC, and funded through UK aid, develop and expand the SIN network into LMICs.

Recommendation 20

I recommend UKRI with other research funders prioritise and support global open access to publications, and data (including surveillance)

Recommendation 21

UKRI to review and encourage strategic approaches to health-related research with a view to increasing cooperation between research councils and;

a. increasing cross-discipline projects, for example, AMR and climate change and

b. developing novel interventions for example digital platforms for mental health.

Antimicrobial resistance (AMR)

AMR is an example of a complex intergenerational issue that is having devastating impact on human health and requires a cross-sectoral response.

AMR needs short- and long-term mitigating actions, taking a ONE Health approach which recognises the inter-dependency of people, animals (terrestrial and aquatic) and the environment. The UK is a global leader on AMR.

Ambition

For the UK to continue to be a global leader, to support other countries to make AMR a priority and to be at the forefront of research, innovation, surveillance and mitigation

Recommendation 22

I recommend the UK Government deliver the UK 5-year action plan for AMR 2019 to 2024, and the UK 20-year vision for AMR.

Recommendation 23

I recommend DfID, FCO and DHSC continue to advocate for action on AMR on the global stage, including implementation of the recommendations from the UN IACG (Inter-agency Coordination Group on AMR).

Recommendation 24

I recommend DHSC and DfID continue to work with LMIC to develop and implement national action plans for AMR.

Recommendation 25

I recommend the UK government continues to prioritise AMR within UK aid spend through the UK aid strategy and DfID single departmental plan, including continued funding of the Fleming Fund.

Recommendation 26

The UK Government should routinely assess the impact of its investments and UK aid on AMR. The UK Government should take steps to ensure that relevant investments and funding mitigate, or at least do not contribute to, AMR. (In other terms, *view investment and funding through an AMR lens*).

Recommendation 27

I recommend DHSC, NICE and NHS England deliver the re-imbursement pilot for new antibiotics with a commitment to extend the pilot if successful.

Recommendation 26

I recommend UKRI establish AMR as a strategic priority.

Section 1

Equity

Ban Ki-moon, Deputy Chair of The Elders

Ban Ki-moon was the UN Secretary-General from 2007-2016. He mobilised world leaders around a new set of challenges and sought to give voice to the world's poorest and vulnerable people. He put Sustainable Development Goals, climate change, and equality for girls and women at the top of the UN agenda; creating UN Women and securing the Paris Agreement (2015). He is a former South-Korean Foreign Minister and diplomat. He is the Chair of the Global Green Growth Institute, Chairman of the Boao Forum for Asia, and Co-Chair of the Ban Ki-moon Centre for Global Citizens.

Health is a human right so no one should be left behind

Dear Dame Sally,

In September 2015, 193 world leaders committed themselves to a new global development framework for our planet when they agreed the Sustainable Development Goals.

Grounded in international human rights law, these 17 goals offer critical opportunities to advance the realisation of human rights for all people everywhere, without discrimination. In emphasising the universal nature of the goals, the new agenda strives to leave no one behind and puts the imperative of equality and non-discrimination at its heart.

Goal 3 is "Good health and wellbeing for people". But as you know well, a global commitment to the right to health isn't new. It was enshrined in the 1948 Universal Declaration of Human Rights and in the Constitution of the World Health Organization established in the same year, which states that "The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition."

But the experiences of the last 70 years and the enormous health inequalities we see today, between and within countries, show that we have failed to deliver on this fundamental human right. So how can global leaders taking forward the SDG agenda raise their game to really, finally achieve health for all, ensuring that no one is left behind?

Looking at the interrelated nature of the SDGs, improving health for everyone will involve fulfilling rights across a wide range of sectors, for example in ensuring a right to peace and security, quality education, gender equality and clean air and water. Also, in terms of what we traditionally refer to as the health sector, it will require everyone accessing a comprehensive range of quality health services involving promotion, prevention, curative, rehabilitative and palliative services. In accessing these services, it will also be imperative that people do not suffer financial hardship, otherwise this threatens their right to be free from poverty.

This latter objective is of course encapsulated in the SDG target of universal health coverage (UHC) which is driving the global health agenda, as illustrated by the forthcoming United Nations High-Level Meeting on UHC this September. I urge the UK to take a prominent leadership role at this event in promoting the health, economic and political benefits of UHC. Furthermore, I hope that the UK will show leadership at the High-Level Meeting to encourage all countries to commit to spending at least 5% of their GDP on health, and to move progressively towards this target.

I was proud to serve as Secretary-General of the United Nations when the SDGs and the 2030 Development Agenda were agreed. After leaving office in 2017, I joined The Elders, a group of independent global leaders founded by Nelson Mandela who use their experience and insights to work for peace, justice and human rights worldwide.

I am delighted that The Elders have made UHC one of their top priorities as part of their support for the sustainable development agenda. As a young man growing up in the Republic of Korea, I witnessed our transition to UHC, when in 1977 President Park Chung-hee launched nationwide health reforms which meant that everyone could access the health services they needed. This required the state compelling healthy and wealthy members of society to subsidise services for the sick and the poor by establishing a socialised health financing system. It continues to underpin my country's health, care and welfare system to this day.

The UK of course has a tremendous track record in this area as well, when it launched its world-famous National Health Service as part of the establishment of a comprehensive welfare state following the ravages of the Second World War. In establishing a health system where people accessed services according to their needs, free at the point of use, the UK was one of the first countries to attempt to realise the right to health agreed internationally in 1948.

Over recent decades the UK has also shown continuing leadership in realising the global right to health, including championing the importance of publicly financing health services in developing countries and removing user fees that stop poor people accessing care. These are policies we at The Elders fully endorse. In addition, the UK, and you personally, have had a huge impact in addressing one of the greatest threats to the right to health – namely tackling antimicrobial resistance (AMR). Like climate change, AMR represents a global emergency which threatens our very existence and should therefore be a top priority for global leaders planning their UHC strategies. We commend you for your global leadership in raising the alarm over AMR and trust you will continue to champion this cause in your new prestigious post as Master of Trinity College, Cambridge.

Looking to the future, my fellow Elders and I hope the UK will continue to fulfil its role as a global leader in achieving health for all, both for its own population and people across the world. With many countries embarking on their UHC journeys, the UK has many valuable lessons to share about how to build and sustain an efficient and equitable health system which has also become one of your most treasured national institutions.

In future, we hope the UK will be more proactive in sharing these lessons in the face of political and commercial pressure from the well-organised private healthcare and pharmaceutical lobbies. In particular, the UK has a powerful global case to make on the importance of primary care and public financing in reaching UHC, with services provided free at point of delivery. These are some of the most impressive features of your efficient and equitable health system, which we trust you will preserve for your people for evermore.

We hope the UK will share these lessons with political leaders across the globe to help realise the right to health and achieve all of the Sustainable Development Goals.

Yours sincerely,

Ban Ki-moon

Susanna Moorehead, Chair of OECD Development Assistance Committee

Susanna Moorehead is the Chair of the OECD Development Assistance Committee, and former British Ambassador to Ethiopia and Djibouti and UK Permanent Representative to the African Union and the United Nations Economic Commission for Africa.

Prevention not cure: Invest in health systems before crisis strikes

Dear Dame Sally,

As every clinician knows, prevention is always better than cure. The same principle applies to tackling health crises in poor countries. Robust national health systems reduce global health threats.

I strongly support the focus of this report. Equity, global health security and sustainability are also key themes in international development cooperation. We collaborate to reach the Sustainable Development Goals (SDGs) everywhere. We have pledged to leave no one behind, which means attacking inequality and making sure we don't forget people who are especially vulnerable or excluded.

Weak primary healthcare systems that struggle to provide basic and affordable healthcare can't cope with major health shocks. Many low and middle-income countries don't have the resources to build and maintain adequate primary healthcare facilities, let alone fight off an epidemic. Ebola and vaccine-preventable diseases such as measles and diphtheria are most likely to spiral out of control in fragile and conflict affected states. Weak or non-existent health systems magnify the risks and the suffering of poor children, women and men.

In recent decades, there have been rapid improvements in access to basic healthcare. 7 million children are alive today thanks to halving child mortality rates in the last 25 years. 2.5 more women have survived giving birth. A total of 14 million children are alive and well thanks to measles vaccinations. Globally, we have managed to contain the horrific AIDS epidemic. Official Development Assistance (ODA) – or international aid – has been a crucial tool to help poorer countries achieve these results. ODA will continue to be a catalyst as we all try to deliver the SDGs by 2030.

SDG number 3 aims to secure good health and wellbeing for all, with specific targets on, for example, achieving universal health coverage, ensuring universal access to sexual and reproductive healthcare services and providing access to affordable essential medicines and vaccines. Many targets will be unrealistic without financing through ODA.

We also face new challenges that are not included among the SDG targets. A global influenza pandemic would require huge resources; antimicrobial resistance is a rising concern threatening to bring back large outbreaks of pneumonia, tuberculosis, and salmonellosis; and we need to be prepared for an unknown pathogen that could cause a serious epidemic.

Aid is under pressure in many OECD donor countries – but improving health systems in poor countries is one of the best investments taxpayers can make. Epidemics like Ebola or AIDS are global public bads that can undermine everyone's health. Investing in health systems – and so in good health – builds resilience to crises and is a global public good. It is in everyone's interest to sustain and increase support for our shared health and development goals.

OECD donors provided £122 billion pounds of ODA in 2018, 15% of which is spent on health. The UK is the second largest donor in the health sector behind the US. While aid is a valuable and important flow of finance, it will never meet all developing countries' health-financing needs. But, ODA can play a catalytic role by crowding in other funding - including philanthropic flows - to leverage the private sector and commercial financial resources. The blending of public and private funds is a fast-growing mechanism to generate funding for the SDGs. Done well, such innovative financing can reduce the costs of drugs and delivery, expand health services, train health professionals and be used to invest in research to find new vaccines and cures. It is also vital to get new and emerging donors to contribute more to health.

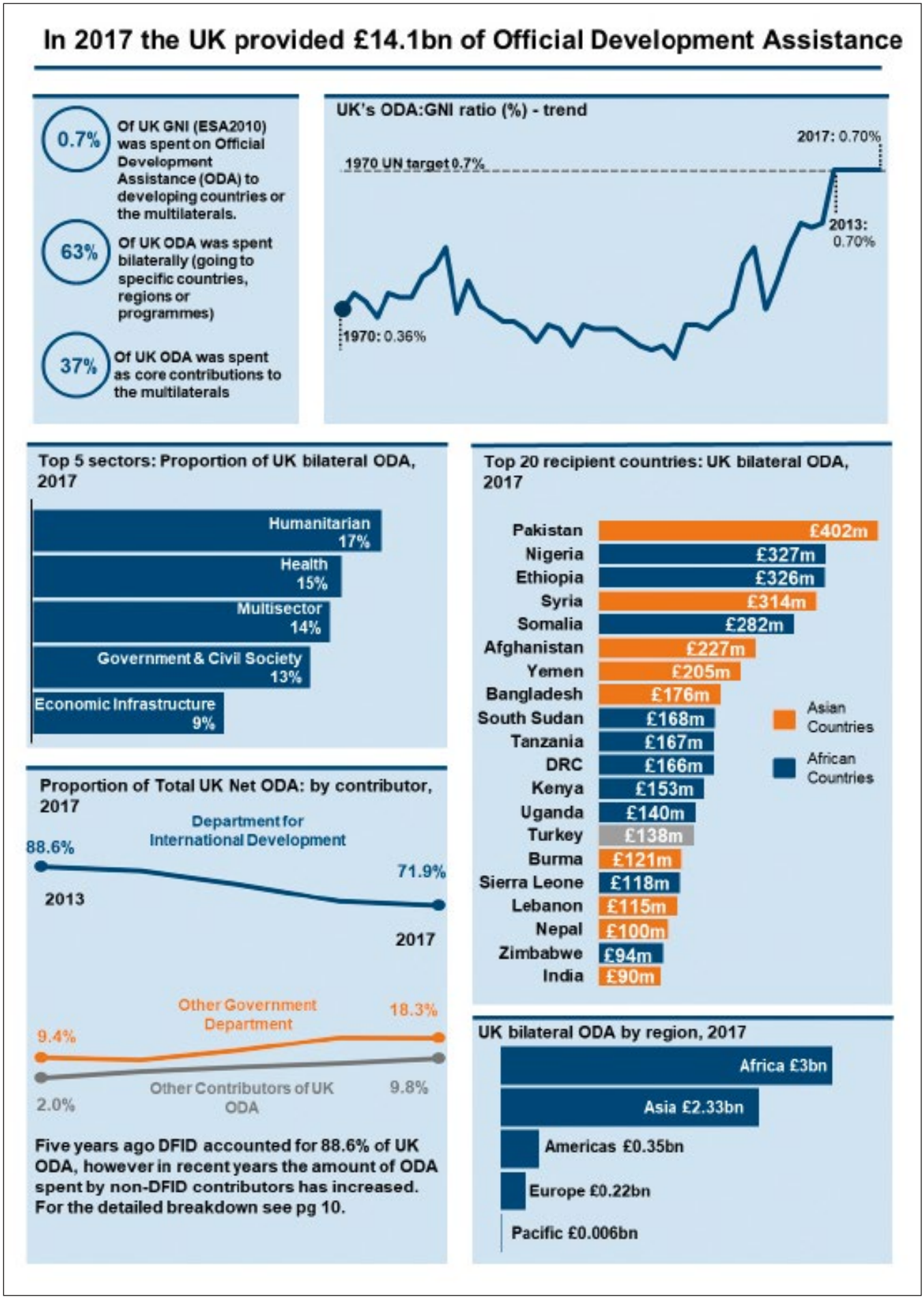
Between now and 2030, the date by which the world has committed to achieve the SDG on health, the international community needs to:

- to redouble efforts to meet the commitment made in 2015 for scaled-up and more effective international support, including both concessional and non-concessional financing, to invest in health in poor countries;
- to focus this investment on building resilient health systems and training health professionals to service them, so we are as prepared as possible for health emergencies;
- to support developing country governments to implement health sector policies that deliver healthcare for all and not discriminating against anyone, especially women and girls;
- to engage in frank conversations with developing country governments about the importance of raising domestic resources for health;
- to use ODA when other resources are not available – and as a catalyst – to help the poorest children, women and men live long, healthy and productive lives.

The UK is a global leader in development cooperation and the only major economy to meet the 0.7% target. With its focus on global health, the UK has a crucial role to play in ensuring a future where citizens live healthy and safe lives at home and abroad.

Yours sincerely,

Susanna Moorehead



Source Department for International Development. Statistics on International Development. Final UK aid spend 2017. National Statistics. November 2018.

Thomas J. Bollyky, Director of the Global Health program at the Council on Foreign Relations

Thomas J. Bollyky is director of the Global Health program at the Council on Foreign Relations and directed the first Council on Foreign Relation-sponsored Independent Task Force devoted to global health, entitled *The Emerging Global Health Crisis: Noncommunicable Diseases in Low- and Middle-Income Countries.*

Mr Bollyky is the author of the recent book *Plagues and the Paradox of Progress: Why the World Is Getting Healthier in Worrisome Ways.* He is also an adjunct professor of law at Georgetown University. Mr Bollyky acknowledges his co-authors on the Lancet study on democracy and health discussed in this letter: Tara Templin, Simon Wigley, Joseph Dieleman, Matthew Cohen, and Diana Schoder. The study is available at https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(19)30235-1.pdf

Human health and democracy – an overlooked opportunity

Dear Dame Sally,

Winston Churchill once said that democracy was the worst form of government, except all others. When it comes to health, however, history abounds with counterexamples and democratic governance has not yet been a driving force in global health.

For decades, the autocracies China and Cuba have been famous for providing good health coverage at low cost. Rwanda, along with Ethiopia, Myanmar and Uganda, rank among the least democratic nations in the world, but each of those nations extended their average life expectancy by 10 years or more since 1996 and did so with the heavy support of foreign aid.

But while democracy may be messy, it is still better than the alternatives for addressing the public health challenges that now confront most nations.

Where democracy matters on global health, it matters a lot and will matter more in the future

Earlier this year, my colleagues from Stanford University, Bilkent University, and the Institute for Health Metrics and Evaluation and I published in the Lancet the first comprehensive assessment of the links between democracy, adult life expectancy, and disease-specific mortality, covering 170 countries between 1970 and 2016.[1] The results are dramatic. Life expectancy at age fifteen was 3% higher on average after a decade in the 15 countries that transitioned to democracy compared to the 55 nations that remained autocratic. A nation's democratic experience – a measure of how democratic a country has been and for how long – matters more than its gross domestic product (GDP) in the reductions in deaths from cardiovascular diseases, transportation injuries, tuberculosis, cancers, and other noncommunicable diseases.

The diseases where democracy matters most are those which now cause most of the deaths and suffering globally. Tuberculosis caused 1.6 million deaths in 2016, making it the world's leading infectious killer. That same year, cancers, stroke, and other noncommunicable diseases were responsible for more than two-thirds of deaths globally, including those of eight million people under the age of 60 in poorer countries. By 2040, noncommunicable diseases will affect roughly the same share of the populations in Bangladesh, Ethiopia, and Myanmar as in the United Kingdom, except the people stricken in those lower-income nations will be much younger and suffer worse health outcomes.[2]

Importantly, prevention and treatment of the diseases and conditions most linked to democracy depend on local governments. Aid initiatives can deliver food, vaccines, and anti-malaria bed nets (Insecticide-treated bed nets) in settings with dysfunctional governments and limited infrastructure. But only local governments can enforce the traffic laws and excise taxes that reduce traffic injuries and tobacco use. Only local governments can sustain the public health systems – the trained doctors, nurses, hospitals, and surgical facilities – necessary for the effective treatment of cardiovascular disease, cancers, tuberculosis, and trauma injuries. No philanthropy is going to enforce smoke-free laws or provide a nation with universal health coverage.

Yet, without pressure from voters or support from foreign aid agencies, autocratic leaders have less incentive than their democratic counterparts to invest in the laws and healthcare infrastructure needed to prevent and treat chronic diseases. This is why autocracies such as China and Cuba have not been as successful when their populations' health needs have shifted to chronic diseases.[3]

Democracy plays a modest role in current global health efforts

In recent years, there has been little correlation between foreign aid and democratic governance. Many of the largest recipients of global health aid rank among the least democratic nations of the world. While overseas development aid overall has more than tripled since 2000, democracy promotion and governance aid programs have been lightly funded outside of active war zones.[4]

The United Kingdom has been consistent with these broader trends. It is one of the most generous nations in the world on health-related aid, contributing more than £3 billion in 2017.[5] UK support for democratic participation and civil society has not kept pace, currently totaling £60 million.[6] Roughly a quarter of UK development assistance for global health goes to democratic nations.[7,8]

Foreign aid giving has also not targeted those diseases for which the effects of democracy are greatest. Just 2% of development assistance for health addresses cancers, stroke, and other noncommunicable diseases.

With chronic diseases on the rise and the high global burden of tuberculosis and transportation injuries, policymakers, aid donors, and international institutions concerned with global health must become more concerned with democracy.

The future of global health is political

The good news is that promotion of democratic institutions and processes can improve population health. Between 1995 and 2015, increases in democratic experience averted an estimated 16 million deaths globally from cardiovascular disease alone.[9] But, continuing to separate population health from elections and the other hallmarks of democracy in aid programs is likely to be less successful as countries' health needs shift to noncommunicable diseases, injuries, and working age adults.

Free and fair elections appear to be particularly important for improving adult health outcomes, most likely by increasing government accountability and responsiveness. Our Lancet study results show that the components of democracy – including suffrage, freedom of association, freedom of expression, and an elected executive – work synergistically, but free and fair elections is the only component that countries seeking to reduce mortality cannot go without. Without free and fair elections, the health benefits of democracy cease to be statistically significant – they effectively disappear.

One way for the United Kingdom to proceed is to increase its funding for the development of agency-led programs for democracy promotion and governance and supporting similar efforts at the World Bank and other intergovernmental institutions. UK development assistance for health for causes where democratic experience matters – such as noncommunicable diseases, tuberculosis, and transportation injuries – may have a greater and more sustained effect if directed to those nations that have shown a commitment to building accountable institutions and open and transparent democratic processes.

Promotion of democracy and accountable governance may also help encourage nations to devote more government resources to health and the provision of essential services. This is particularly needed in North Africa, the Middle East, and sub-Saharan Africa where many governments are underspending on health, given their growing populations and rising burden of noncommunicable diseases.[10]
Our research shows that increases in democratic experience do not necessarily make nations wealthier, but they are strongly associated with more government health spending and fewer deaths from cardiovascular disease.[11]

When it comes to global health, time and recent research has proved Churchill correct: democracy is better than the alternatives. Healthy populations are best sustained with healthy, accountable, and responsive political systems.

Sincerely yours,

Thomas J. Bollyky

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Dr Tedros Adhanom Ghebreyesus, Director-General of the World Health Organization

Dr Tedros Adhanom Ghebreyesus is Director-General of the World Health Organization. He is the first WHO Director-General to have been elected from multiple candidates by the World Health Assembly,and is the first person from the WHO African Region to serve as WHO's chief technical and administrative officer.

Immediately after taking office in July 2017 Dr Tedros outlined five key priorities for the Organization: universal health coverage; health emergencies; women's, children's and adolescents' health; health impacts of climate and environmental change; and a transformed WHO. Dr Tedros served as Ethiopia's Minister of Foreign Affairs from 2012-2016 and as Ethiopia's Minister of Health from 2005-2012. He received the Decoration of the Order of Serbian Flag in 2016 and was awarded the Jimmy and Rosalynn Carter Humanitarian Award in recognition of his contributions to the field of public health in 2011.

Primary healthcare holds the key to universal health coverage

Dear Dame Sally,

In 2018 both the World Health Organization and the UK's National Health Service (NHS) marked their 70th anniversaries. The celebrations remind us of two important facts about global public health. First, every person has the right to the highest attainable standard of health – one of WHO's founding principles. Second, to realize this right, each country requires a health service such as the NHS that provides universal health coverage (UHC) in a form tailored to the unique health profile of its population.

New global health challenges have emerged since 1948, such as HIV, antimicrobial resistance, climate change and the increased prevalence of noncommunicable diseases, but the urgent need for UHC remains. At least half the world's population does not have access to essential health services. About 800 million people spend 10% or more of their household budget on healthcare, which pushes them into poverty and further ill health. There is currently a shortfall of 18 million health workers to achieve and sustain UHC by 2030. Countries are acutely aware of these issues and, supported by WHO and its partners, are asking: how do we deliver UHC and what form should it take? The key to delivering UHC lies in reinvigorating and strengthening primary health care (PHC), through which 80% of people's healthcare needs can be met in an equitable, efficient and cost-effective way. This was also affirmed by the 2018 Declaration of Astana, which acknowledges that "PHC is a cornerstone of a sustainable health system for universal health coverage and health-related Sustainable Development Goals".

The UK's role

Over the last few years the UK has played an important role in developing the concept of UHC and how it can be adapted to the health challenges of the 21st century. The Department for International Development (DfID) through UK aid have been at the forefront with their funding and support for the Resilient and Responsive Health Systems research consortium (RESYST). By conducting health policy and systems research in Africa and Asia in areas such as the health workforce, financing and governance, RESYST has informed the global discussion around how to build health systems that deliver and sustain UHC. For example, their research in Thailand demonstrated that UHC can be achieved at low cost. The eight-year RESYST programme ended in 2018, but I trust the UK's support for the work it pioneered will continue. The UK academic sector is also an important driver of research into UHC through institutions such as Imperial College London and the London School of Hygiene & Tropical Medicine.

PHC: A platform for delivering UHC

"Universal health coverage" may sound like a top-down approach that begins with massive investment in buildings, insurance and infrastructure. However, in practice the most effective approaches to UHC are often bottom-up, focusing on PHC in the community and pooling risks and investments. In my own country, Ethiopia, the foundation of UHC is the tens of thousands of health extension workers who bring healthcare to villages and enable communities to take more control of their own health. This is, of course, a variant of PHC.

The origins of PHC predate both WHO or the NHS, but until recently it has been the Cinderella of health services. It has been underfunded, particularly in low- and middle-income countries,[2] perhaps because it lacks the glamour of tertiary care and well-funded vertical programmes. This has to change, as PHC – if adapted to 21st century challenges – holds the key to UHC.

PHC is the most equitable, efficient and cost-effective way to address the vast majority of people's health needs throughout their lives. It is the frontline of the fight against disease, with its local presence and focus on health promotion and prevention (particularly immunization). Countries can use PHC to prevent, detect and treat noncommunicable diseases and to check outbreaks of infectious diseases. As well as saving lives, this is much cheaper than fighting a rear-guard action through hospital-based treatment and crisis management of epidemics.

It is an inherently nimble model of healthcare that can respond quickly to changing epidemiological and demographic trends. It is well placed to address issues of equity and access because it is delivered close to care seekers' homes by healthcare workers who know the traditions, practices and cultures of their communities. People, including those from marginalized communities, are much more likely to seek care and to be open about issues such as sexual violence and discrimination, if they know they will be understood and respected.

Above all, PHC is not a static concept. It can and must be adapted to incorporate our emerging understanding of the myriad of individual, environmental and social determinants that shape people's health across the life course.
Any country's assessment of how to develop PHC as part their plans for UHC should begin with an analysis of these factors. It should also incorporate a multisectoral approach to health, with particular emphasis on the links to education, health literacy, water and sanitation, food and nutrition, climate change and sustainable development.

In September, the world will come together in New York for the first high-level meeting on universal health coverage.
I encourage the UK and other nations to support WHO in its efforts to cement PHC as a platform for delivering UHC. In truth, there will be no UHC without PHC.

Yours sincerely,

Dr Tedros Ghebreyesus

What is Universal Health Coverage (UHC)?

UHC means that all individuals and communities receive the health services they need without suffering financial hardship. It includes the full spectrum of health services, from health promotion to prevention, treatment, rehabilitation, and palliative care.

Achieving UHC is one of the targets the nations of the world set when adopting the Sustainable Development Goals (SDGs) in 2015. Progress towards UHC is measured by two SDG Indicators[1]:

Indicator 3.8.1
The proportion of a population that are covered with essential health services (UHC service coverage index)[2]

Indicator 3.8.2
Proportion of population with large household expenditures on health as a share of total household expenditure or income

Together with World Bank, World Health Organization (WHO) reports on progress towards UHC every two years. The next report is due in September 2019. Coverage of essential services has increased substantially since 2000. Nonetheless, it was estimated that in 2015 at least half of the world's population did not have full coverage of essential services. Considering selected health services, over 1 billion people have uncontrolled hypertension, more than 200 million women have inadequate coverage for family planning, and nearly 20 million infants fail to start or complete the primary series of diphtheria, tetanus, pertussis (DTP)- containing vaccine, with substantially more missing other recommended vaccines.

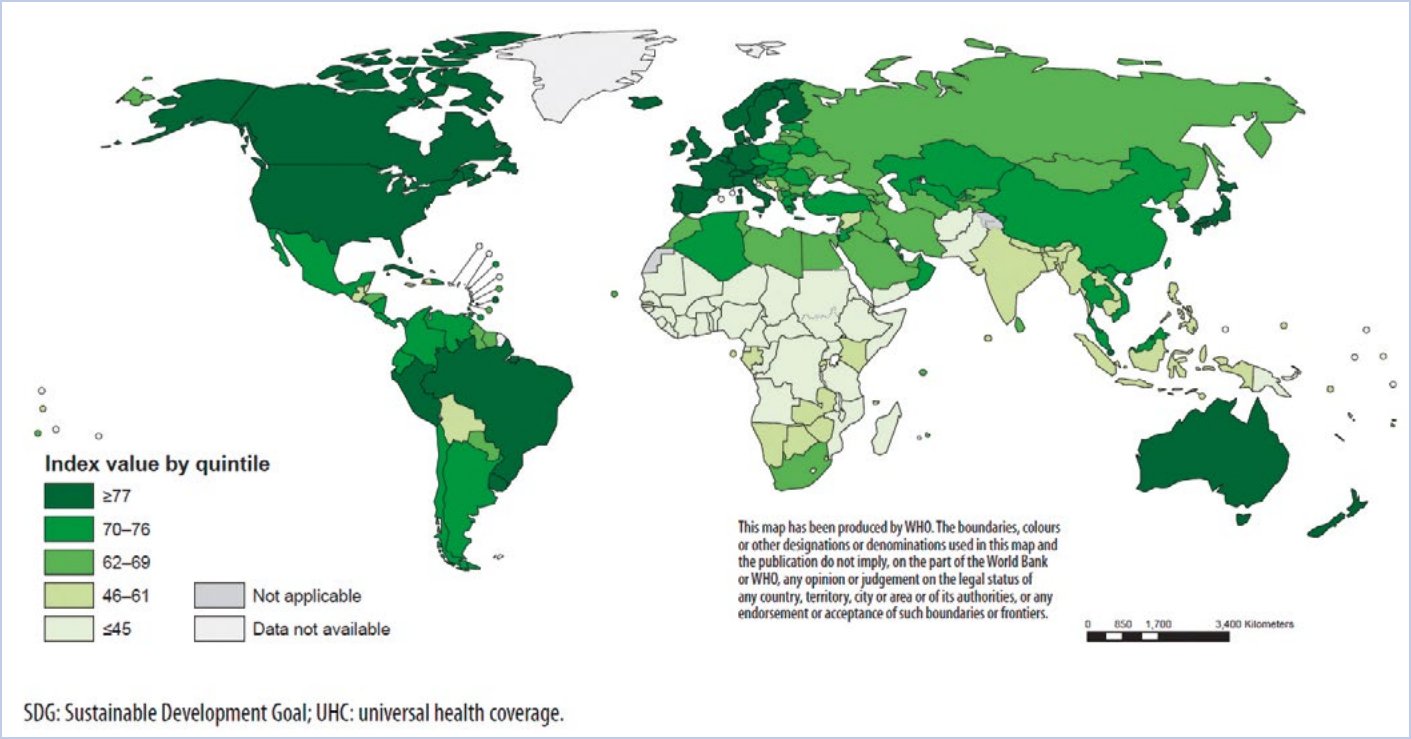
The levels of service coverage vary widely between countries (see Figure 1). As measured by SDG 3.8.1 (the UHC service coverage index), it is highest in East Asia (77 on the index) and Northern America and Europe (also 77). Sub-Saharan Africa has the lowest index value (42), followed by Southern Asia (53). The index is correlated with under-5 mortality rates, life expectancy and the Human Development Index. Moving from the minimum index value (22) to the maximum value (86) observed across countries is associated with 21 additional years of life expectancy, after controlling for per capita gross national income and mean years of education among adults. Gaps in service coverage are largest in the poorest countries and the poorest populations within countries, which highlights the importance of structuring health services so that no one is left behind.

Notes

1 For a full list of indicators see https://unstats.un.org/sdgs/metadata/

2 Defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access

Figure 1 UHC service coverage index: SDG Indicator 3.8.1, 2015



SDG: Sustainable Development Goal; UHC: universal health coverage.

Source Tracking universal health coverage: 2017 global monitoring report. World Health Organization and International Bank for Reconstruction and Development / The World Bank; 2017. Licence: CC BY-NC-SA 3.0 IGO. © World Health Organization and the International Bank for Reconstruction and Development / The World Bank 2017

Julia Gillard, Chair of Global Institute for Women's Leadership at King's College London

Julia Gillard was sworn in as the 27th Prime Minister of Australia on 24 June 2010 and served in that office until June 2013. Ms Gillard is the first woman to ever serve as Australia's Prime Minister or Deputy Prime Minister.

As Prime Minister and in her previous role as Deputy Prime Minister, Ms Gillard was central to the successful management of Australia's economy, the 12th biggest economy in the world, during the Global Financial Crisis and as Australia positioned to seize the benefits of Asia's rise.

She currently serves as the Chair of Beyond Blue, one of Australia's leading mental health awareness bodies; is Chair of global funding body for education in developing countries, the Global Partnership for Education; and is the inaugural Chair of the Global Institute for Women's Leadership at Kings College in London, which through research, practice and advocacy, is addressing women's under-representation in leadership.

Change, systems, scale, learning – transforming girls' education

Dear Dame Sally,

The Taliban's shooting of Malala Yousafzai as she rode home from school one day in 2012 didn't just radically alter the life of a brave 15-year-old. It galvanized global attention to Malala's cause – the right of every girl to an education.

The world learned what girls like Malala understand instinctively: that educating girls pays dividends for them, their families, communities, nations, and even the planet. Educated girls help lift their families out of poverty. They choose to have fewer children, have lower maternal and child mortality,[1] are less likely to get HIV/AIDS, are more likely to send their own children to school, and are less likely to join extremist groups.[2] The return on investment in girls' education is clear, but educational opportunities for girls are still more limited than those of boys.

In all, 132 million girls worldwide are out of school,[3] and many millions more are in school but not actually learning. Girls are shut out of school for many reasons, including poor health, gender-based violence, early marriage, domestic chores, a lack of girl-friendly sanitary facilities in school, and discrimination. It is the most marginalised girls – those who live in poverty, remote areas or conflict zones – who are most often denied an education.

Solutions

The world's attention to girls' education following Malala's shooting has been welcome, but its gaze hasn't resulted in transformative change at scale. Now is the time to change that.

Legendary political campaigner James Carville is credited with keeping Bill Clinton's campaign for president focused by hanging a sign in campaign headquarters that read:

1. Change vs. more of the same.
2. The economy, stupid.
3. Don't forget health care.

Truly transforming education globally will take at least as much ruthless and relentless focus. Perhaps our watchwords should be:

1. Change vs. more of the same.
2. Systems and scale, stupid.
3. Don't forget it's about learning.

Why reject more of the same? First and foremost because it will end in failure. In 2030, we won't be putting a tick next to the Sustainable Development Goal on Education. Instead, we will have a 100-year gap between educational outcomes in developed and developing countries.[4] Girls will be at the most risk of being left behind. Second, because it means the highest income countries on the planet will continue to outlay overseas development aid resources in a fundamentally inequitable way.[5] In answer to that, someone will inevitably say "but the largest expenditure on education in developing countries is from those nations themselves". That's right, and the equity and efficiency of that spend must also improve. But it is hard to be an evangelist about that if the behaviour being modelled by those with the most resources needs profound change.

Change means focusing on whole systems and at scale; we need to focus on systems because even with the rapid growth of non-government schooling, overwhelmingly children will continue to be in government school systems. In any event, the health of the whole system matters for the quality of those non-government schools too. Think teacher training: if that part of the system is broken, it's busted for every school. In addition, research clearly shows that strong systems, even in lower income countries, will outperform the learning results of weaker systems in higher income countries.

Improving systems means better learning at scale. There will always be innovative projects supported by philanthropy or funded by overseas development that point the way forward. But to get millions learning, the insights generated need to be translated into systems and have impact at scale.[6] The Global Partnership for Education has pioneered a systems-strengthening approach, including in the most fragile and poorest countries. It leverages additional domestic expenditure, improves equity, including for girls, and ensures accountability. In addition, it sharpens the focus on measurement and learning outcomes. Because we must never forget, our goal isn't to have children sitting in schools, it's to have them learning.

At-scale, agile philanthropy can complement system-strengthening efforts. CAMFED, the Campaign for Female Education for example, is creating change at scale in government schools by supporting girls' education throughout Sub-Saharan Africa.

The United Kingdom is rightly recognized as a global leader in girls' education. Now is the time for the UK to build on its wonderful reputation by stepping up its investment and advocacy for change, systems, scale and learning.

Yours sincerely,

Julia Gillard

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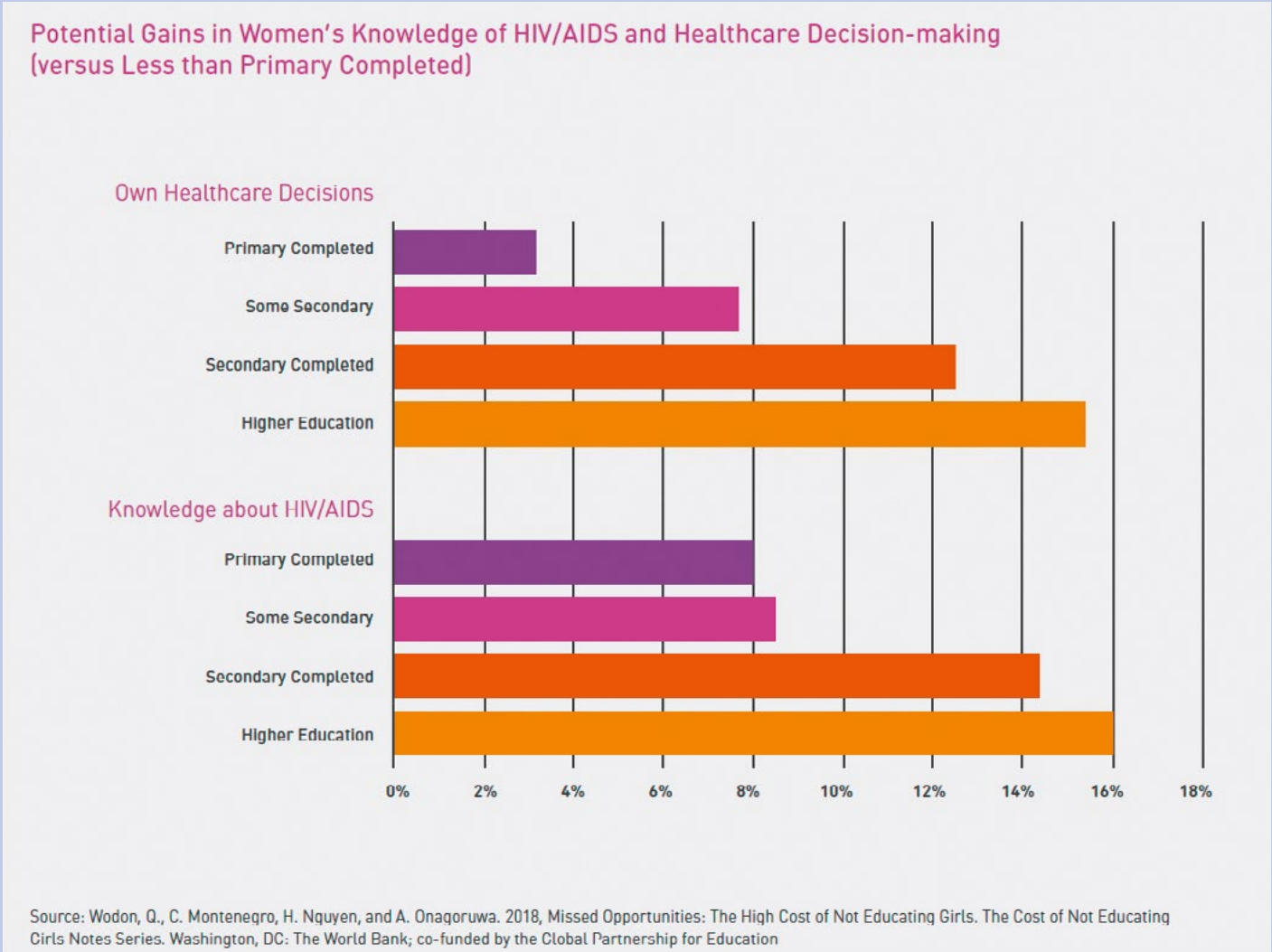
Global Partnership for Education Case Study

Brishna, Afghanistan

Brishna, 9, lives in Helmand, one of the most volatile regions in Afghanistan. She has always wanted to go to school, but there was no school in her village and poverty and cultural barriers were keeping her family from prioritizing her education.

Global Partnership for Education supported the government to recruit, train and deploy qualified, female teachers and helped establish community-based classes, one of which Brishna now attends. "I am happy because I can learn now", Brishna.

If all girls completed secondary education, there could be a 20% increase of knowledge about HIV/AIDS in developing countries. The potential effect is thus large, and it underscores the value of education for vital health knowledge.



Source: Wodon, Q., C. Montenegro, H. Nguyen, and A. Onagoruwa. 2018, Missed Opportunities: The High Cost of Not Educating Girls. The Cost of Not Educating Girls Notes Series. Washington, DC: The World Bank; co-funded by the Global Partnership for Education

Professor Vikram Patel, Pershing Square Professor of Global Health and Wellcome Trust Principal Research Fellow at Harvard Medical School.

Professor Vikram Patel is Pershing Square Professor of Global Health and Wellcome Trust Principal Research Fellow at the Harvard Medical School. His work has focused on the burden of mental disorders, their association with social disadvantage, and the use of community resources for their prevention and treatment.

He holds Honorary Professorships at the Harvard TH Chan School of Public Health, the Public Health Foundation of India, and the London School of Hygiene & Tropical Medicine (where he co-founded the Centre for Global Mental Health in 2008), and is a co-founder of Sangath, an Indian NGO which won the MacArthur Foundation's International Prize for Creative and Effective Institutions in 2008 and the WHO Public Health Champion of India award in 2016. He is a co-founder of the Movement for Global Mental Health. He is a Fellow of the UK's Academy of Medical Sciences and has served on several WHO expert and Government of India committees, including the WHO High Level Independent Commission for Non-Communicable Diseases and Mental Health.

He has been awarded the Chalmers Medal (Royal Society of Tropical Medicine and Hygiene, UK), the Sarnat Medal (US National Academy of Medicine), an Honorary Doctorate from Georgetown University, the Pardes Humanitarian Prize (the Brain & Behaviour Research Foundation), an Honorary OBE from the UK Government and the John Dirk Canada Gairdner Award in Global Health in 2019. He was listed in TIME Magazine's 100 most influential persons of the year in 2015.

A fresh approach to transform mental health globally

Dear Dame Sally,

Mental health problems affect us all. This is not surprising as these problems include a diverse range of conditions, from autism, intellectual disability and Attention Deficit Hyperactivity Disorder (also known as ADHD) in childhood, to depression, anxiety, substance use disorders and psychoses in young adults to dementia in older adults. Who would not know at least one person, and more often several, in their intimate social networks who are struggling with a mental health problem?

Mental health problems affect populations across the world, are strongly associated with social disadvantage, are inseparable from physical health, cut lives short and lead to profound levels of suffering and disability. Even though a range of effective interventions exist, from those seeking to prevent mental health problems, to helping people with acute conditions recover, to enabling people with chronic and enduring problems to lead productive and meaningful lives, the vast majority of the global population do not benefit from this knowledge. The recent national surveys from India and China, two middle-income countries which are home to a third of the global population revealed that, even in these relatively well-resourced middle-income countries, over 80 per cent of people with any mental disorder did not receive any treatment in the previous year. Further, there are large treatment gaps even in the richest countries of the world, and these national averages hide massive disparities within countries; in all countries, rural and disadvantaged communities have even less access to quality care.

Quite simply, mental health is the orphan child of the healthcare system and all countries are 'developing' when it comes to mental health. The chances that any country will achieve the aspirations of Universal Health Coverage without addressing mental health are zero, for healthcare cannot be universal without mental health!

The UK has been a champion of mental health. Domestically, significant financial investments in the quality of mental health care, and the remarkable Improving Access to Psychological Therapies programme are some exemplars of this commitment. Globally, the UK has taken the lead in marshalling cross-national support for greater investments in mental health care through hosting the first ever Global Ministerial Summit on Mental Health in October 2018. Investments in research, by the UK Research Councils, the Wellcome Trust and DFID, have built a compelling base of knowledge testifying not only to the immense, and often tragic, burden of mental health problems in under-resourced contexts, but also the hope that widely available and affordable human resources, notably community health workers, can effectively deliver psychosocial interventions and transform lives. Indeed, the recent Lancet Commission on Global Mental Health and Sustainable Development (which I co-led and which was launched at the Global Ministerial Summit) has recommended such delivery systems, facilitated by the potential of digital technologies, as the foundation of a mental health care system globally.

The Lancet Commission recommended establishing mental health care as a pillar of UHC, using public policies to protect mental health (in particular during developmentally sensitive periods of the life course), actively engaging people with the lived experience in mental health care, investing much more in mental health, and strengthening monitoring and accountability of mental health care.

Despite the science and the changing attitudes, the global community still has much work to do. The massive unmet needs for care, the rising incidence of mental health problems in some communities (and, in particular, in young people), the abuses of fundamental rights of people with mental health problems and the very low investments in mental health care, both nationally and through development assistance, are unacceptable.

Looking ahead, I think we will need to particularly invest in strategies which address the structural barriers to improving access to quality care, realizing the unique opportunities presented by the growing political will to address mental health problems. I propose four specific actions which arise from the Lancet Commission's recommendations.

The first is to build the global mental health workforce through digital platforms which can empower community-based providers to learn, master and deliver evidence-based psychosocial treatments. Such interventions can transform lives and digital platforms can effectively train and support providers and assure quality of their delivery.

Second, at the other end of the healthcare system, we need to build leadership capacity in governments and organizations responsible for mental health care to use resources efficiently and effectively.

A learning collaborative comprising leaders in this sector, who are often isolated within their own organizations, could provide an enabling and catalyzing framework for peer-learning and excellence.

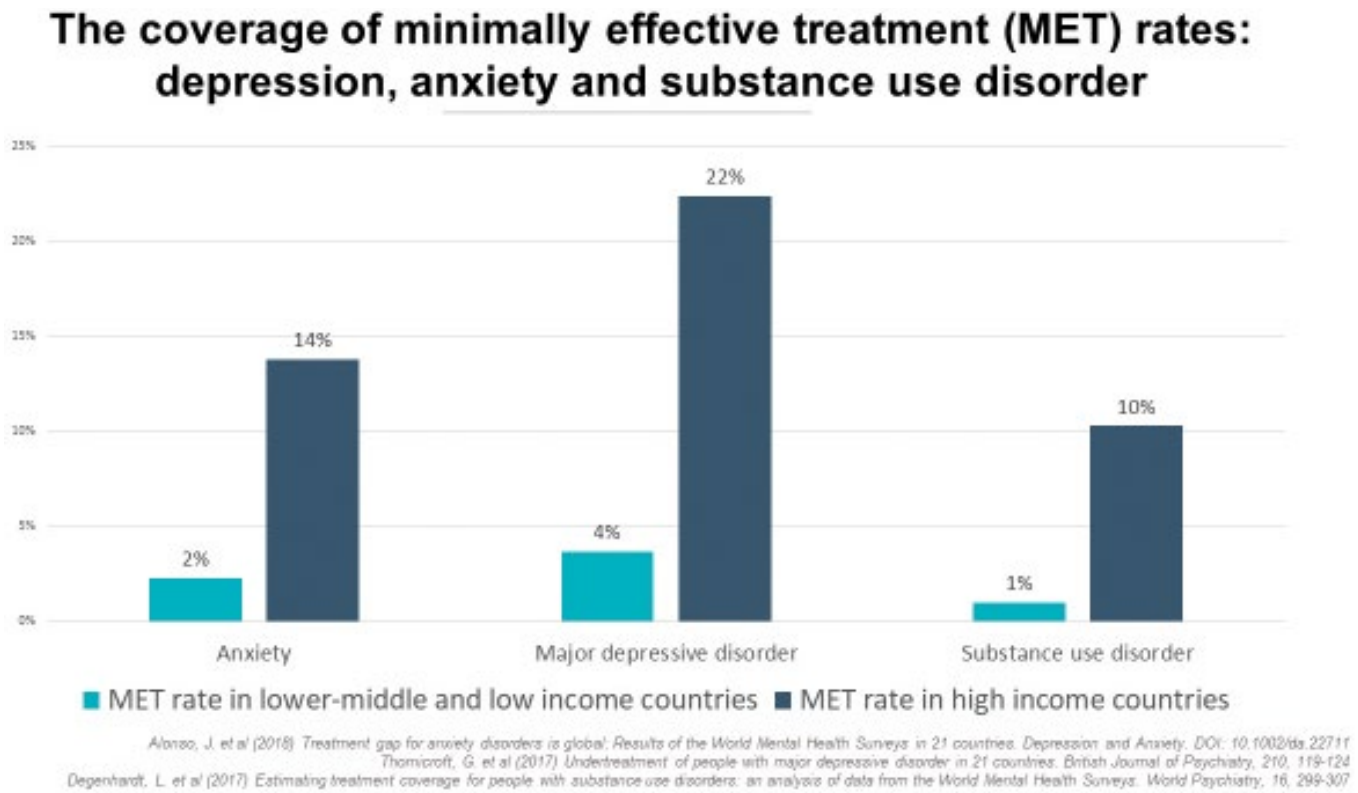
Third, countries need to make investments in mental health care accountable. The recently announced Countdown Global Mental Health 2030 offers the potential to develop a common set of metrics which cover a range of domains pertinent to mental health, ultimately leading to the development of a single 'mental health system indicator', which can be used to evaluate country and region-level progress and the impacts of enhanced investments in mental health.

Fourth, health systems need a renewed commitment to work across sectors to reduce the incidence of mental health problems, in particular to enable, and where necessary enforce, nurturing environments in the early years of life: at home, in schools, in neighborhoods and, of course, in the digital world. Without addressing these barriers, the world is unlikely to see much impact on reducing the global burden of suffering due to mental health problems. It goes without saying, of course, that the voices of people with the lived experience must be central to each of these initiatives.

The UK needs to build on its historic global leadership role in this sector to increase its development assistance and mobilize its partner countries in the OECD and middle-income world, to support actions which seek to address the structural barriers I have proposed, as well as to support countries with the least resources to build their mental health care systems. We need not only more investment but a fresh approach to transforming mental health globally.

Yours sincerely,

Professor Vikram Patel



Professor Felix Dapare Dakora, President, The African Academy of Sciences

Professor Felix Dapare Dakora is the President of the African Academy of Sciences. He has over 33 years-work experience in Africa and North America where he has been a researcher and has supervised and graduated master's and doctoral students.

Professor Dakora's research spans the fixation of biological nitrogen (N_2) in legumes and has promised great results. He is currently a Plant and Soil Biotechnology Professor at the Tshwane University of Technology in Pretoria and a National Research Foundation grant holder.

He is a recipient of the UNESCO-Equatorial Guinea International Prize for Research in the Life Sciences; the African Union Kwame Nkrumah Scientific Award; and is a Fellow of the Academy of Science of South Africa. He has served on the advisory and scientific committees of many major international conferences and was President of the African Association for Biological Nitrogen Fixation.

Developing Africa's research leadership

Dear Dame Sally,

our health and survival are closely linked to the health of our ecosystem. This is especially true in Africa where innovative, local solutions are needed to improve the continent's research ecosystem and ensure sustainable development. The producers of these innovative solutions should be African scientists who best understand the problems facing the continent.

The African continent is facing new threats that require us to quadruple our efforts to build a critical mass of scientists who will urgently research solutions to these challenges. Currently, non-communicable diseases (NCDs) account for 23% of the disease burden on the continent, contributing to a rise in medical costs and impact on human development. The World Health Organization predicts that NCDs will overtake communicable, maternal and perinatal diseases as the leading cause of death by 2030.

Additionally, climate change remains a threat to lives and livelihoods. By 2020, between 75 and 250 million people in Africa are projected to be exposed to increased water stress and yields from rain-fed agriculture could be reduced by up to 50% in some countries because of climate change, according to the United Nations Environment Programme.

To achieve just the world average for the number of researchers per capita, we at The African Academy of Sciences (AAS), estimate that the continent needs another million new PhDs.

The role of the UK

The UK has been instrumental in supporting efforts to build a critical mass of scientists in Africa. Through the support of Wellcome Trust[1] and their overseas programmes, organisations such as KEMRI-Wellcome Trust Research Programme[2], the Malawi-Liverpool-Wellcome Trust Clinical Research Programme[3] and the African Health Research Institute[4], have trained thousands of scientists and funded them to conduct research that is relevant to the continent.

Wellcome has partnered with the UK government's Department for International Development (DfID) in recent years to amplify this support in investing in Africa's future generations of scientists through the African Academy of Sciences (AAS). Their support has enabled the AAS to partner with the African Union Development Agency (AUDA-NEPAD), formerly the NEPAD Agency, to create an agenda setting, funding and programme management platform, the Alliance for Accelerating Excellence in Science in Africa (AESA).

The AAS' flagship programme, Developing Excellence in Leadership, Training and Science (DELTAS) Africa, is implemented through AESA. DELTAS Africa is a US$100 million programme supporting 11 collaborative teams headed by world class African researchers and spanning 54 lead and partner institutions from more than 20 African countries. DELTAS trains and develops world class researchers and research leaders in Africa. The results have been phenomenal, with about 1,400 master's, PhD and postdoctoral trainees, half of whom are women, having been recruited. The 11 programmes have collectively produced 493 scientific publications and attracted 298 additional grants worth over $227 million and received 153 prizes and awards worth $9.3 million in recognition of their scientific excellence.

DfID's support to Africa is longstanding. At the AAS, DfID began with investing in the Climate Impact Research Capacity and Leadership Enhancement (CIRCLE) programme that developed the skills and research results of 94 early-career African researchers, half of whom were women, in the field of climate change with a 100% publication rate. The UK agency has now extended this support to the Climate Research for Development (CR4D) initiative, an initiative which seeks to strengthen links between climate science research, and climate information needs, to support development planning in Africa.

As DELTAS Africa and CIRCLE numbers reflect, UK funding has enabled deliberate efforts to recruit more African women in science to increase the current figure of 30%. The Royal Society has also long been a player in the field and is now enabling talented early-career researchers, whose science is focused on the needs of the continent, to establish independent careers in African institutions and ultimately, their own research groups through Future Leaders – African Independent Research (FLAIR), a programme it is implementing in partnership with The AAS.

It is important that the UK funding is increasingly being invested directly in African institutions and researchers. This enables African scientists to build long-term sustainable research ecosystems, to set the research agenda, particularly one that addresses challenges faced on the continent and to cultivate the research management skills and capacity required to attract more funding.

Looking to the future

The future of Africa lies in the hands of its scientists who if adequately funded and trained can provide the solutions to the continent's developmental needs. But these problems are not just local. We know that some of the challenges that we face, such as climate change, are global and that diseases know no geographical boundaries. We hope that the solutions from our scientists will be of global relevance as well. The UK must ensure that African researchers are not excluded from conferences, research and scholarship opportunities by any future visa system. It needs to be a flexible system that recognises the mutual benefit of shared learning, collaboration and cooperation.

We are grateful to our international partners who have joined hands with the continent to realise this vision. Our African governments will also need to spend more than the current average of 0.45% of their gross domestic product (GDP) on research to build this critical mass of researchers. Governments have pledged their commitment to science with an African Union target to invest 1% of their GDP. This commitment should be translated into action (speedily) for the benefit of African people.

Governments should also create a conducive environment for the private sector and the continent's philanthropists to invest in research and development. Together with partners, the AAS has created the Coalition for African Research and Innovation (CARI) to mobilise this funding and support and see it as a vehicle that can be used to realise the vision of supporting more African researchers to address local and indeed global problems.

The AAS is also proud to be working closely with the African Union to achieve the AU Agenda 2063 – The Africa we want.

Yours sincerely,

Felix Dapare Dakora
President of The African Academy of Sciences

References

1 https://wellcome.ac.uk/

2 https://kemri-wellcome.org/

3 https://www.mlw.mw/

4 https://www.ahri.org/about/

Section 2

Sustainability

Dr Chelsea Clinton, Vice Chair of the Clinton Foundation and an Adjunct Assistant Professor, Columbia University's Mailman School of Public Health

Dr Devi Sridhar, Chair and Professor of Global Public Health, University of Edinburgh Medical School and Director of the Global Health Governance Programme

Chelsea Clinton is Vice Chair of the Clinton Foundation and an Adjunct Assistant Professor at Columbia University's Mailman School of Public Health. Chelsea holds a B.A. from Stanford, an MPhil and DPhil from Oxford University and an MPH from Columbia University's Mailman School of Public Health.

Devi Sridhar is Chair and Professor of Global Public Health at the University of Edinburgh Medical School and Director of the Global Health Governance Programme. Recipient of a Rhodes scholarship, Devi holds an MPhil and a DPhil from Oxford University as well as a B.S. from the University of Miami's Honors Medical Program.

Together, Drs Clinton and Sridhar are the co-authors of *'Governing Global Health: Who Runs the World and Why?'.*

The UK's role in international health institutions

Dear Dame Sally,

To effectively address infectious diseases such as TB and HIV/AIDS, as well as obesity-related health conditions, we need efficient and equitable health systems within countries as well as efficient and equitable global health institutions. The World Health Organization (WHO) and the Global Fund to Fight AIDS, Tuberculosis and Malaria are two examples of how the world has tried to achieve the latter, albeit with different respective mandates, strengths and challenges. The United Kingdom (UK) is a major funder to each, both in terms of absolute pounds contributed and as a percentage of total funds received. In 2017, the UK contributed more than $163.7 million to WHO, making it the third largest total contributor (after the U.S. and the Bill & Melinda Gates Foundation), a pattern that has generally held true in recent years.[1,2] Through 2018, the UK had contributed £2.88 billion to the Global Fund, making it the third largest donor to the Global Fund since its inception in 2002.[3]

World Health Organization: Strengths and Challenges

For all the criticisms levied at WHO in recent years, it retains a unique place in the global health system.[i] It is the only organization with normative power and remains the only significant (in terms of resources) global health-focused institution comprised solely of member states (the World Bank has a much broader poverty-fighting mandate). At the World Health Assembly, the ultimate governing body of WHO, each member state has one vote, though in practice donor countries (like the UK) play a disproportionate role in setting the organization's agenda, through what gets voted on and which issues get funded. Member states, particularly developing countries, continue to look to WHO to set global health priorities and for technical expertise; we see this on a range of health issues from malaria to universal health coverage to diabetes prevention. It, again uniquely, is the only global health organization with legal authority, which it has used to strengthen global standards and regulations around disease surveillance and reporting and tobacco control. However, its ability to enforce those legal agreements or to pursue coordinated action on priorities, even in emergencies, has been seriously undermined by its inability to marshal necessary resources. For all that member states expect of WHO, they have not voted to increase assessed contributions in more than 30 years; annual assessments are less than 15% of the UK's total annual contribution to WHO. Most of the UK's voluntary contributions, as is true of other major donors, are earmarked, including for polio eradication and outbreak response.[ii]

Additionally, even as non-state actors have risen in importance for global health over recent decades, from providing direct health services in fragile states to wide-ranging technical assistance to developing country governments, WHO has not meaningfully reformed how non-state actors interact with it. Non-state actors are not permitted on the member-state only WHO executive board nor are they generally allowed in the room when major decisions are being discussed or made, even when non-governmental organization (NGO) partners may be expected to act on those decisions (the 2014/2015 Ebola crisis arguably saw many examples of this, as WHO dithered to declare a Public Health Emergency of International Concern and yet expected Doctors Without Borders, Partners in Health and other groups to support and complement the affected countries' responses).

Arguably, an exception to this is Bill Gates given his direct line of communication to whomever the WHO Director-General is and the significance of the Bill & Melinda Gates Foundation to WHO's voluntary contributions (in recent years, the Bill & Melinda Gates Foundation contributed more than the UK).[iii] Another challenge WHO faces relates to its relative lack of transparency, at least as compared to other global health institutions, and increasingly to other multilateral institutions beyond health. It remains notably lacking in transparency in many of its decision-making processes to other stakeholders and the public, while other organizations, including the Global Fund, have published a wider range of materials about the hows and whys of their work.

The Global Fund: Strengths and Challenges

The Global Fund has a different set of strengths and challenges.[iv] Conceived purposefully as a new type of institution, and one different than WHO, the Fund enfranchises NGOs, patient groups and the private sector, both on its board and by requiring all grant applicants to demonstrate broad-based multi-sector representation. Although the Fund does not have member states like WHO, country governments hold the majority of Board seats (75%), with country representation a mix of regionally-reserved seats and those designated for a specific country, including the UK. Other seats are reserved for a representative from a community affected by one of the Fund's constituent diseases, developed and developing country NGOs, a private foundation (which has always been the Gates Foundation) and the private sector.

Does this greater enfranchisement translate into a more meaningful vote and influence for non-donor countries? Our previous research indicates that significant donor influence persists at the board level as it does in fundraising; more than 95% of the Fund's resources come from donor countries, with a composition very similar to that of WHO's largest voluntary contributors. Donor influence can also be seen in grant applications with donor representation often part of, or at least consulting to, the multi-stakeholder applicant.

Still, the Board historically has accepted the funding recommendations of the independent Technical Review Panel, so the picture of donor influence and governance is at least nuanced. On transparency, the Fund for many years was a leader, publishing significant materials on Board and Committee meetings, grant funding decisions (including for those that did not receive funding) and grant progress reports. In recent years, the Fund has notably restricted what it publishes about grant decision-making and progress. We hope that it returns to its more open posture, yes, to help researchers and even further, to assist in developing country governments, donors and partners in understanding how the Fund defines and measures success.

Shaping the Future: Priorities and Risk Assessment

As the UK determines what its global health foci will be over the next years, we hope that it matches those priorities with the institutions best situated to meet them; we do not believe there is appetite or interest in creating a new entity or in wholesale WHO reform to position it as a more comprehensive implementing partner to member states. If the UK is most concerned about the rising threat of outbreaks, drug-resistant infections and the public health consequences of natural disasters, we hope that it will look to strengthen WHO's emergency response competencies while also supporting WHO's work with countries on building resilient health systems, inclusive of universal health coverage. If the UK wants to continue to maintain and advance progress against HIV/AIDS, TB and malaria, it must continue to support the Global Fund. Finally, we hope that the UK uses its position as a reliable donor and advocate of both institutions to continue to push for greater representation at every level, including within the organizations themselves.

Yours sincerely,

Drs. Chelsea Clinton and Devi Sridhar

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1 WHO, Seventy-First World Health Assembly, "Voluntary contributions by fund and by contributor, 2017," 19 April 2018, p. 6. Accessed 22 June 2019: https://www.who.int/about/finances-accountability/reports/A71_INF2-en.pdf?ua=1

2 WHO, "Notice of Assessment for the Financial Year 2017 as of May 2016, United Kingdom of Great Britain and Northern Ireland." Accessed 22 June 2019: https://www.who.int/about/finances-accountability/funding/revised-2017-invoice/gbr_en.pdf?ua=1

3 The Global Fund, Government Donors, "United Kingdom." Accessed 22 June 2019: https://www.theglobalfund.org/en/government/profiles/united-kingdom/

Notes

i For more on WHO, including what is discussed in this section, please see: C. Clinton & D. Sridhar, "Governing Global Health: Who Runs the World and Why?" (Oxford University Press, 2017). For discussions on WHO funding, please see specifically pp. 90-97 and on relative transparency, please see specifically pp. 141-147, 150-159.

ii As one example, of the more than $163.7 million the UK contributed as voluntary funds to WHO in 2017, more than $18 million was earmarked for outbreak and crisis response, $75 million for special programmes and collaborative arrangements, $36 million for other specified voluntary contributions and more than $3 million for the special programme for research and training in tropical diseases, among others.

iii For more on Bill Gates's and the Gates Foundation's influence at WHO and other global health institutions, please see: Clinton & Sridhar (2017), pp. 78-81.

iv For more on the Global Fund, including what is discussed in this section, please see: Clinton & Sridhar (2017). For discussions on Global Fund funding sources, please see specifically pp. 107-113 and on its relative transparency historically, please see specifically pp. 142-159.

Christopher J.L. Murray, MD, DPhil, Institute Director of the Institute for Health Metrics and Evaluation (IHME), Professor and Chair of Health Metrics Sciences at the University of Washington

Professor Murray's career has focused on improving health for everyone worldwide by improving health evidence. A physician and health economist, his work has led to the development of a range of new methods and empirical studies to strengthen health measurement, analyze the performance of public health and medical care systems, and assess the cost-effectiveness of health technologies. IHME provides rigorous and comparable measurement of the world's most important health problems and evaluates the strategies used to address them.

Before founding IHME, Murray served as Executive Director, Evidence and Information for Policy Cluster at the World Health Organization, Director, Harvard Initiative for Global Health and Harvard Center for Population and Development Studies, and Richard Saltonstall Professor of Public Policy at the Harvard School of Public Health. Dr. Murray has authored or edited 16 books, many book chapters, and more than 420 journal articles in internationally peer-reviewed publications. He is an elected member of the National Academy of Medicine (NAM) and the 2018 co-recipient of the John Dirks Canada Gairdner Global Health Award. He holds undergraduate degrees from Harvard University, a DPhil in International Health Economics from Oxford University, and an M.D. from Harvard Medical School.

Strengthening health surveillance

Dear Dame Sally,

Measurement of health and its determinants is the foundation for better health policy. We need to know people's health problems, which are getting better and which are getting worse and where inequalities are most pressing. Sound measurement is not only the basis for targeting and a major input to prioritization but is also the foundation for evaluating which investments are working. Honest reflection on successes and failure is essential for political accountability and for optimal course correction.

To have the desired impact, sound measurement needs five ingredients: strong primary data collection systems; international norms and standards for data collection, data classification and data processing; appropriate data synthesis tools; full transparency; and effective public dissemination. Taking a global view, there are major challenges in all of these areas. Primary data systems for monitoring health and health systems require many components but three are the most important: complete civil registration and vital statistics with medical certification of causes of death (CRVS); a period national household representative survey with biomarkers capturing critical disease, risk and health intervention information; and administrative data collected at health facilities on diagnosis and health intervention delivery. In most high-income countries, CRVS and administrative data are often well developed but household surveys with biomarkers are often infrequent or absent. In many low-income countries because of the efforts of the Demographic and Health Surveys, the Multiple Indicator Cluster Surveys and the STEPS survey program, surveys are more developed than CRVS or administrative data.

All three platforms are essential for any coherent plan to monitor health and the health system response highlighting the pressing needs in nearly all countries for improvement.

The second critical input for better health monitoring is international norms and standards. While the more than 100 year history of the International Classification of Diseases and Injuries (ICD) is a shining example of success, many critical areas have not received needed attention. Data collection and data processing have in most cases not been standardized. For example, how should national statistical authorities and others make sense of deaths registered in CRVS that are assigned to non-specific or impossible causes? This is a widespread problem that confounds comparisons of death rates across time and across communities. How should results from surveys on malaria using blood smears be compared to surveys using rapid diagnostic tests? Even for many health-related Sustainable Development Goal (HRSDG) indicators, data are collected using different assays. Standards for processing data to allow for comparison are urgently needed. WHO with a proud history of sustaining the ICD has a major potential role to play in convening the scientific community to establish more comprehensive data collection and data processing standards.

The third challenge is data synthesis. Collecting data even according to global standards is rarely enough. How government statistical authorities, civil society, academia, and international organizations analyze and interpret the available data can differ widely. Data can inform policy debates only after inconsistencies between measurements, gaps in time series and missing data have been addressed. Large disagreements across different sources such as Ministries of Health, WHO and the Global Burden of Disease Collaboration for an indicator like the maternal mortality ratio can in part be traced to different philosophical and statistical approaches to data synthesis. To date, a great diversity of approaches have been used even within the same organization. A more coherent and comprehensive approach to data synthesis is needed. One example of an internally consistent approach is the Global Burden of Disease Collaboration. See Figure 1 for an illustrative example of the shifting global burden of disease.

Fourth, public trust, scientific rigor and social accountability are all strengthened by the highest level of transparency for the input data, data processing and data synthesis used by national statistical authorities, international organizations and others to produce indicator values. The WHO led the development of the Guidelines on Accurate and Transparent Health Estimate Reporting (GATHER) which was an important milestone towards transparency. The Global Burden of Disease, and a few select WHO programmes have implemented them. But the majority of national and international efforts are not GATHER compliant. Despite limited adoption, we need a GATHER 2.0 that goes even farther for transparency. GATHER requires metadata but not the actual primary data to be publicly available. In many cases, national authorities who collect data share it with international organizations with unclear instructions on whether it can be shared publicly. Everyone would be better served if the bar was raised so that data had to be shared, otherwise it could not be included in global accountability efforts such as monitoring the SDGs. To achieve such a jump in transparency requires leadership from the UN and WHO. Clarity is needed on what input data sharing means as well. Is sharing tabulated data enough? The more that unit record data with strict controls for protecting privacy can be shared the greater the benefit to the broader community interested in tracking health and the organized social response to health.

The last ingredient for data impact is investing in modern approaches to share the results of monitoring with the public, civil society organizations and academia. A diverse set of audiences can and should be encouraged to understand the data and use it in debate and policy formulation. Such a diverse set of actors requires a diverse set of dissemination strategies that reflect the ways in which different groups get and internalize information.

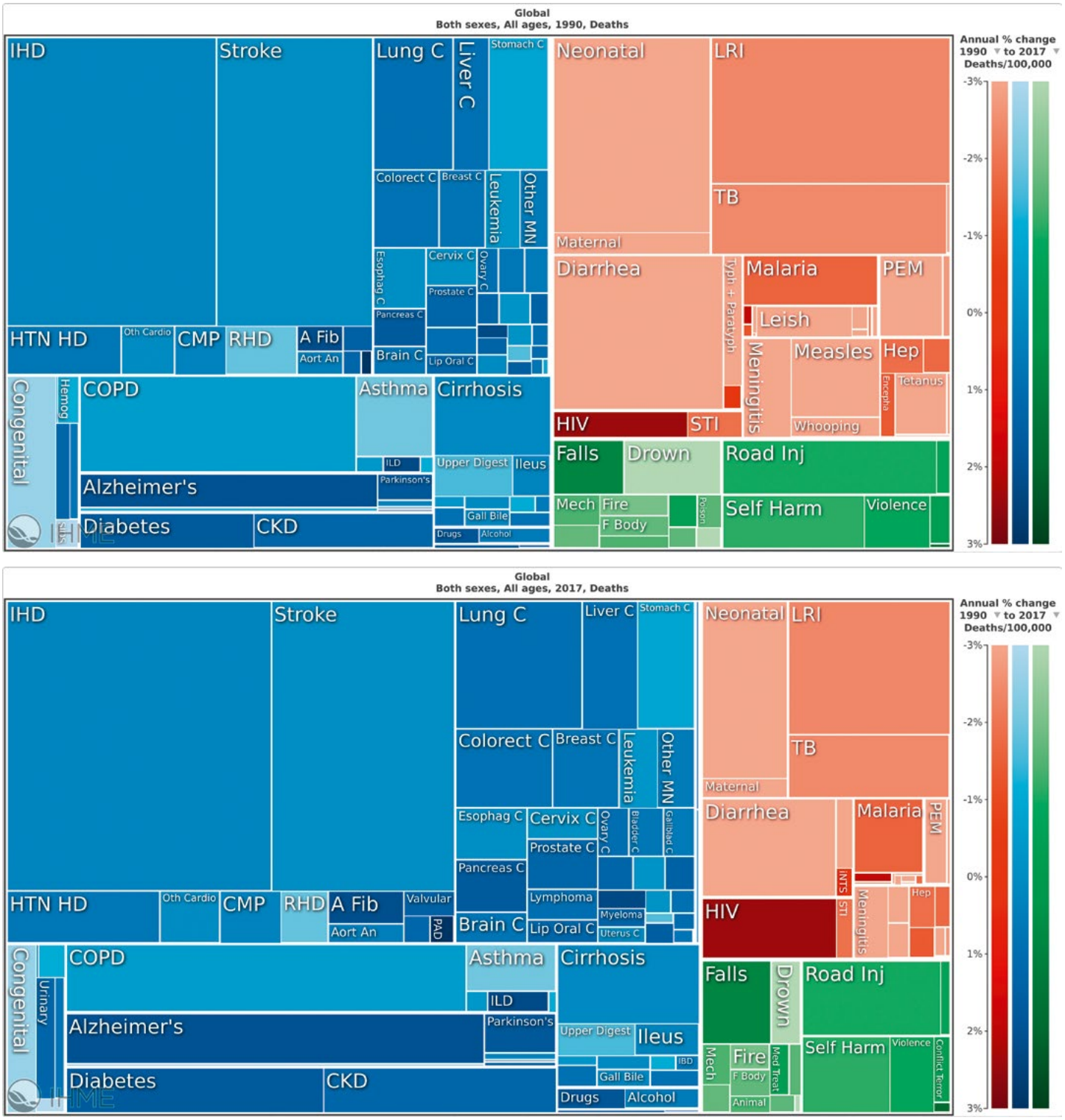
Health surveillance is in a far better place than 20 years ago. Transparency has increased. Data synthesis methods are dramatically better through the rapid evolution of low cost computation and data science methods. But progress on primary data and the larger vision on how the pieces fit together has been slower than expected. The potential of a range digital technology to change how data are collected and transmitted remains great but remains stubbornly in the future not the present.

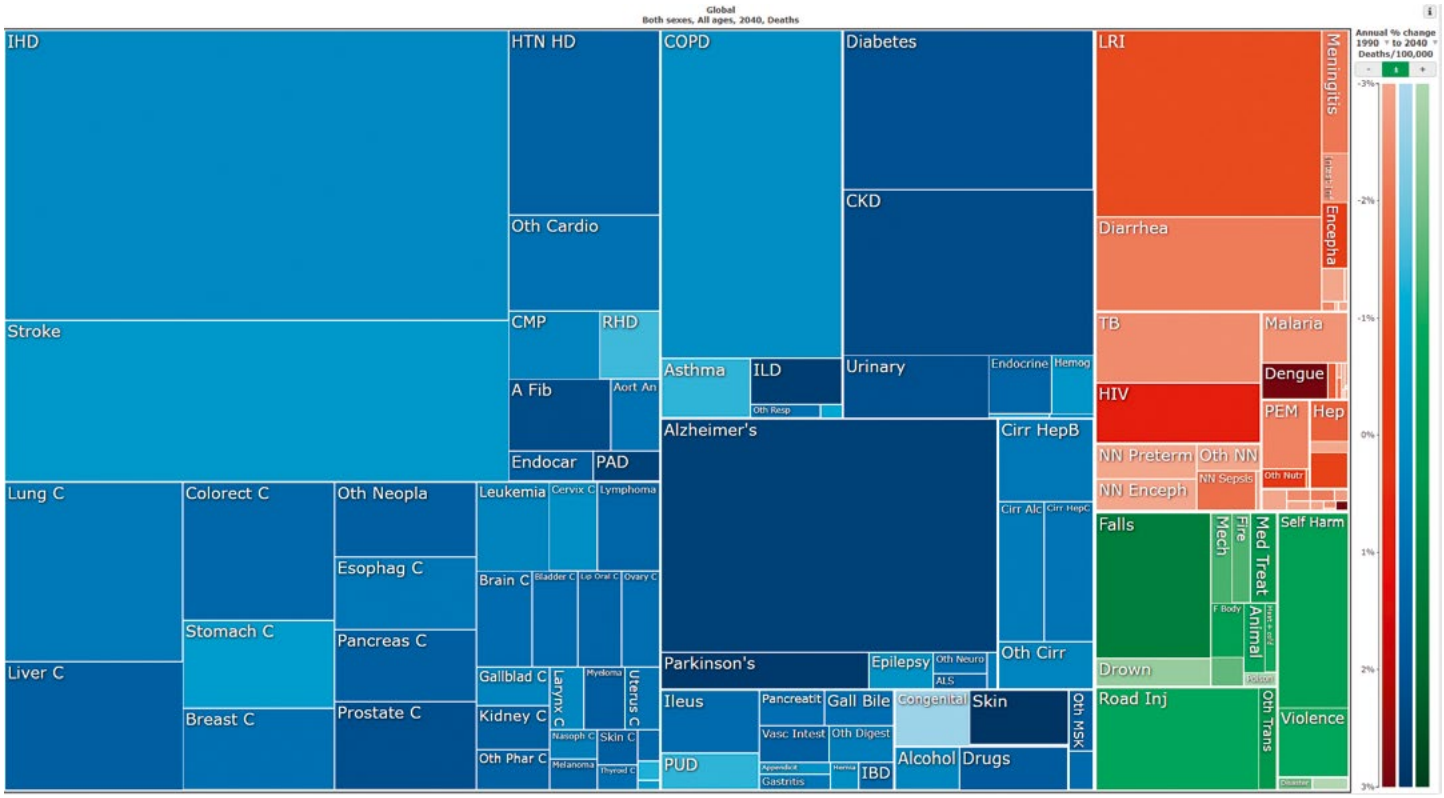
The data and surveillance space could be radically improved in the coming years. But a remarkable amount of energy is still devoted to arguing about 'ownership' of different indicators. There is much discussion about which group should have exclusive access to data sets, who should be the authority on data processing and data synthesis and who should be the prime communicator of monitoring to the public. These ongoing skirmishes collectively mean that no dramatic transformation in the health surveillance space is coming yet. The global community who have a stake in better monitoring including national statistical offices, ministries of health, donor agencies, international organizations, non-governmental organizations and academics need to focus on the broader agenda and not on the indicator by indicator 'ownership' debates. A major shift towards everyone working together to strengthen the basis for health surveillance will only happen if there is committed and visionary leadership. Key organizations need to come together, articulate a shared vision and act on it. Times are auspicious for such a push. WHO under the leadership of Dr. Tedros is emphasizing partnership including in the data space; the growing collaboration between WHO and the Institute for Health Metrics and Evaluation is one example of this new direction. But many other actors need to come together to strengthen the five components for sound measurement. We need to all seize the opportunity to forge a new vision and act on it.

Yours sincerely,

Christopher Murray

Figure 1 The shifting global disease burden, as illustrated by causes of death recorded in 1990 and 2017, and forecast to 2040





Note

The global disease burden is shifting. Here this is illustrated by global deaths for all ages recorded in 1990 and 2017 and forecast to 2040. The data demonstrates a continued increase in the proportion of deaths attributable to non-communicable disease.

Source Institute for Health Metrics and Evaluation (IHME). GBD Compare Data Visualization. Seattle, WA: IHME, University of Washington, 2018. Available from http://vizhub.healthdata.org/gbd-compare

The Composite Health Index

If we reposition and prioritise health as our primary asset, acknowledging that health is a key component of an individual's human capital and a healthier population translates to a healthier wider economy, we must measure this, tracking progress to a healthier, fairer future. We now understand the health of an individual and a nation as a whole, to be a result of complex inter-relationships across the commercial, social and biological determinants of health. Indeed, in many instances we know what to do to improve the population's health and have the tools to do so. Despite this, improvements in health and reductions in morbidity have slowed while health inequalities have persisted, and in many instances, worsened.

The UK will be one of the first countries in the world to develop a composite health index which can be used to measure and promote the nation's good health, an asset, rather than retrospectively tracking ill-health. The Composite Health Index will comprise a basket of measures across the three leading domains of health, social determinants of health (e.g., percentage of the population in relative poverty), modifiable risk factors (e.g., prevalence of overweight or obesity or smoking in pregnancy), and health care (e.g., cancer survival) to enable tracking of progress. Crucially, measures of *relative inequalities* would be captured at all levels of the health index to provide transparency and accountability to encourage and monitor policies promoting healthier and fairer populations in years to come.

Supranational organisations, such as The World Bank, can learn from the UK's leadership to develop health indices to sit alongside Gross Domestic Product globally, to ensure health is protected and promoted as an asset to the development and prosperity of individuals and nations alike.

Text kindly supplied by Dr Jonathan Pearson-Stuttard, Imperial College London

Dr Matshidiso Rebecca Moeti, WHO Regional Director for Africa

Dr Matshidiso Rebecca Moeti is the WHO Regional Director for Africa and the first woman to occupy this position. She has led a transformation agenda that is widely acknowledged to have improved the performance and effectiveness of the organization.

Dr Moeti is a medical doctor and public health expert, with more than 38 years of national and international experience. She has been with the WHO Regional Office for Africa, where she has held several senior positions, since 1999.

Dr Moeti will always be remembered for successfully leading WHO's "3 by 5" Initiative in the African Region, improving access to antiretroviral therapy in countries.

Prior to joining WHO, Dr. Moeti worked with UNAIDS as the Team Leader of the Africa and Middle East Desk in Geneva, with UNICEF as a Regional Advisor, and with Botswana's Ministry of Health in various capacities.

Health system strengthening for better health in the world

Dear Dame Sally,

Success on the global commitment to achieving healthy lives and wellbeing for all, at all ages, will depend on how strong countries' health systems are, and on their ability to deliver the needed services and care. However, half of the world's population does not have access to essential health services. I am concerned that service coverage is lowest in the World Health Organization (WHO) African Region and in low-income countries.[1]

There are differences in the status of health systems in the world, both between and within regions and countries. For example, while a minimum health workforce density of 4.45 doctors, nurses and midwives per 1000 population is required for success on the 3rd Sustainable Development Goal (SDG3), the African Region faces the greatest challenge – 37 of the 57 countries in the world that have a density below 2.3 per 1000 population[2] are in the Region.

It is estimated that an additional US$371 billion would be needed to reach the SDG health systems' targets, translating into $271 per capita, an increase on average of 7.5% in the share of national gross domestic product (GDP) spent on health.[3] The major portion of these costs is for the health workforce and infrastructure (including medical equipment). I believe that unless these health systems' elements which constitute the biggest gap in the African Region and developing countries are adequately addressed, the world will not achieve the 2030 SDG health targets.

There is increasing recognition, at the highest political level in countries, of the need for strong health systems. The G20 countries reflected this in their discussion of Universal Health Coverage (UHC), calling for collective action to strengthen health systems worldwide, including through developing the health workforce. Equally, the African Heads of State and Government at the African Union Summit of February 2019 adopted a declaration on health financing for UHC, with strong emphasis on increasing domestic financing.

I wish to emphasise the importance of prioritising the needs of vulnerable and hard-to-reach populations that tend to be left out (including those in urban slums) in all actions and support to improve health systems. The socio-economic and other determinants of health should also be addressed through promoting intersectoral collaboration, while action to ensure synergy between disease-specific programmes and health system efforts are pursued.

The United Kingdom has been at the forefront of providing support for health systems' strengthening. The UK supports countries to strengthen their health systems through bilateral country programmes, multilateral partners, global initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, and non-governmental organisations (NGOs). I appreciate the support provided by Her Majesty's Government for critical aspects of health system resilience such as health information and data, health financing, health security and antimicrobial resistance (AMR), as well as broader action on the prevention and control of diseases.

The UK's commitment as the first G7 nation to spend 0.7% of national income on international aid and its longstanding commitment to tackling malaria makes it the second largest donor to fighting malaria in the world. UK funding for malaria tripled between 2008 and 2014, reaching an estimated £536 million; this has made a significant contribution to the estimated 47% reduction in malaria-related mortality since 2000.

You have personally played a critical role in the progress in global action on AMR, through your 2011 Annual Report, recommending global leadership and action, and as the Chair of the WHO Strategic and Technical Advisory Group (STAG) on antimicrobial resistance. The UK 5 year action plan and 20 year vision for AMR are testimony to your country's leading role in international action on AMR, in collaboration with WHO and other international partners. I look forward to your continued leadership of global action as the UK's Special Envoy on AMR. Your country's support to global epidemic preparedness and response, including WHO's Contingency Fund for Emergencies, builds on the significant contribution to the Ebola Virus Disease outbreak in West Africa.

DFID has developed a new programme called Stronger Health Partnerships for Stronger Health Systems (2019-2023), contributing to strengthening resilience and response to crises, tackling extreme poverty and helping the world's most vulnerable, and supporting countries to achieve Universal Health Care and strengthen health systems. I expect this to be a model that other countries will follow.

Progress has been made but there is more to be done. Support by global partners and in particular by the UK Government has led to significant improvement in the health of the world's population. Accelerating this to achieve global health goals will require considerably increased investment in health systems, especially in countries in the African Region and other developing countries. The improvements in investment in health by these countries will not be adequate to enable then attain the SDGs and will need additional support. Further investment will be required to tap into innovations and enhancing digital health, increasing capacity for implementation research and finding effective ways to fully involve the private sector in health sector development.

What is required is high level advocacy to the governments to significantly increase the domestic financing and improving efficiency in use of the resources. It is critical that the UK and other partners should help build the health systems' capacity of these countries. Support for north to south and south to south collaboration will facilitate learning from best practices. The UK's familiarity with the health systems in the African Region and low-income countries puts the UK in the best position to continue to lead in health systems' strengthening.

Yours sincerely,

Matshidiso R. Moeti

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The Uganda UK Health Alliance – a health consortium model

Global health partnerships and initiatives have contributed significantly to the development of healthcare systems around the world. The alignment and harmonisation of these programs with national priorities however is still a challenge for many countries that lack effective coordination of such undertakings. Governments can be overwhelmed by partnerships and initiatives that have parallel approaches, which affects the implementation of national health strategic plans. There is therefore a need to model interventions that can ensure alignment of global health programs to national priorities, reduce duplication of efforts while ensuring mutual benefit and value for money in collaborations.

Since its launch in 2013, the Uganda UK Health Alliance (UUKHA) serves as an enabler for UK (predominantly first and third sector) organisations who are undertaking healthcare capacity building activity in Uganda. Through its health consortium model, the Alliance does not aim to control or inhibit individual organisational members activity but rather provide a system-platform to allow each member to maximise their impact by linking them to other agencies working in the same geographical region or sharing similar activities. The Alliance also provides a mechanism to assure member organisations that their activities map to the priorities of the Ugandan Ministry of Health and wider government.

Under the Human Resource for Health Program, UUKHA has fostered mutual collaboration between Uganda and the UK in workforce development. An example of this is the Eye Health Consortium which provides an exemplar of how various institutions and NHS Trusts in the UK collaborate with institutions in Uganda to exchange skills and knowledge while supporting comprehensive delivery of eye health services in their respective settings.

In Uganda there is a current focus on integrating eye care services into primary healthcare, however, a shortage of ophthalmologists, opticians, optometrists and ophthalmic nurses is a major barrier to success. The Eye Health Consortium under UUKHA brought together UK organisations and those receiving UK aid support in Eye health to work out strategies of improving eye care services, training and research in Uganda. The consortium[1] set out strategies that have delivered professional exchange between Uganda and UK. These include sharing knowledge and training to ophthalmologists in Uganda by UK experts, and joint eye camps delivered by both UK and Ugandan health professionals which have enabled comprehensive eye care services to be extended to the underserved population. With the close working relationship between the consortium and the Ministry of Health, its activities have been integrated into the National eye health strategic plan.

This approach has built enormous capacity of Ugandan eye care experts and likewise UK professionals report how the joint working with Ugandan counterparts has developed leadership, team work and communication skills.

It appears an Alliance model fills an 'in-country gap' which has been present within the third sector community for many years. The model acts to promote economy of scale, common purpose and attractiveness to donors and funders. The structure and its operational platform mitigate the risk that third sector in-country activity will be in direct opposition to government policy. This model is currently being considered as a mechanism for assisting in the delivery of the Foreign and Commonwealth Office's, Better Health, programme of the UK's Prosperity Fund.

This text has kindly been provided by John-Paul Bagala, Team Lead Uganda UK Health Alliance

https://www.uukha.org/

Reference

1 The Eye Health Consortium consists of Moorfields Eye Hospital, Sight Savers Uganda, Helping Uganda Schools, Diaspora, Eye project Uganda, Kings College London, Great Ormond Street Children's Hospital, The Royal College of Ophthalmologists and Vision 2020
https://www.uukha.org/projects/eye-health-consortium

Dr Ngozi Okonjo-Iweala, Chair, Gavi, the Global Alliance for Vaccines and Immunisation, and Senior Advisor, Lazard

Dr Ngozi Okonjo-Iweala is an economist and international development expert with over 30 years of experience. She is Chair of the Board of Gavi, the Global Alliance for Vaccines and Immunisation. She is also Senior Adviser at Lazard and sits on the Boards of Standard Chartered PLC and Twitter Inc.

Previously, Dr Okonjo-Iweala served twice as Nigeria's Finance Minister, from 2003-2006, and 2011-2015, and briefly as Foreign Minister, the first woman to hold both positions. She spent a 25-year career at the World Bank as a development economist, rising to the No.2 position of Managing Director, overseeing an $81 billion operational portfolio in Africa, South Asia, Europe and Central Asia.

Dr Okonjo-Iweala has been ranked by *Fortune* as one of the 50 Greatest World Leaders in 2015, by *Forbes* as one of the Top 100 Most Powerful Women in the World consecutively for four years, by *Time* as one of the Top 100 Most Influential People in the World in 2014, and by the UK *Guardian* as one of the Top 100 Women in the World in 2011.

Dr Okonjo-Iweala is the author of numerous articles on finance and development, and several books including *Fighting Corruption is Dangerous: The Story Behind the Headlines* (MIT Press, 2018) and R*eforming the Unreformable: Lessons from Nigeria* (MIT Press, 2012).

How the world's poorest economies can afford better health for all

Dear Dame Sally,

In the world's poorest countries, where poor health is often synonymous with poverty, the idea of 'better health for all' may seem like a pipedream. But in fact, not only is this possible, it is already beginning to happen. Many low-income countries have taken great strides towards improving access to healthcare for their people, to the extent that some countries, like Rwanda, are now in many ways actually doing better than far wealthier middle-income countries, such as South Africa, Indonesia and my home country, Nigeria.

For Rwanda, a nation that suffered an horrific and devastating genocide barely a quarter of a century ago, that is simply remarkable. But Rwanda is not alone. Governments of low-income countries are increasingly realising that investing in health is good for the economy. By investing in the right kind of health interventions, and with the right kind of assistance – whether it is financial, technical or political – they are challenging preconceptions. They are showing that it is possible to build sustainable and strong primary healthcare that reaches even the most impoverished and vulnerable populations, and in doing so they are helping to tackle threats to global health security, while boosting their economies at the same time.

The governments of low-income countries are increasingly recognising this and looking at how they can raise more domestic resources for health. As a former Minister of Finance, twice, I know first-hand how challenging this can be. But to improve health for all, it's not just the amount of funds you put into health – whether public domestic resources or development assistance – it's how you allocate it that counts.

For countries with very limited resources, the key is to first focus on cost-effective and high impact health interventions, ones that most benefit the poorest and most marginalised communities. By extending the reach of such interventions, governments can then use them like a platform upon which additional health services can be built.

Child immunisation is a prime example of how this can work in practice, delivering both a highly cost-effective and impactful intervention, but also providing an opportunity to build platforms for additional infrastructure and support.

Childhood immunisation not only protects individuals and communities from infectious disease and prevents epidemics, but every dollar a country spends on vaccination saves US$16 in terms of healthcare costs, lost wages and lost productivity due to illness. If you take into account the broader benefits of people living longer, healthier lives, that rises to $44. That's because a healthy child does not need costly medicines or for parents to stay at home to look after them. A healthy child can go to school, get qualifications and become a more economically productive member of society, while their parents are more able to go to work and have more money to put back into the economy to help it grow. It is a virtuous cycle.

Childhood immunisation also brings with it vital infrastructure and support, such as supply chains, cold storage, trained healthcare staff, data monitoring, disease surveillance, healthcare records and much more. So, when a community gets access to childhood immunisation, it is often not long before they also receive other health services, such as neonatal and maternal healthcare, nutritional supplements, malaria prevention measures, and sexual and reproductive health and education, among others.

In contrast, the impact medical bills can have on the most vulnerable people can lead to a vicious cycle that actually pushes millions of people into poverty. The World Health Organization (WHO) estimates that as many as 100 million people end up below the poverty line every year because of medical costs. A further 150 million face "catastrophic healthcare costs", where 40% of the household budget goes on healthcare after basic needs have been met. So, prevention is not just better than cure, it's also cheaper.

This kind of approach is helping put low-income countries on a path towards achieving the Sustainable Development Goal of universal health coverage, where everyone has access to affordable and quality healthcare, no matter where they live. And, with the right kind of assistance, countries are doing this in a way that enables them to fully fund their health programmes.

The UK Government, which is the largest donor of Gavi, the Vaccine Alliance, of which I am Board Chair, is providing precisely this kind of support. With Gavi, supported countries always contribute towards the cost of vaccines. As their economy grows so too does their contribution, until eventually they pay the full cost. Since 2000 this has allowed Gavi to help countries vaccinate more than 700 million additional children, saving 10 million lives. This translates into $150 billion in economic benefits in the 73 poorest countries. And by 2020, this kind of co-financing model will have seen 20 of these Gavi-supported countries transition out of its support and fully funding their own immunisation programmes, with more to follow. In essence, it is a hand up, not a hand out.

But with one-in-ten children still not receiving any vaccines at all, there is more work to be done, and not just in the poorest countries. By 2030, nearly 70% of these children will be living in middle-income countries because despite relative wealth of these countries, their immunisation programmes are not reaching vulnerable populations and large pockets of inequities are allowed to persist.

There are a multitude of reasons for this, not least the rise of fragility and conflict. But such countries often can and should afford to pay for their own programmes, so instead we need to assist them in making more efficient use of their own domestic resources, to make health a political priority and to help make health systems more resilient to climate shocks and epidemics. As many of their poorer neighbours are demonstrating, with the right kind of approach to health systems – and with creativity, efficiency and innovation – better health is possible for all, even in the world's poorest countries.

Yours sincerely,

Dr Ngozi Okonjo-Iweala

The UK-Jamaica Nursing Exchange Programme

"The experience so far is great. Critical Care is the same concept as at home but for me there is much more technology and staff support which makes the care top notch. Everyone is friendly and helpful; the customer service and patient care is great".

Charlene Red Whyte (Jamaican exchange nurse based at General ICU, Leeds General Infirmary)

"It's been an awesome experience so far. Staff on the NICU are warm and welcoming. They are always willing to teach us something new and also eager to learn from us too."

Monique Patrick (Jamaican exchange nurse based at Neonatal intensive care, Leeds General Infirmary)

The UK-Jamaica Nursing Exchange Programme provides an example of how innovative collaboration between two countries can enable the development of a mutually beneficial relationship in workforce development. The programme was set up to assist the Jamaican Government in tackling the chronic shortage of specialist nurses.

This shortage is severely affecting health service delivery in Jamaica.

The programme, facilitated by Health Education England (HEE) through a Memorandum of Understanding (MoU), is supporting the Jamaican Government's priority to improve the capability and capacity of its nursing workforce. The programme is planned to last for two years. Fifteen registered nurses from Jamaica will undertake work placements at Leeds Teaching Hospital for five months in intensive care areas. They will go back to Jamaica to utilise and share their new skills, knowledge and experience with their own healthcare system.

In return, NHS staff will be given the opportunity to undertake placements in Jamaica to share their knowledge of the NHS system and support the development of quality improvement programmes. A tangible benefit for both countries is to create a knowledge network of healthcare professionals from both the UK and Jamaica to support continuous learning and knowledge beyond the programme itself.

Source Leeds Teaching Hospital, 2019

"The nurses at LTHT are very friendly, warm and eager and willing to help us with our programme. It's new on both sides so at times we are learning together as we go along. It's great to work together to plot the path to success. Awesome experience so far."

Latavya McCarthy – Children's cardiac surgery, Leeds General Infirmary

Leeds Teaching Hospital is an ideal NHS Trust for the partnership because it can provide the necessary expertise in, and intensity of, care delivery to collaborate in delivering the critical care training and exposure required. Crucially, Leeds also has an existing Jamaican population who are offering pastoral support essential to helping the nurses to integrate into local communities whilst on their placements.

This programme is a unique way of training international nurses to the highest standard and serves as a historic partnership for both countries and nurses globally. It is hoped that in the future the UK will develop similar partnerships that sees exchanges of staff for mutually-beneficial learning and experience in different health economies.

The MOU, which sets out the expectations of the programme, was officially signed by Professor Sally Davies and Dr. the Hon. Christopher Tufton, Health & Wellness Minister in Jamaica, at the World Health Assembly in Geneva, Switzerland on Thursday, May 23rd 2019. The first cohort of nurses arrived in Leeds on Friday 14th June 2019.

> *"We welcome the Jamaican nurses who have arrived in the UK to begin their journey of learning in Leeds Teaching Hospitals. This is the start of what we hope will be a mutually-beneficial relationship with the Jamaican Government that will see nurses from the Caribbean further develop their skills and competencies and UK multi-disciplinary staff travel to Jamaica to provide support for the nursing workforce there. This is an exciting partnership that will benefit patients both in the UK and Jamaica."*
>
> Tracey Collins – Head of Global Nursing at Health Education England

Source Office of the Chief Medical Officer, UK 2019

This Case Study was kindly provided by Department of Health and Social Care, in collaboration with Leeds Teaching Hospitals and Health Education England

Michael Bloomberg, Entrepreneur and Philanthropist

Michael R. Bloomberg is an entrepreneur and philanthropist who served as Mayor of New York City from 2002 through 2013. While in office, Bloomberg implemented ambitious public health programs, and New Yorkers' life expectancy rose 36 months – 2.2 years longer than the national average.

As a philanthropist, Bloomberg's lifetime giving has exceeded $8 billion. His investments in public health total more than $1 billion, and include initiatives to eradicate polio, reduce obesity, tobacco use, and drowning, and improve road safety and maternal health. In 2016, he launched the American Health Initiative at Johns Hopkins University to tackle declining life expectancy in the United States, and in 2017, started the Partnership for Healthy Cities, a global network of cities committed to confronting noncommunicable Diseases and injuries. In recognition of his efforts, the Johns Hopkins Bloomberg School of Public Health was renamed in his honor, and he is currently the WHO's Global Ambassador for Noncommunicable Diseases.

Bloomberg leads a number of coalitions taking action on urgent issues in the United States, such as gun safety and climate change, and serves as the UN Secretary-General's Special Envoy for Climate Action. He is co-author, with Carl Pope, of the *New York Times* bestseller *Climate of Hope: How Cities, Businesses, and Citizens Can Save the Planet*.

Why cities have the power to improve global health

Dear Dame Sally,

A city can be good for your health.

During 12 years as mayor of New York City, we showed that a city can take the lead in fighting disease, improving public health, and extending life expectancy. When we left City Hall after 12 years, the life expectancy of New Yorkers had increased by three years, two years longer than the national average.

Cities are increasingly driving progress on some of the most pressing challenges the world faces – from climate change and road safety, to obesity and tobacco use. They are making an impact not only locally, but also beyond their borders, as the best ideas spread and drive advances in public health worldwide. That is the idea behind the Partnership for Healthy Cities (PHC), a program that Bloomberg Philanthropies is leading with the World Health Organization and Vital Strategies. The Partnership works with mayors and local leaders, including London Mayor Sadiq Khan, to improve global public health through policies started at the city level. To date, the Partnership has recruited 54 cities in every region of the world to take on different challenges.

It's common sense to mobilize cities to improve health because, increasingly, that's where the majority of the world's people are living. According to the United Nations, over half the world's population now lives in urban areas. By 2030, that figure is expected to grow to 60%.

Cities are well-positioned to tackle the world's leading causes of death and suffering, because of their authority to adopt and implement public health policies and programs. Injuries and noncommunicable diseases (NCDs) – including heart disease, stroke, cancer, respiratory diseases, and diabetes – kill 45 million people each year, accounting for 80% of all deaths globally. The Partnership connects and supports mayors of cities around the world who are committed to reducing those numbers.

Each Partnership city focuses on one of 10 proven interventions to prevent NCDs and injuries. Those interventions are: creating a smoke-free city; banning tobacco advertising; reducing sugary drink consumption; promoting healthy food for all; creating livable streets; promoting cleaner fuels for cleaner indoor air; reducing drink driving; reducing speeding; increasing seat belt and helmet use; and monitoring NCD risk factors. The Partnership provides up to $100,000 in support for each city, to help them evaluate their efforts' effectiveness.

Cities are pursuing bold new strategies to curb NCDs. Quito, Ecuador is eliminating junk food in schools. Shenzhen, China is banning e-cigarettes indoors. And Accra, Ghana is implementing speed reduction measures at a dangerous intersection in the heart of the city, to reduce injuries and deaths from road traffic crashes. In London, Mayor Khan's administration is pioneering a comprehensive approach to improving childhood nutrition, the Healthy Early Years London program. The child obesity rate in London's poor neighborhoods is more than double the rate in affluent neighborhoods.

London is committed to addressing such health inequalities by providing nurseries, children's centers, playgroups, and caregivers to help teach children the importance of healthy eating and exercise. After a successful pilot phase, the program is now expanding to 13,000 settings across the city.

With support from the Partnership, London will evaluate its comprehensive approach to promoting children's health and wellbeing. Then, if London proves that it works, it may move the UK to implement a similar plan on a national scale.

In London and beyond, the Partnership's efforts reflect the power of local leaders to identify urgent health challenges and take action. More mayors are turning their cities into policy labs, testing out big ideas to fight NCDs. What emerges from these efforts will be useful models for other cities, regions, and even countries. The lessons learned from all of these efforts will offer opportunities to build on what works – and build a healthier, happier world.

Yours sincerely,

Michael R. Bloomberg

School stores in Quito, Ecuador

In Quito, Ecuador, where 30 percent of children aged 6 to 12 are overweight or obese, the city's work in the Partnership for Healthy Cities focuses on improving the quality of food sold in school stores. Mayor Mauricio Rodas has been an especially strong advocate for this and other efforts to improve childhood nutrition. In 2018, Mayor Rodas said that "All levels of government should be part of this…and money should be focused on communication about healthy lifestyles."

Quito has completely transformed six schools with Partnership for Healthy Cities support, reaching 13,000 children, not just by replacing junk food with fresh options and traditional, unprocessed dishes, but also through teacher training and outreach to parents on the importance of eating more fruits and vegetables. Soon, interactive tools will help residents of the city improve their diets with simple, accessible information and recipes.

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Road fatalities in Accra, Ghana

Road fatalities in Accra, Ghana seemed until recently like an inevitable byproduct of economic growth. Residential neighborhoods, shopping districts and schools have grown up around high-speed highways with people increasingly needing to rush across multi-lane traffic without protections.

In 2018, a road death sparked riots. "It's time now to get serious about the high death toll," wrote Mayor Mohammed Adjei Sowah in an April 2019 opinion column in Africa Report. Accra has partnered with Bloomberg Philanthropies' Partnership for Healthy Cities initiative to reduce road traffic deaths. Partnership for Healthy Cities' intervention has focused on the crash-prone Lapaz highway crossing, responsible for 16% of road crashes in Accra, with new signaling and other pedestrian protections as well as a range of speed-reduction measures.

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Renu Swarup, Secretary, Department of Biotechnology, Ministry of Science & Technology, Government of India and Chairperson BIRAC, New Delhi

Dr. Renu Swarup is the Secretary, Government of India heading the Department of Biotechnology, Ministry of Science and Technology. She has served in the Department of Biotechnology for nearly 30 years. A postdoctorate from The John Innes Centre, Norwich UK, Dr. Swarup's principal area of research has been Genetics and Plant Breeding. She was also closely involved in programmes and activities related to planning, policy and science management in areas of biotechnology specifically bioresource development and utilization, Energy Sciences, Plant and crop sciences and in women & science. Dr. Swarup was actively engaged in the formulation of the Biotechnology Vision in 2001, National Biotechnology Development Strategy in 2007 and Strategy II, 2015-20 as the Member Secretary of the Expert Committee. She is currently responsible for all biotechnology related activities in the country which, in addition to policy, planning, promotion also focus on research, innovation, translation and commercialisation across sectors of health, agriculture, clean energy and environment. International collaborations also occupy a significant position.

In addition to her current role, she holds the position of Chairperson, Biotechnology Industry Research Assistance Council (BIRAC), a Public Sector Company incorporated by the Government to nurture and promote innovation research in the biotech enterprise with special focus on start-ups and SMEs.

The future of science: an exciting journey

Dear Dame Sally,

The journey of science – India and the world

The Indian Government has pledged its commitment to achieving the United Nations (UN) Sustainable Development Goals (SDGs) and is working actively towards achieving the ambitious targets set out in the 2030 Agenda for Sustainable Development. Science research and innovation play a role in almost all of the SDGs. This is especially true for SDG 3: Good health and well-being for all. Faced with the myriad health challenges that an increasingly globalised world is facing today, with inequitable impacts and outcomes for developing countries, innovative interventions for health and wellbeing are a moral imperative.

The Government of India plays a major role in supporting a robust science, technology and innovation ecosystem to allow research and innovation, both in the public and private sectors, to develop and grow exponentially to provide innovative solutions and interventions of huge impact to the public health system.

The last five years have seen a surge in the growing biotech innovation ecosystem in India. From the strong foundational base of cutting-edge science to a well-established translational ecosystem, the critical components of the growing biotechnology sector have been strengthened and the vibrant ecosystem has connected students and young researchers from the public sector, academia, and the private sector.

Established in 2012 by the Department of Biotechnology, Government of India, with the vision to 'stimulate, foster and enhance the strategic research and innovation capabilities of the Indian biotech industry, the Biotechnology Industry Research Assistance Council (BIRAC) is also playing a transformative and catalytic role in building a US$ 100 billion Indian Bio-economy. BIRAC focuses on funding and mentoring start-ups and SMEs, for creation of affordable products addressing the needs of the most vulnerable section of society.

With the increasing number of strategic collaborations and the growing globalised virtual ecosystem, science and technology are playing a key role in strengthening bilateral and multilateral cooperation. Science diplomacy has, over the years, exhibited strength in bringing together teams across nations to collectively solve global challenges and greatly improve international relations.

India is seen as a preferred destination for science and technology collaboration and we have moved from being receivers of technology to co-development partners. India has played a key leadership role in many bilateral regional and multilateral co-operations. India has partnerships with over 80 countries in biotechnology and is also a major contributor to multilateral cooperation-across the G-20, BRICS (Brazil, Russia, India, China, and South Africa), European Union, Bangladesh, India, Mynamar, Sri Lanka, Thailand, Economic Coperation (BIM-STEC), Association of South-Eastern Nations (ASEAN) partnerships.

India and the UK: an exciting partnership

The Department of Biotechnology (DBT), Government of India has one of the longest standing, productive partnerships with the UK, both with government agencies and other bodies, which has spanned over 20 years and has greatly benefitted, science, technology and innovation cooperation in both countries.

With varied models of partnership ranging from researcher and student exchanges to joint collaboration research in high priority areas, to joint centres of excellence, the partnership has greatly benefitted not only the public sector but also private sector co-operation, start-up and entrepreneurial research. Collaboration between incubation centres is a new model of partnership that has now been taken up.

Today, the DBT has partnerships with the Biotechnology and Biological Sciences Research Council (BBSRC), the Medical Research Council (MRC) and the Natural Environment Research Council (NERC), and the Science and Technologies Facilities Council (STFC) under UK Research and Innovation (UKRI). From agriculture to health to clean energy and environment, the DBT-UK government partnership spans diverse sectors, that are of importance to both partners. Today, the DBT and UKRI together support over 75 projects in India in areas of food security and agri-technology, environment, health and energy.

The unique aspect of this country-level partnership is that it manifests as both inter-government co-operation as well as government co-operation, with UK-based organisations such as the Wellcome Trust, Innovate UK, Research England, Cancer Research UK, University of Cambridge among others.

The DBT-Wellcome India Alliance is an £80 million initiative funded equally by Wellcome Trust, UK and the DBT. The broad aim of the Alliance is to build excellence in the Indian biomedical scientific community by supporting future leaders in the field. Over 10 years, 320 fellowships at 93 institutions across 34 Indian cities have been granted to research fellows from across the world to work in India.

Both countries are also working together to identify new areas of common interest. There is a huge emphasis on the 'One Health' approach by both partners and major initiatives have been launched on human, animal and environmental health and tackling issues related to antimicrobial resistance (AMR). The DBT is also the Indian partner for the Longitude Prize by Nesta for diagnostics addressing AMR.

The future

As we look forward it is difficult to envisage what this journey would look like 10 years from now, given the dynamism and disruptive nature of the field. All that we are sure of that it will be a journey of continued passion and excitement on both sides. A journey, which will combine disruptive, cutting-edge technologies with technologies of human impact, and will give scientists, researchers, policy makers on both sides opportunities to look at and implement new models of co-operation and partnership.

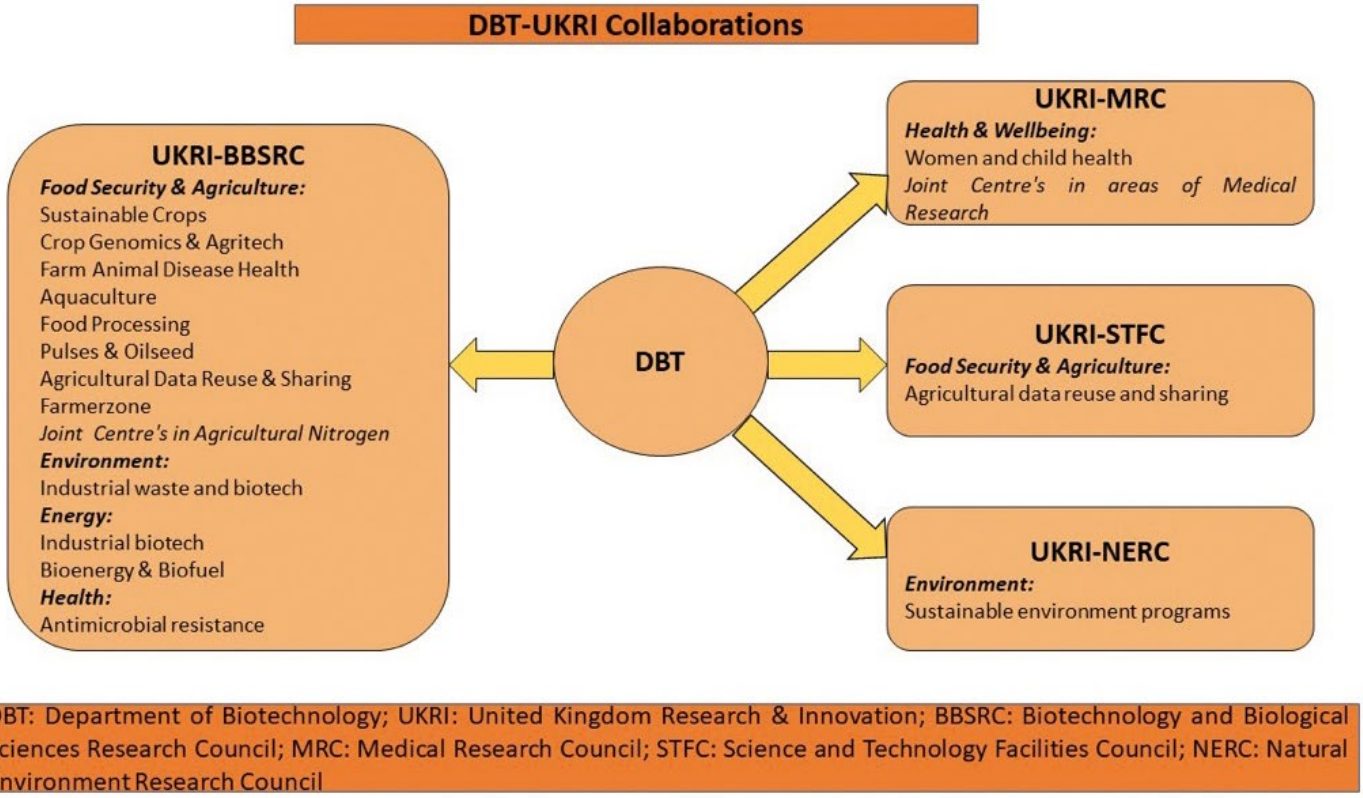
We are very quickly moving from bilateral co-operation to multilateral co-operation for funding innovative solutions for global challenges.

This journey must continue, the partnerships need to grow exponentially. I am confident that India and the UK will continue to play a central role in addressing key challenges of global concern.

Yours sincerely,

Dr Renu Swarup

Figure 1 DBT-UKRI Collaborations



DBT: Department of Biotechnology; UKRI: United Kingdom Research & Innovation; BBSRC: Biotechnology and Biological Sciences Research Council; MRC: Medical Research Council; STFC: Science and Technology Facilities Council; NERC: Natural Environment Research Council

The Science and Innovation Network

The Science and Innovation Network (SIN) consists of over 100 officers covering 47 different countries. It operates across major markets (US, China, India), emerging markets (Latin America, Asia-Pacific, Africa) and other, traditional markets (Australia, Canada, New Zealand). We deliver through bilateral work and by influencing science policy and programmes. This work is underpinned by creating and maintaining networks of stakeholders and influencers in the science and research sectors. SIN covers a wide variety of topics and collaborations, including Artificial Intelligence (AI), technology, climate change and global health. The Science and Innovation Network was a unique tool in the UK's 2016 campaign to raise awareness of antimicrobial resistance (AMR).

UK Japan – Partnership in Global Public Health

SIN Japan has been supporting the Department of Health and Social Care (DHSC) to strengthen the UK-Japan partnership on global public health. Practical activities include the regular exchange of public health doctors, learning from each other's public health methods, working together on emergency preparedness and increasing UK Japan research collaboration. Japan is a world leader in global and national public health, with health outcomes amongst the world's best. Japan has significant expertise in preparing for and responding to, emergencies. Japan is also a key partner for the UK in the global battle against AMR and infectious diseases.

In May 2017, SIN Japan organised a visit by the Chief Executive of Public Health England (PHE) to Japan. During the visit, PHE and Japan's Ministry of Health, Labour and Welfare (MHLW) signed a Memorandum of Understanding to underpin the development of joint work on infectious diseases, outbreak management, AMR and health emergency preparedness; as well as public health planning and response planning for mass gathering events. Since the visit, SIN Japan have been working closely with DHSC, PHE and partners in Japan to further strengthen these links. As a result, MHLW have put in place a regular secondment programme with PHE, to send medical officials to the UK for one year at a time. This has enabled the exchange of expertise on both sides, helping both countries better understand and address public health issues, for example AMR surveillance systems, rabies control, vaccination strategies and emerging infectious diseases.

In addition, a legacy of the 2012 London Olympics is PHE's commitment to share best practice on public health planning, including emergency preparedness, with countries around the world. With SIN Japan's support, PHE have been working with Japan's National Institute of Infectious Diseases and MHLW to improve infectious disease surveillance systems for the Tokyo 2020 Olympic and Paralympics. SIN Japan held a joint seminar with MHLW in October 2018 that focused on coordination between central and local government. This in turn has led to an agreement to conduct joint research on mental illness after natural disasters in both countries and in other countries.

Text kindly supplied by Griff Jones, Yumiko Myoken, SIN Team Tokyo, and James Crean, Science and Innovation Team, Foreign and Commonwealth Office

Section 3

Security

Bill Gates – Co-chair of the Bill & Melinda Gates Foundation

Bill Gates is co-chair of the Bill & Melinda Gates Foundation. Along with Co-chair Melinda Gates, he shapes and approves grantmaking strategies, advocates for the foundation's issues, and helps set the overall direction of the organization.

Disease elimination and eradication

Dear Dame Sally,

I am delighted that you are focusing your annual report this year on global health. Thank you for inviting me to contribute some thoughts on why eradicating certain diseases should be one of our shared goals. The progress we've made toward disease eradication is a remarkable story, and I wish more people knew about it – and about the important role the UK has played.

Our generation has witnessed an incredible improvement in the human condition. My favourite graph begins in the year 1990 and shows a line steadily dropping downwards: Over the past three decades, the number of children who die before their fifth birthday has fallen by half, even as the number of children being born has increased.

This progress hasn't happened because we're lucky. It's been because of a global effort to deliver vaccines and other building blocks of primary healthcare around the world – an effort in which the UK has played an indispensable part. As a result, we have made dramatic advances against many of the diseases that used to cut short children's lives – or limited their potential. In fact, now some diseases can be defeated once and for all.

Take polio as an example. In 1988, there were 350,000 people in 125 countries being paralysed every year by polio. But that same year the world established the Global Polio Eradication Initiative to immunize children against the disease. Since then, we've seen a 99.99% reduction in cases, down to 33 cases of wild poliovirus last year. Today, the virus is endemic in just three nations – Nigeria, Afghanistan and Pakistan.

Polio isn't the only disease on the verge of eradication. There are more that realistically could be ended within our lifetimes. Malaria, guinea worm and sleeping sickness are all within our ability to wipe off the face of the earth, if we can unlock the innovations, the resources and the political will to do so.

Eradicating a human illness isn't an easy job. The world has only done it once before, with smallpox, which was declared gone from the planet in 1980 after decades of tireless immunization campaigns. Consigning other illnesses to the dustbin of history will require efforts of similar scale and skill: It will take more rigorous surveillance systems, more efficient supply chains, and more and better trained health workers. These workers will also have to travel to some of the hardest-to-reach parts of the world because that is where the last few cases of a disease tend to be.

For those diseases where it is feasible, I believe that eradication is worth the effort. For one thing, it's the right thing to do. Many of the diseases we're talking about – like polio and malaria – were eliminated long ago in nations like the US and the UK. And if we've eliminated them here, I don't think it's right to argue that we shouldn't do it everywhere; where you live shouldn't determine whether you live.

But the argument for eradication is not simply a moral one. These diseases take a huge financial toll too, in the cost to health systems, and the days of school and work that are lost to sickness. So eradicating a disease helps grow economies. The global effort to eradicate polio has saved more than US$27 billion in health costs since 1988, and generated billions more in economic development.

Eradicating one disease also helps us fight others. Malaria is a good example. It makes people more susceptible to other illnesses, and by removing malaria from the equation in one area we can disproportionally lower mortality there.

In some cases, eradication initiatives can even help us to respond to new threats. The polio programme set up an Emergency Operations Centre in Nigeria with the goal of helping with eradication efforts. Neither the polio team nor the Nigerian government expected the centre's resources would be used to fight a different kind of outbreak, but that's exactly what happened during the 2014 West Africa Ebola outbreak when cases started appearing in the country. The Nigerian government used the centre to stop the disease in its tracks. The outbreak was confined to just 19 cases.

Most importantly, we need to pursue eradication where it's a feasible target because it will be the most cost-effective way in the long-term to fight a disease. Diseases like malaria don't stay the same. They evolve and mutate, developing resistance to the treatments we currently use. If we don't eradicate them, eventually we'll need to find new ways and new tools to fight them – and that will take even more effort and money – and in the meantime, those diseases have a potential to spread with a vengeance.

Fighting a disease, after all, is sort of like fighting a fire: If you only put out some of it, the rest will come roaring back. Projections show what would happen if we stopped trying to eradicate polio today: By the year 2029, as many as 200,000 children would be infected annually. In other words, the number of new cases would be back where it was 30 years before.

Countries most affected by these diseases are increasingly leading eradication efforts, but the scientific expertise of nations like the UK is still very much needed to stay ahead of these diseases. The UK is a hub of health research, and at the forefront of the genome revolution. Your researchers are developing the new drugs, vaccines, diagnostics, vector control products and disease modelling that we need.

The UK's political and financial support are also essential. Over the past 20 years, this nation has been one of the biggest contributors to the health organisations that have marshalled the world's resources to buy medical supplies – and then built the global network to deliver the goods.

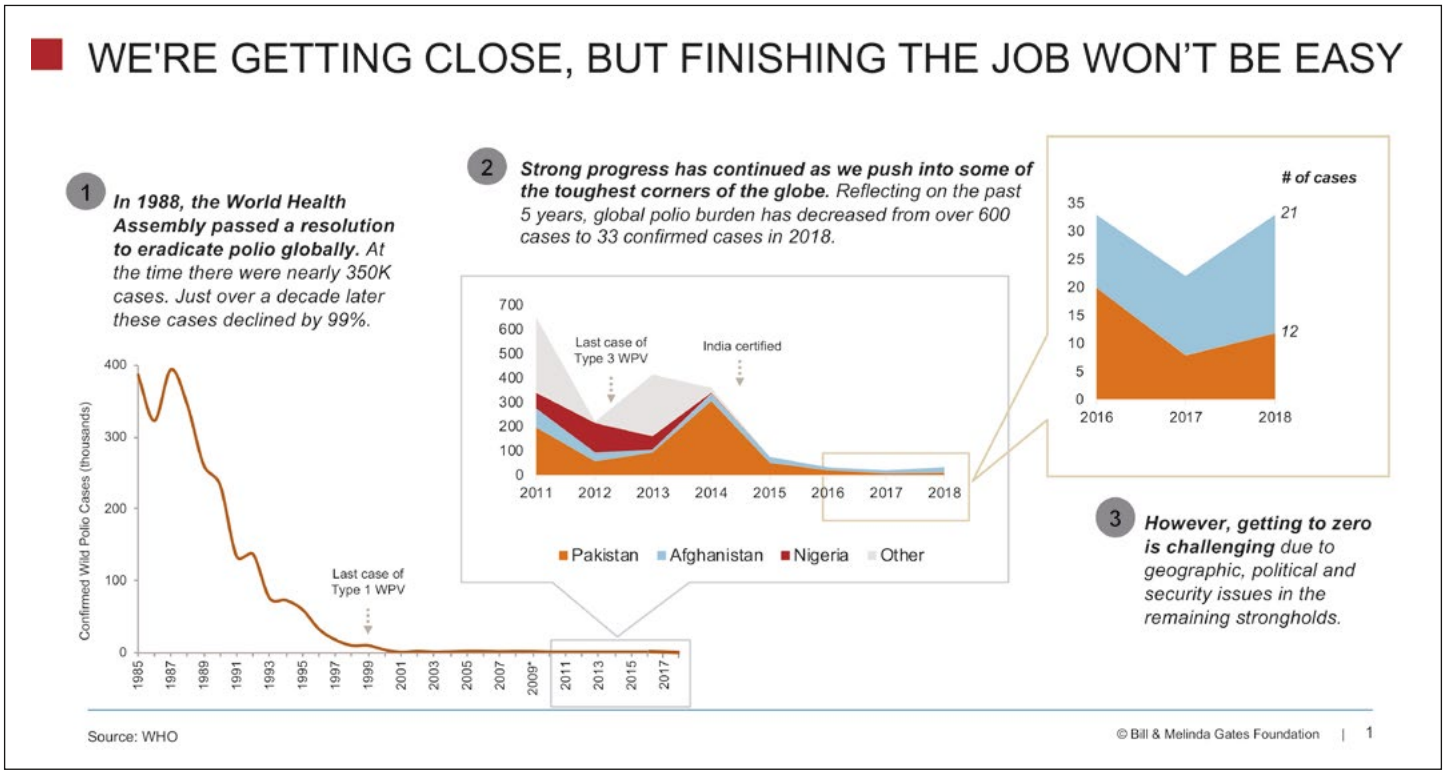
For example, the UK Government has recently announced renewed funding for the Global Fund to Fight AIDS, Tuberculosis and Malaria that will help save 16 million lives over the next three years. The UK's funding will distribute 92 million mosquito nets to protect children and families from malaria – an essential tool to save lives while we develop the innovations that will allow us to reach our goal of eradication.

The UK has been at the forefront of fighting disease for centuries. On May 14, 1796, a doctor in Gloucester, England inoculated a local eight-year-old boy – the son of his gardener – with a disease called cowpox. For many years, the doctor, Edward Jenner, had suspected that catching cowpox might prevent someone from catching the much deadlier smallpox, and he was right. The gardener's son was Jenner's first documented vaccination – a phrase and process he invented – and two hundred years later, smallpox was gone from the world.

Eradicating the first disease in history started here in the UK, with a bit of inventiveness and hard work. I believe eradicating the next diseases will happen in the same way, with UK science, innovation and financial leadership at the forefront.

Sincerely,

Bill Gates



Malaria Innovations

Next Generation Bed Nets

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Widespread uptake of bed nets has helped reduce malaria deaths by more than 60 percent globally since the early 2000s, but some mosquitoes are developing resistance to the insecticides used in these nets. To address this challenge, the *Innovative Vector Control Consortium* at the Liverpool School of Tropical Medicine is working with leading agrochemical companies and other partners to develop bed nets treated with new combinations of long-lasting insecticides, for more comprehensive and durable protection.

New Medicines

©Gates Archive/Ilan Godfrey

Plasmodium vivax malaria, a form of the disease common in Asia and Latin America, caused an estimated 7.4 million cases in 2017. People infected with this form of malaria have historically needed a two-week course of treatment to prevent relapse of the disease. In 2018, Me*dicines for Malaria Venture* and UK pharmaceutical company *GlaxoSmithKline* announced regulatory approval of a **new treatment – tafenoquine – which cures the disease in most individuals in a single dose**, providing a simpler and more efficient alternative for patients.

Malaria Innovations (continued)

Genetic Vector (mosquito) Control

©Bill & Melinda Gates Foundation/Michael Kemp

Advances in gene editing technology are opening new doors in the fight against malaria and other diseases. *Target Malaria*, an international research consortium coordinated by Imperial College London, is investigating the use of a **genetic editing technique called gene drive**, which would spread an infertility gene through malaria-carrying *Anopheles gambiae* mosquitoes to reduce their populations in areas affected by the disease. Gene drive has shown promise that could one day be a vector control tool that could help dramatically reduce the burden of malaria

Advanced Disease modelling

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Staying one step ahead of malaria will require a better understanding of the timing, location and burden of the disease, as well as resistance to existing tools in affected communities. At *Imperial College* London, Dr. Azra Ghani and her team are **pioneering advanced disease modelling techniques to inform more effective delivery of malaria interventions to the people who need them most**. Her research helps organizations like the *Innovative Vector Control Consortium* to optimize their approach and increase their impact.

Suwit Wibulpolprasert, Global Health Advisor, Ministry of Public Health, Thailand

Dr Suwit Wibulpolprasert is a public health specialist and policy advocate at national and global level. He began his career as a Director and practitioner in rural areas and has worked for the Thai Food and Drug Administration, the Bureau of Health Policy and Planning, as Deputy Permanent Secretary, and as senior expert in Health Economics and Disease Control. His current position is as Global Health Advisor to the Ministry of Public Health, Thailand.

Dr Suwit was the first Programme Director when Thailand started Universal Health Coverage (UHC) in 2001, has been a member of the National Health Security Board and chaired the National Essential Drug List committee. In addition, he is a board member of the National Electronics and Computer Technology Center, the National Nanotechnology Center, the Executive Board of the National Health Commission Office and Chair of the Committee for Yothi Health Innovation District Development.

Dr Suwit is also Vice Chair of the International Health Policy Program Foundation and the Health Intervention and Technology Assessment Foundation, Chair of the Institute for the Development of Human Research Protections Foundation, Chair of the Health and Society Creation Foundation, Chair of Road Safety Policy Foundation and Vice Chair of Health Professional Education Foundation.

Global Health Security: Are we doing our best?

Dear Dame Sally,

Are we doing our best to tackle emerging infectious diseases?

In 1918, between 50 and 100 million people worldwide died from Spanish flu. Science, surveillance and our health systems have changed markedly since then, but the threat of a global infectious disease pandemic remains. Accelerating factors like globalisation, urbanisation, a growing population and climate change have contributed to an increasing number of outbreaks of emerging pathogens in recent decades.

Furthermore, 90 years since Sir Alexander Fleming discovered penicillin we are now facing the rising threat of antimicrobial resistance (AMR). As resistance grows and our treatment options deplete, we are at the brink of "having no effective antimicrobials against super bugs!"

In 2007, the World Health Organization (WHO) adopted the International Health Regulations (IHR) 2005. These legally binding instruments of International Law make countries work together to save lives endangered by the international spread of diseases. If used consistently, these could be a vital tool for rapid detection, response and control for the global public health community. However, in 2014, only one-third of WHO member states reported meeting the minimal core capacity standards of IHR 2005.[1] This highlights the challenges in achieving effective global public health preparedness and response.

The 2009 swine flu pandemic H1N1 awakened the global community to an inefficiency in the detection and response to emerging infectious diseases (EIDs), and in particular multi-country outbreaks. Subsequently, WHO has declared public health emergencies of international concern (PHEIC) for many outbreaks emphasising this challenge: Middle East respiratory syndrome coronavirus (MERS-CoV) in the Middle East and Korea (2012), Zika virus and microcephaly in 2016, and the Ebola epidemic in West Africa (2014–2016).

The recent Ebola outbreaks in the Democratic Republic of Congo have now been going on for more than one year, and have spread into a neighbouring country. In July 2019 WHO declared a PHEIC at the fourth meeting of the Emergency Committee on this topic.

What has the UK done?

The UK has always been at the forefront of global health security and preparedness. The UK has engaged globally and contributed almost £500m since 2015 to supporting projects aimed at "developing a world safe and secure from infectious disease threats and promotion of Global Health as an international security priority".[2] An IHR strengthening project has been co-ordinated by Public Health England to support other countries to build public health technical capabilities and enhance compliance with the requirements of the IHR 2005.[3] This is further supported by the development of the UK Public Health Rapid Support team (PHRST) which was established to respond directly to public health threats to prevent them turning into health emergencies. The UK PHRST also work to support countries to build their own capacity for an improved response to future threats.

As you will know yourself Sally, the UK is also one of the most proactive global leaders tackling antimicrobial resistance (AMR). The UK Government has demonstrated many achievements on this agenda; a series of reviews on AMR since 2014-2016, reducing antibiotic use in both humans and animals, and importantly providing funding to improve laboratory capacity for diagnosis and surveillance of AMR in low-income countries. Between 2013-2017, overall antibiotic consumption in both humans and animals in the UK dropped by 19%, of which 6% in humans and 35% in animals.[4] More recently, the government's 20-year vision and 5-year national action plan for containing and controlling AMR by 2040 has been published – taking a 'one health' approach, addressing AMR in humans, animals and the environment.

What's next for the UK?

To protect the health and safety of its people, governments must increase the capacity of their own health systems for timely and effective prevention, detection, and response to public health threats.[5] In global health security, you are only as strong as your weakest link. The failure of control measures in one country has the potential to put other countries at risk. We need strong collaboration among countries, and not only within the IHR vertical structure. We need semi-formal networking of countries and experts in a horizontal manner, for example the Mekong Basin Disease Surveillance Network, the Ending Pandemic Threats network, and the linkage of the United Nations Tripartite agencies (WHO, Food and Agriculture Organization and World Organisation for Animal Health). By interweaving these horizontal approaches with the vertical structure of the IHR programme, we will be able to form a strong "Social Disease Control Fabric".

The UK should continue to build and support a network of integrated, multi-stakeholder, multi-sectoral approaches to both pandemic preparedness and AMR. This should be continued by building up the capacities of other countries at all levels, based on a trusted "One Health Approach", recognising the inter-dependencies of humans, animals and the environment.

We need more global leaders to commit to these issues. There are many champions in the UK for pandemic preparedness response, especially you Dame Sally. You are well supported by leaders in the vertical, political and bureaucratic systems, and also committed professors, health professionals and social activists. The focus of the UK on building up individual and systems' capacities can inform future approaches around the world. Together, we can identify and support more champions to fight global health threats.

As one of the top five global economies and with its strong global spirit, the UK should not be "trying to do its best", but to do better than the best to fully achieve the goal of "a world safe and secure from infectious disease threats".

"It's no use saying, 'We're doing our best.' You have got to succeed in doing what is necessary."
– Sir Winston Churchill

Yours sincerely

Dr Suwit Wibulpolprasert

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The UK Public Health Rapid Support Team (UK-PHRST)

In 2016, Public Health England and the London School of Hygiene and Tropical Medicine were commissioned and financed by the Department of Health and Social Care to establish a UK Public Health Rapid Support Team (UK-PHRST). The UK-PHRST was established to contribute to the UK's public health response to outbreaks in low- and middle-income countries (LMICs) to prevent these events from becoming larger public health emergencies. In addition to outbreak response, the UK-PHRST mandate includes conducting operational and other research on outbreak-prone diseases to provide an evidence base for optimal response, and capacity building for response from within LMICs. This comprehensive approach aims to "put out the fire, identify the causes of the fire, and provide the means to prevent future fires".

The UK-PHRST operates through a full-time, core, deployable team consisting of specialists in epidemiology, laboratory microbiology, infection prevention and control, clinical case management and clinical research, social science, data management and logistical support who are available to deploy to disease outbreaks within 48 hours. The core deployable team is complemented by fellows from the field epidemiology training programme as well as a cadre of reservists from across the UK who provide surge capacity and specialist expertise when needed. In addition to contributing to the UK's response capability overseas, this approach provides important professional and personal development opportunities, honing skills that enhance capacity for outbreak response closer to home, in the UK and European countries.

The UK-PHRST research programme revolves around five themes:

1) Epidemiology (including disease modelling and mapping),

2) Patient-centred clinical research (led by contractual arrangement with the University of Oxford),

3) Microbiology (including novel diagnostics and real-time sequencing),

4) Social science, and

5) Mental health and wellbeing (led by contractual arrangement with King's College London).

The UK-PHRST is rapidly becoming a global leader in the field, called upon frequently by both national governments and the World Health Organisation (WHO) to lend a hand in outbreak situations. The work of the UK-PHRST has been recognised by Bill Gates recently who included the team as one of his "Global Health Heroes. (https://www.gatesnotes.com/Health/Meet-the-virus-hunters).

To date, the UK-PHRST has deployed to ten outbreaks, including pneumonic plague in Madagascar, diphtheria in the displaced Rohingya population in Bangladesh, Lassa fever in Nigeria (see case study), and the current Ebola Virus Disease outbreak in the Democratic Republic of the Congo. For this latter outbreak, the UK-PHRST has been one of the major international responders since the very early stages, providing epidemiologic, data analytic, clinical research, and other strategic support at the request of WHO.

Lastly, the UK-PHRST is engaged in a broad range of capacity building endeavours in LMICs to support training of African public health workers and laboratory scientists in collaboration with Africa Centre for Disease Control, WHO, and local partners in Nigeria, Sierra Leone, and Sudan. The ultimate goal of the UK-PHRST is to help build sufficient capacity for outbreak response so that outside support would no longer be required, to paraphrase James Bryce, to "labour incessantly to destroy the reason for our existence."

See case study on next page

Case Study UK-PHRST action against Lassa fever

Lassa virus causes a potentially fatal haemorrhagic fever syndrome that, in its most severe form, is similar to Ebola virus disease. The virus is carried by a rodent called the "multimammate rat", which is found across West Africa, infecting humans exposed to infected rodent excreta, with occasional secondary transmission between humans, including to healthcare workers. There are estimated to be hundreds of thousands of infections and tens of thousands of deaths due to Lassa fever every year, with transmission usually peaking during the dry season.

Outbreak Response: Putting out the fire

Lassa fever reached epidemic proportions in Nigeria during the dry seasons of 2018 and 2019, prompting the Nigerian Centres for Disease Control to request support from the UK-PHRST. The UK-PHRST quickly deployed personnel to provide epidemiologic, laboratory, and logistical support to Nigeria to help bring the outbreak under control.

Research: Identify the causes of the fire

The UK-PHRST is collaborating with investigators in Nigeria and Sierra Leone – two countries where Lassa fever is hyperendemic and often leads to epidemic spread – to fill key knowledge gaps regarding this dangerous disease. These include studies exploring the clinical evolution and pathogenesis of Lassa fever and looking at the pharmacokinetics of ribavirin, a drug used to treat the disease but whose efficacy and mechanism of action remains to be determined.

In the laboratory, the UK-PHRST is working on the development of a less invasive diagnostic antibody test that can be performed on saliva (as opposed to on blood), which will facilitate field studies on risk factors for transmission. The UK-PHRST is also engaged in social science research to better understand healthcare seeking behaviour for febrile illness in an effort to encourage early recognition and presentation of care for people with Lassa fever, potentially allowing rapid implementation of life-saving care.

Capacity Building: preventing future fires

With an eye to the long-term, the UK-PHRST is helping to development clinical research capacity at the Kenema Lassa Ward in Kenema, Sierra Leone, one of the major care centres for the disease in West Africa. This will facilitate the study of novel therapeutic agents and vaccines for Lassa Fever, with the hope of ultimately being able to prevent the disease. In addition to enhancing the physical infrastructure in Kenema, the UK-PHRST has sponsored the training of local physicians in the use of various techniques, such as echocardiography to assess cardiac function, to better understand the pathophysiology of Lassa Fever, and thus provide better clinical care.

This text was supplied by Daniel Bausch, Olivier le Polain and Susan Ismaeel, UK Public Health Rapid Support Team

Dr. Chikwe Ihekweazu, Director General of the Nigeria Centre for Disease Control (NCDC)

Dr. Chikwe Ihekweazu is the Director General of the Nigeria Centre for Disease Control (NCDC) and was until January 2018, the Acting Director of the West Africa Regional Centre for Disease Control. Dr Ihekweazu trained as an infectious disease epidemiologist and has over 20 years' experience working in senior public health and leadership positions in several National Public Health Institutes, including the South African National Institute for Communicable Diseases (NICD), the UK's Health Protection Agency, and Germany's Robert Koch Institute (RKI). Dr Ihekweazu has led several short-term engagements for WHO, mainly in response to major infectious disease outbreaks around the world.

Global health security must be underpinned by strengthening national health security

Dear Dame Sally,

What is global health security?

Global health security is a shared responsibility that requires collaboration, communication and coordination across national borders to prevent, detect and respond to infectious disease outbreaks. No country can afford to ignore the threat of infectious diseases and definitely never to overlook the potential re-emergence of long forgotten infectious diseases.

This exact scenario played out in 2018, when two patients turned up in the UK with a skin rash which was later confirmed to be a rare viral disease – monkeypox. Both of the patients came to the UK from Nigeria, where the virus had re-emerged in 2017 after 30 years with no reported cases. Subsequently, a single transmission event from one of the cases in the UK then led to a third case in a healthcare worker at an NHS hospital. These cases were well managed in the UK and the public health consequences were minimal. Although the cases in the UK were managed in high containment facilities, we were also lucky that monkeypox is a fairly mild virus that generally causes a scary rash, but with few constitutional symptoms, such as a fever or chronic fatigue. With good supportive care, the risk of severe outcomes is limited and, in this case, all three patients were eventually discharged.

In both of the imported cases, it appears that the patients were incubating the virus before they travelled and had not become symptomatic, so it would have been almost impossible to detect any sign of illness at the port of entry into the UK. This points to our interconnectedness, collective vulnerability and potential exposure to any number of infectious diseases that may manifest in any part of world, at any point in time. The pathway and speed of transmission of the monkeypox virus highlighted, as global travel increases, the risk of infectious diseases spreading across national borders.

Global = National

"Global health security" is not just a trendy term, it underscores the need for countries to strengthen their national health security infrastructure through improved prevention, detection and response to infectious disease threats, by building well-funded national public health institutes (NPHI) that incorporate surveillance and response to all infectious diseases. The outbreak of SARS in 2002, declared a Public Health Emergency of International Concern (PHEIC) at the time, was a game changer in the way infectious diseases are viewed. The rapid spread through air travel and high death rate awakened people to the role that globalisation was playing in obliterating borders that which may have limited the spread of infectious diseases.

After the re-emergence of the Ebola virus disease (EVD) in Guinea, West Africa in 2013, many reviews suggested that the "global health community's" response was too slow. However, there really is no organised global health community! The global health community is made up of a collection of sovereign countries, professional groups, multi-lateral organisations and civil society who ultimately have the collective responsibility for addressing the cross-border spread of infectious diseases.

The Ebola outbreak in West Africa heightened the need to review the health security architecture of the most affected countries, namely Guinea, Sierra Leone and Liberia. At the time of the EVD outbreak, the health systems in Liberia and Sierra Leone had been hollowed out from years of civil war and the outbreak further decimated the already weakened health systems. Since 2015, there has been significant progress in establishing and strengthening the national health security architecture in many African countries, with the establishment of the Africa Centres for Disease Control (Africa CDC) and its regional hubs, as well as the growth in NPHIs. However, many of these institutions have struggled to get the political support and sustained funding from their own governments and international partners.

This has therefore hindered them from evolving into the expert institutions required to safeguard the public health needs of their population as well as to inspire confidence among their citizens that should there be an outbreak, their countries have the core capabilities to prevent, detect and respond to infectious disease outbreaks.

In my country, Nigeria, we have the Nigeria Centre for Disease Control (NCDC) which is one of the youngest NPHIs on the African continent. However, the country also has the largest population in Africa with an estimated 200 million people. The case of EVD that reached the country in July 2014 was rapidly contained due to the swift action of public health officials in the country's largest city, Lagos. Had the disease spread, the outcome in terms of human lives lost and economic loss would have been catastrophic. In the last three years, Nigeria has experienced many severe infectious disease outbreaks, including meningitis, Lassa fever and monkeypox.

Working together for success

The UK Government has long recognised the need for international collaboration and in the now expired 2008 Health is Global Strategy called for the establishment of long term links with equivalent institutions in other countries. This work is now led by Public Health England (PHE) who, through Official Development Assistance (ODA) funding are supporting the establishment of strong NPHIs in low- and middle-income countries (LMICs) in order to ensure timely and effective prevention, detection, response and control of public health threats. In 2018, PHE, as the UK's NPHI, signed a Memorandum of Understanding (MoU) with the Nigeria Centre for Disease Control, an institute with a similar mandate and relevant expertise. This includes supporting improvements in the NCDC's National Reference Laboratory, national surveillance systems and emergency preparedness and response. Outcomes will be measured through improvements in indicators used in the Joint External Evaluation to assess the country's ability to prevent, detect and respond to infectious disease outbreaks.

With the continuous threat of new and re-emerging diseases, NPHIs will be at the frontline of ensuring that infectious disease outbreaks are contained. This will also require having a well-trained workforce which would include epidemiologists, laboratory scientists, programme managers and statisticians. In addition, interdepartmental continuous collaboration will be critical in order to safeguard the national health security of the citizens. NPHIs provide a stable locus of expertise, continuity of experience, scientific knowledge and appropriate human, technical, and financial resources to tackle public health challenges both within countries and across national borders. They provide a practical platform to translate the term "global health security" to national relevance.

We are only as strong as our weakest link, so global health security has to be a shared responsibility requiring collaboration, communication and coordination across national borders to prevent, detect and respond to infectious disease outbreaks.

Yours sincerely,

Dr. Chikwe Ihekweazu
Director General

Nigeria Centre for Disease Control

Re-emergence of monkeypox in Nigeria

In September 2017, Nigeria experienced a re-emergence of human monkeypox, 39 years after the last reported case. The first case was reported on the 22nd of September 2017, from Bayelsa state in the South-South of Nigeria.

Following confirmation of the first case, state epidemiologists and Ministries of Health in all 36 states were notified to establish enhanced surveillance based on a standard case definition developed by the Nigeria Centre for Disease Control (NCDC). Within two weeks, the notification of suspected cases from other states increased. The NCDC rapidly developed interim guidelines and protocols and disseminated these to guide response activities. In addition, intensive surveillance, public sensitisation, community mobilisation, and case management training were implemented across all states.

To ensure co-ordination, the Nigeria Centre for Disease Control (NCDC) activated a national Emergency Operations Centre (EOC) on the 9th of October 2017. In addition, Rapid Response Teams were deployed immediately to Bayelsa, and other states. The multi-sectoral EOC facilitated joint epidemiologic investigations, targeted risk communication, and developed laboratory diagnostic capacity for human and animal specimens.

Laboratory diagnosis was initially undertaken at Institut Pasteur (Dakar, Senegal) and the US Centers for Disease Control and Prevention. Samples had to be collected, processed and transported outside Nigeria for testing, taking as long as 14 days for results to be received. Within a month of confirmation of the first cluster of cases, the US CDC provided technical support and built capacity for monkeypox molecular diagnosis within the NCDC National Reference Laboratory. Currently, the National Reference Laboratory provides diagnosis for monkeypox in Nigeria, with a turn-around-time of 24 hours.

Two cases of monkeypox from Nigeria were reported in the United Kingdom (UK), as the first diagnosed cases outside the African continent since 2003. The first case was a Nigerian on training to the UK, and the second was a Nigerian resident in the UK, who had just returned from a short visit. Subsequently, two cases with travel history to Nigeria were reported in Israel (March 2018) and Singapore (May 2019). The spread of monkeypox across four countries within two years, highlights the importance of collaboration for global health security. In response to these cases, national health officials in all countries worked closely with NCDC for contact tracing and epidemiological review. Given the spread of cases, Nigeria is currently reviewing epidemiological data to include monkeypox as part of the country's Integrated Disease Surveillance and Response (IDSR) framework.

At the peak of the outbreak, colleagues at the Institut Pasteur Dakar and partners carried out the first genetic sequencing of cases. This showed that the index case of the outbreak in Nigeria was not imported, but probably originated from a spillover event from an animal host. These results emphasised the value of local surveillance for the early detection of viral spillovers. The results also suggested endemicity of monkeypox in Nigeria with evidence of human-to-human transmission.

Since the first case was detected in September 2017, 163 confirmed cases have been reported, with eight deaths from 17 states. However, Nigeria has quickly developed local capacity for detection and case management of monkeypox. With support from Public Health England, NCDC has recently begun research to test suspected monkeypox cases that tested negative, for other diseases. This would increase existing evidence and understanding, on the epidemiology of monkeypox.

Figure 1 Confirmed monkeypox cases in Nigeria between September 2017 and September 2018 by Local Government Area affected and ecological zones (n=122)

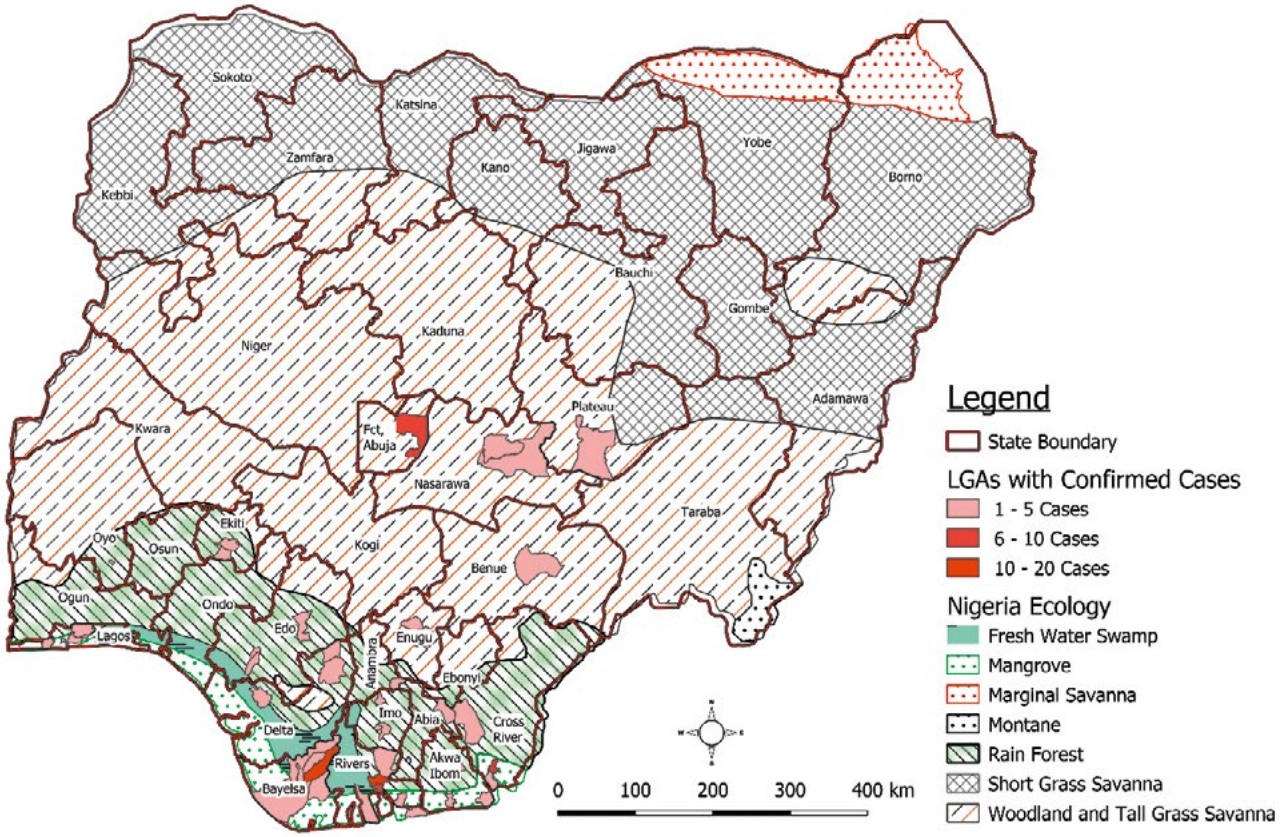
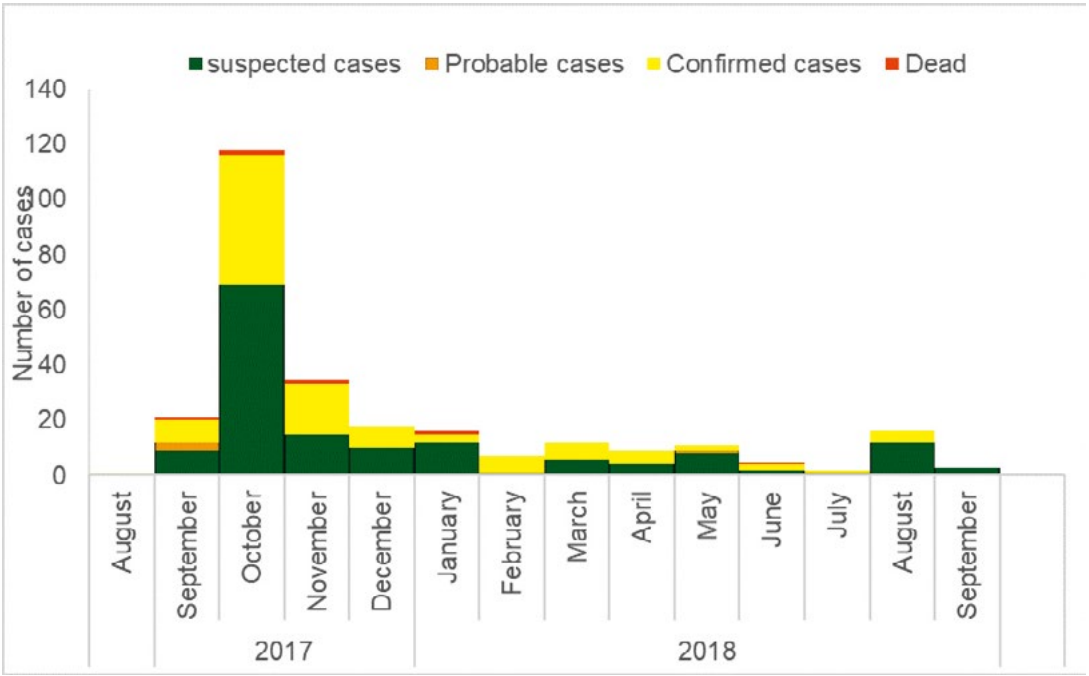


Figure 2 Distribution of Nigeria monkeypox cases reported between 22 September 2017 and 16 September 2018 by month of onset of disease and by case definition category (n=276)



Marc Mendelson, Professor of Infectious Diseases and Head of the Division of Infectious Diseases and HIV Medicine, Groote Schuur Hospital, University of Cape Town

Marc Mendelson is Professor of Infectious Diseases and Head of the Division of Infectious Diseases and HIV Medicine at Groote Schuur Hospital, University of Cape Town. He is Chair of the South African Ministerial Advisory Committee on Antimicrobial Resistance (AMR) and co-founder of the South African Antibiotic Stewardship Programme. His work focuses on national and international policy development on AMR. Marc is the current President of the International Society for Infectious Diseases.

Global governance must include the voices of LMICs to alter the tide of Antimicrobial Resistance

Dear Dame Sally,

Antimicrobial Resistance (AMR) presents one of the greatest public health challenges of our time and threatens attainment of the Sustainable Development Goals (SDGs) by 2030, and Universal Health Coverage. There is no doubt that AMR threatens modern medicine, placing millions of lives around the world in jeopardy.

Low- and middle-income countries (LMICs) bear the brunt of the global infection burden due to the epidemics of HIV, tuberculosis and malaria, the full scope of endemic neglected tropical diseases, and the extraordinary load of community and hospital-acquired infections. In South Africa, the health landscape has been dominated for the last three decades by the dual epidemics of HIV and tuberculosis, both of which have become increasingly difficult to treat with escalating drug resistance. Importantly, mortality from AMR will predominate in LMICs,[1] and one third of the predicted 10 million persons worldwide who will die from drug-resistant infections by 2050, will die from drug-resistant tuberculosis.

Drug resistance is driven by a range of complex factors that need to be addressed through strong and coordinated interdisciplinary efforts of all sectors and society, local and international. Its drivers act across human, animal, and environmental health sectors and as such, our responses need to be equally wide reaching, engendering a One Health approach.

The fact that AMR disproportionately burdens LMICs requires that we too must become an important voice in defining the strategies to mitigate and control. AMR is by no means just a high-income country problem, and there can be no bystanders in addressing it. LMICs must become central to the process as advocates and actors of radical change. Embedding LMIC voices in the global governance structure will provide a far greater opportunity to create a sustained response to AMR and provide the power of a collective voice.

Innovation will be critical to the future success of our response to AMR. In parallel to addressing infection prevention and development of new models of delivering antimicrobial stewardship programmes in LMICs with weak health systems and significant human resource shortages, research and development in the fields of diagnostics, vaccines and therapeutics are a global necessity. Moreover, access to these tools for LMICs must be facilitated through new funding models.

In South Africa, we have witnessed the benefit of such innovation; the introduction of novel diagnostics such as Xpert MTB/RIF Ultra and point of care urinary lipoarabinomannan (LAM) has been groundbreaking in the diagnosing of new cases of drug-sensitive and drug-resistant tuberculosis. The rollout of new antibiotics such as bedaquiline and others in the treatment of multi- and extensively drug-resistant tuberculosis has reduced treatment duration, morbidity and mortality, and recent advances in tuberculosis vaccine development has given new hope to improving tuberculosis vaccination responses.

The UK has been a global leader in programmes to reduce the global burden of infection including the Roll Back Malaria Partnership, the Global Fund to Fight HIV, Tuberculosis and Malaria, the Drugs for Neglected Diseases initiative, and now in the field of AMR advocacy and action. Your leadership has ensured AMR is at the top of the global agenda and your strong advocacy led to the United Nations General Assembly (UNGA) high-level meeting on AMR in 2016 and the formation of the Interagency Coordination Group (IACG). In turn we in South Africa shone the spotlight on the urgent need to address the scourge of tuberculosis at the UNGA high-level meeting on ending tuberculosis in 2018. Both meetings have been important milestones in the global response to drug resistance and a springboard for coordinated international action.

The UK has been instrumental in financing important gaps in our collective ability to tackle AMR. The UK's Fleming Fund has catalysed surveillance of AMR in LMICs. Contributions towards the Global AMR and Innovation Fund (GAMRIF) has seen financing directed to support important programmes of research and development for new antimicrobials (Combating Antibiotic Resistant Bacteria Biopharmaceutical Accelerator (CARB-X) and the Global Antibiotic Research and Development Partnership (GARDP)) and development of critical diagnostics for drug-resistant infections (Foundation for Innovative New Diagnostics (FIND)).

Despite the level of global funding already achieved for AMR, key strategic areas that are particularly relevant to LMICs remain under-resourced and under-prioritized. This is especially true for infection prevention, which negates the need for antimicrobials in humans and animals. In contrast to high-income countries, strengthening infection prevention may be more impactful in reducing AMR in LMICs than antimicrobial use itself.[2] Domestic and global funding to support the delivery of clean water and sanitation (WASH), and increased vaccine coverage to humans and food production animals, must be prioritized.

Furthermore, for LMICs to reduce antimicrobial use in food production while maintaining food security, improved infection prevention interventions at the farm level must be introduced. Governments and funding bodies must work together to enable this transition which carries a significant cost. We in South Africa agree with the recent IACG recommendation relating to global finance and urge that existing and future financing mechanisms in One Health must give AMR greater priority in their resource allocation. We urge the international collective to recognize the needs of LMICs in prioritizing the direction of funds to the global South.

Now is the time to build upon the recent publication of the IACG recommendations by collectively redoubling our efforts to mitigate the rise in AMR and to addressing the next stage in the development of the global AMR response, through governance and action. We call upon our counterparts in all LMICs to join us as a strong, unified voice, thereby ensuring true, collective, global action to address this public health crisis.

Yours sincerely,

Marc Mendelson, University of Cape Town

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Commonwealth Partnerships for Antimicrobial Stewardship

During a 25-year career as a pharmacist in the NHS I have been fortunate to take part in several global health projects. Two of these took a health partnership approach where the NHS organisation I work for pairs with an organisation in Africa. They have been the source of some of my most rewarding professional (and personal) experiences.

The pairing of Ipswich Hospital with Beira Central Hospital was one such example. Funded by UK aid, I travelled with a multidisciplinary team to Mozambique to deliver training on medication safety and antimicrobial stewardship – two areas of clinical practice that pharmacists lead on in the UK. Our team demonstrated an approach and passion for innovation and engagement that was inspiring, representing the values and achievements of the NHS on a global stage and gaining new skills for our work in Ipswich in the process.

And then, last year, the Commonwealth Pharmacists Association and the Tropical Health and Education Trust received UK aid funding through the DHSC Fleming Fund, for the pioneering Commonwealth Partnerships for Antimicrobial Stewardship scheme (CwPAMS). These partnerships enable NHS pharmacists like me to work with our counterparts in four African countries to help address the threat of growing antimicrobial resistance, a crisis that is affecting us here in the UK of course, as well as overseas, and therefore needs a concerted global response. In the process, we are enhancing the excellent relationship the NHS and the UK has with these four countries.

Volunteering in global health projects has provided me with unmatchable learning opportunities. As a result, I am a more confident and effective communicator, a more self-aware and outward-looking pharmacist, and I bring skills and ideas to my NHS work that would have otherwise never occurred to me.

This text was kindly provided by Sarah Cavanagh, Senior Pharmacist, Ipswich Hospital (East Suffolk and North Essex NHS Foundation Trust) and International Partnerships Lead for the Commonwealth Pharmacists Association

The Fleming Fund is a UK aid programme, helping low- and middle-income countries tackle antimicrobial resistance (AMR). The aim is to improve the surveillance of AMR and generate relevant data that is shared nationally and globally.

The Tropical Health Education Trust (THET) is a UK charity that works to train and educate health workers in Africa and Asia, working in partnership with organisations and volunteers from across the UK.

Partnering in Mozambique

Source Sarah Cavanagh, Senior Pharmacist, Ipswich Hospital

Professor Charles Rotimi, Chief of the Metabolic, Cardiovascular and Inflammatory Disease Genomics Branch and the Director of the Center for Research on Genomics and Global Health, US National Institutes of Health

Professor Charles Rotimi, a genetic epidemiologist, is the Chief of the Metabolic, Cardiovascular and Inflammatory Disease Genomics Branch and the Director of the Center for Research on Genomics and Global Health at the US National Institutes of Health. Professor Rotimi has directed innovative research to understanding the genomic, social and cultural determinants of metabolic diseases mostly in African ancestry populations. He is a leader in exploring the implications of the increased genetic diversity in African ancestry populations for disease gene discovery.

Professor Rotimi is especially proud of his efforts at globalizing genomics. His engagement of African communities for the International HapMap and 1000 Genomes projects has had a transformative impact. He was the founding president of the now thriving African Society of Human Genetics, and spearheaded formation of the Human Heredity and Health in Africa (H3Africa) Initiative with over 170 million US dollars funding from the NIH and Wellcome Trust.

Rotimi was recently recognized as an "African Innovator" by Quart Africa, elected to the USA National Academy of Medicine and the African Academy of Sciences and named the 2019 recipient of the Curt Stern Award in recognition of significant scientific contributions by the American Society of Human Genetics.

The growing power of genomics

Dear Dame Sally,

Genomics, a rapidly evolving discipline, is providing scientists with cost-effective technologies to read and edit the complete inherited information encoded in the DNA of organisms. Impressive not only for its rapid technological advancement as for the breadth of its reach, genomics has impacted disciplines as diverse as history, archaeology, medicine, agriculture, and management of epidemics. Here I highlight some of the recent scientific progress of genomics relevant to health and disease, along with the challenges that accompany these advances.

DNA editing approaches are being applied to global health and food supply problems that have been considered intractable. In biomedicine, the potential for this technology includes preventing and treating inherited diseases and cancers, cystic fibrosis, hemophilia, and congenital heart diseases. In 2015, gene editing technology called TALENs was used by scientists in the UK to save the life of a one-year old child suffering from leukemia, after all other treatments had failed. A new, promising gene editing technology CRISPR-Cas9 is adapted from a naturally occurring genome editing system in bacteria. CRISPR-Cas9 system which has generated considerable excitement in science is faster, cheaper and more accurate than previous approaches. This revolutionary advance, however, is not yet ready for routine use. Unresolved technical and ethical issues remain, including implications for the global ecosystem and for future generations of humans. For example, editing the genes of mosquitoes can alter their ability to transmit malaria.

While drastically reducing the burden of this deadly disease is attractive, concerns over unanticipated impacts on other organisms remain to be addressed. Also, the ability to alter DNA in the germline, i.e., making changes that will be transmitted across generations, could reduce inheritance of fatal genetic disorders, but it could also be used to select traits such as athletic ability for one's offspring, raising weighty ethical issues. How gene editing can be ethically employed to humanity's benefit is a matter of ongoing debate.

Another major advance in genomics is in the maturation of a technique called the genome-wide association study (GWAS), which evaluates genetic variants across the genome for a correlation with a trait or disease in large groups of individuals. This approach, facilitated by global resources such as the UK Biobank with genomic and clinical data on 500,000 individuals, has led to the discovery of hundreds of genetic variants influencing susceptibility to many diseases. Researchers can now create 'polygenic risk scores', an estimate of an individual's risk for common diseases, such as coronary artery disease, based on their genetic sequence at many different points in the genome. This allows us to target individuals with the greatest genetic risk for additional monitoring or lifestyle changes well before the appearance of abnormal clinical results.

The development of polygenic risk scores has contributed to growing enthusiasm for a future in which genomic data is regularly included in the practice of medicine. Genomic or precision medicine holds the promise of not only informing patients of genetic risk for common diseases, as in polygenic risk scores, but individualised drug prescribing, based on genetic variants related to drug metabolism. Major public and private genomic medicine initiatives are underway in the UK, United States, Canada, Finland, Asia and Africa, and the eventual inclusion of genomic information within standard medical care appears probable. Indeed, England's now completed programme to sequence 100,000 whole genomes, and in most cases feed the results back to patients, is breaking new ground.[1]

A hallmark of genomics are the well-established data sharing policies and practices that have facilitated the formation of global collaborative networks for accelerated discoveries and clinical translation. Global sharing of genomic and clinical data has been particularly successful in helping patients with rare, undiagnosed disorders. The sharing of information among worldwide clinicians enables them to find similar cases, which facilitates diagnosis and can lead to therapeutic intervention. Such a collaborative environment recently supported the understanding of a rare genetic disease called DADA2 that causes stroke in children. By identifying the effects of the malfunctioning gene, researchers at the National Institutes of Health were able to design a therapy that eliminated stroke occurrence in these children,[2] the insights of which can now be used to help children with these symptoms identified by clinicians worldwide.

A challenge accompanying each of these advances is the equitable distribution of the benefits of genomics. Over 70% of these genomic activities are taking place in high-income countries.[3] Similar results are found for genetic testing, an important way that genomics is currently used in medicine. These tests are used to confirm the presence of a genetic disorder, allowing the patient to access appropriate treatments and support. The laboratories offering these tests are largely found in high-income countries, with only 9% in middle- and none in low-income countries.[4]

The application of gene editing technology for individuals is currently very limited and carries a high expense, raising concerns that the benefits of this technology may not be equally accessible by all those who need it. In addition to the economic disparities in genomics, unequal distribution of genomic benefits due to ancestry is of serious concern (see Figure 1). Some features of our genomes differ across ancestries due to historical migration patterns, and these differences mean that research conducted in people of one ancestral background cannot be extrapolated to those of other ancestral backgrounds. For instance, risk scores based on studies conducted in those of European ancestry are not as accurate for those of other ancestries. Since most genomic research has been conducted in those of European ancestry, as polygenic risk scores become more clinically useful, those of different ancestral backgrounds will not benefit equally from this advance, potentially exacerbating known disparities in healthcare (see Figure 2).

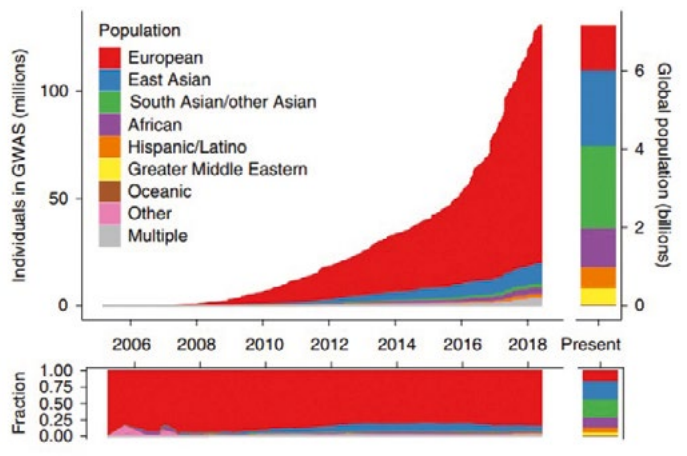
There is evidence that this lack of diversity in genomics is already impacting clinical care. African Americans with hypertrophic cardiomyopathy, a genetic heart disorder, receive inconclusive diagnoses more often than European Americans because reference databases include findings from predominantly European ancestry individuals.[5] This lack of representation of diverse individuals in genomic research is an acknowledged failing in the field, and major initiatives have been established to address this challenge.

In 2010, the African Society of Human Genetics, the National Institutes of Health and the Wellcome Trust came together to establish the Human Heredity and Health in Africa (H3Africa) initiative to address this lack of diversity in both genomic research participants and researchers. H3Africa supports a pan-African network of laboratories that are applying cutting-edge research to study the interplay between environmental and genetic factors in disease susceptibility and variable drug responses in Africans. H3Africa is ensuring access to relevant genomic technologies for African scientists, facilitating integration between genomic and clinical studies, training of research leaders at all levels of the biomedical enterprise, and establishing necessary research infrastructure (see Box 1). While this initiative is certain to be of considerable benefit to our scientific understanding, clinical practice, and research community, the sustained funding of this initiative beyond its current framework will require new commitment of resources from the global community, particularly from African public and private sectors.

Sincerely,

Charles N. Rotimi, PhD

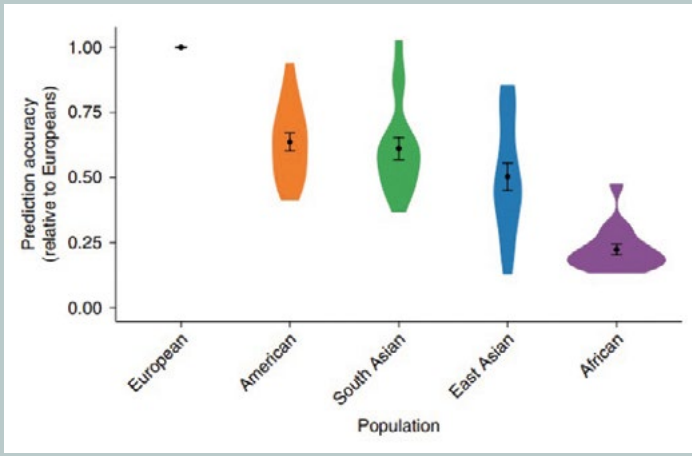
Figure 1 Ancestry of GWAS participants over time, as compared with the global population



Note: Cumulative data, as reported by the GWAS catalog. Individuals whose ancestry is 'not reported' are not shown.

Source Nature Genetics, Vol 51, April 2019 584-591

Figure 2 Prediction accuracy (relative to European-ancestry individuals) of polygenic risk scores across 17 quantitative traits and 5 continental populations in the UK Biobank



Source Nature Genetics, Vol 51, April 2019 584-591

H3Africa Impact

Overall monetary investment by NIH/ Wellcome Trust	$170 million
African Countries Involved	34
Consortium Members	>500
Workshops/Themed Meetings (including H3ABioNet)	53
Projects Supported	48
Trainees	382
– BSc	61
– MSc	127
– PhD	193
Research Participants Recruited	54,000
Publications	197

Source H3Africa.org (accessed 1/7/2019)

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Genomics in a conflict zone

Cholera is a killer in waiting. It can move rapidly when conditions allow; poor sanitation, no clean drinking water and a lack of public health systems caused by natural disasters or civil unrest help fuel it's spread. In Yemen, as a result of the brutal civil war, cholera took hold. 16 million people out of the population of 28 million do not have access to clean drinking water[1] meaning the majority of the population are part of a humanitarian disaster. Yemeni people have experienced two outbreaks of cholera; the first in 2016 and the second in 2017, which combined, are the worst in recorded history. By 2018, the disease had affected over 1 million people and caused almost 2,500 deaths.[2]

To understand the spread and transmission of microorganisms, I, with colleagues from the Sanger Institute, am part of an international partnership which responds to cholera outbreaks around the globe. With colleagues from Institute Pasteur, Médecins Sans Frontières (MSF) / Doctors Without Borders, the Ministeries of Health for Sana'a and Saudi Arabia along with other National public health and research institutes, we use genomics to trace the source and routes of transmission of microbes. For Vibrio cholerae, the bacterium that causes cholera, we monitor how it emerges, evolves and transmits – within and between households, towns, regions and countries. Genomics can identify optimum treatment options, influence policy and monitor the risk of future outbreaks.

V. cholerae Isolates were collected from stool samples across the Yemeni population and a temporary refugee centre on the Saudi Arabia–Yemen border. The bacterial genomes were sequenced at the Institute Pasteur, and in collaboration we analysed the data at the Sanger Institute. We compared the sequences to a collection of over 1,000 cholera samples from the current, ongoing global pandemic, caused by a single lineage of V. cholerae, 7PET. By combining our data and efforts we were able to show that the Yemen outbreak was also caused by the pandemic 7PET lineage, and is likely to have entered the region with the movement of people from Eastern Africa, where it was circulating prior to 2016. Originally, the outbreaks in Yemen were thought to be caused by non 7PET strains. We also found that unlike the majority of 7PET bacterial isolates those responsible for the Yemen outbreak are missing four genes responsible for resistance to commonly used antibiotics, making the bacterium more suceptilble to antibiotic treatment, and the Yemeni population more vulnerable without it.

It has taken a huge collaborative effort across continents to shed important new light on this bacterium, to enable us to answer the question of what caused the cholera in Yemen. We couldn't do it without local and international partnerships. Building capacity and providing training are a vital part of our work. Our approach is repeated across the globe to understand the root causes of other outbreaks including in Latin America and Asia.

Many may think of cholera as a disease of the past, but it's still deadly today. We are showing that international monitoring, specifically using genomics, provides vital evidence to help inform control strategies. UK science, with its connections to international collaborations, is a powerful force against some of the most deadly diseases on the planet.

This text was kindly supplied by Professor Nicholas Thomson, Wellcome Sanger Institute and the London School of Hygiene & Tropical Medicine

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> *"In addition to helping understand the outbreak better, our work helped improve sample collection, surveillance efforts and patient management. We were able to hand out hygiene kits to everyone we evaluated as part of the study in the community, and helped people understand how to stop the spread. We have also developed methodologies for working in resource limited settings. We worked with local scientists and were able to contribute to people's professional development. It is important there is an exchange of ideas and methods between everyone involved."*

Ankur Rakesh is a volunteer doctor with Médecins Sans Frontières (MSF) / Doctors Without Borders, who travelled to Yemen in July 2017. As an epidemiologist with MSF, Ankur works on outbreak response, control, surveillance and operational research. He collected the samples for genome sequencing, working together with local doctors in Sana'a, often in dangerous situations as the war continued around them.

Mahima Datla, Managing Director of
Biological E Limited

Mahima Datla is the Managing Director of Biological E Limited, one of the leading vaccine manufacturer based in India. Over a career spanning 20 years, she has also held key positions in several public health organisations such as Gavi, DCVMN (Developing Countries Vaccine Manufacturers Network), Global Health Innovative Technology Fund, Hilleman Labs, representing her organisation and the DCVMN.

Expanding the UK Government's engagement in research and development funding for public health

Dear Dame Sally,

GAVI, the Vaccine Alliance, has been remarkably successful. Since its inception in 2000, GAVI has helped countries introduce 430 programmes and vaccinate over 700 million children.[1] It's no small achievement that GAVI has helped developing countries prevent more than 10 million future deaths through its support for routine immunisation programmes and vaccination campaigns.

However, as we celebrate the achievements of GAVI, it is important that we reflect on what it's going to take to ensure continued success.

GAVI, amongst many things, was intended to be a catalyst for better health services. By making new vaccines more widely accessible, and by sustaining immunization coverage, it was hoped that countries would work hard to take up the challenges to continue this essential provision of services. While GAVI achieved great success, many emerging economies, despite rapid economic growth, are not increasing public health spend to levels needed for immunization and building robust healthcare systems. The ownership and active involvement of national governments is necessary for success to become more durable. This will free up more resources of GAVI, allowing it to introduce newer vaccines within routine immunisation programmes, and to respond to health emergencies which are becoming more frequent.

Immunisation continues to be one of the most cost-effective interventions available. The return on investment on immunisation programmes in GAVI-supported countries is US$18 per US$1 spent, generating over $150 billion in economic benefits to date.1 Given that immunization activities rank amongst the most cost-effective health interventions for low- and middle-income countries,[2] disease prevention by immunisation should be a top priority for governments. So how do we influence countries to make vaccines a health priority?

It's appropriate to note the tremendous contribution from the Developing Country Vaccine Manufacturers Network (DCVMN), a network of 50 vaccine manufacturers from 17 different developing countries, who have been active partners in GAVI's success. During 2012-16 alone, DCVMNs, through UNICEF, have supplied to 70+ GAVI-eligible countries accounting for 7 billion doses, which represents 58% of GAVI's requirement.3 Forty vaccines are WHO Pre-Qualified and are supplied to several countries through UNICEF.

Vaccine research, development and manufacturing are extremely complex and require huge investments. DCVMNs mostly rely on risk capital, through debt and/or private equity to make investments. However, DCVMNs do not have access to wealthy-country markets due to stringent regulatory and financial barriers. So, returns on investments for DCVMNs are dependent on public markets, largely in GAVI-eligible emerging economies. Therefore, most DVCMNs' investment decisions are heavily influenced by policy decisions in GAVI, WHO and UNICEF.

Additionally, these public markets must balance the trade-off between long-term sustainability of supply and a heavy emphasis on short-term price reduction. Historically, this approach has adversely affected the financial health of manufacturers, and severely undermined their ability to appropriately invest in R&D.

There are very few stakeholders supporting push funding for R&D, the most notable being the Bill and Melinda Gates Foundation. In developing countries, even where government funding for R&D is available, it is often fragmented and is tailored to support academic institutes. So DCVMNs are unable to rely on government support for funding innovation. Push funding policies would incentivise industry to innovate by reducing industry's costs during the R&D stages.

The UK has been one of the biggest supporters of GAVI, showcasing their commitment to global health security and equal access to vaccines. The UK has also substantially contributed to supporting public health in the developing world through its collaborations established in the Commonwealth Nations, for example the UK-India health partnership. The UK could further support the development of sustainable health systems and seek further return on aid investment by supporting action that encourages and assists the research and development of vaccines by DCVMNs. The resultant competition will lead to more accessible pricing.

The UK could also simplify the regulatory path for vaccine registration in the UK. This would be a welcome initiative benefiting healthcare in the UK and other developed countries. This would improve DCVMNs' ability to invest in innovation and offer tiered prices not only to GAVI-eligible countries but also to middle income countries. The DCVMNs' commitment to quality is well established given that many DCVMNs have WHO prequalification for their vaccines and also US Food and Drug Administration (FDA) approvals for generic pharmaceuticals. Experience shows that whenever a pathway for generics has been created, it has resulted in huge savings for governments and consumers alike.[4]

Yours sincerely,

Mahima Datla

Managing Director of Biological E Limited.

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Dame Minouche Shafik, Director of the London School of Economics and Political Science

Dame Nemat (Minouche) Shafik is a leading economist, whose career has straddled public policy and academia. She was appointed Director of the London School of Economics and Political Science in September 2017.

Dame Minouche took her BA at the University of Massachusetts-Amherst, her MSc at the LSE and her DPhil at the University of Oxford and, by the age of 36, had become the youngest ever Vice President of the World Bank. She taught at Georgetown University and the Wharton Business School. She later served as the Permanent Secretary of the UK Department for International Development from 2008 to 2011, Deputy Managing Director of the International Monetary Fund from 2011 to 2014 and as Deputy Governor of the Bank of England from 2014-2017, where she sat on all the monetary, financial and prudential policy committees and was responsible for a balance sheet of over £500 billion.

Dame Minouche has served on, and chaired, numerous boards and currently serves as a Trustee of the British Museum, and sits on the Supervisory Board of Siemens, the Council of the Institute for Fiscal Studies, and the Economy Honours Committee. She was made a Dame Commander of the British Empire in the Queen's Birthday Honors list in 2015.

Excise taxes on tobacco, alcohol and sugary beverages are powerful and effective policy tools to improve population health

Dear Dame Sally,

In 2018, the Task Force on Fiscal Policy for Health brought together leaders from fiscal policy, development and health from around the world to examine the role that fiscal policies can play to improve the health and wellbeing of our world. In our recently released report, 'Health Taxes to Save Lives' (available at https://www.bloomberg.org/program/public-health/task-force-fiscal-policy-health/) we concluded that few interventions have the power to save as many lives as raising tobacco, alcohol and sugary beverage taxes.

Non-communicable diseases are the leading cause of deaths worldwide. More than 10 million premature deaths each year – about 16% of all deaths in the world – could be prevented by reducing consumption of three products: tobacco, alcohol, and sugary beverages. A disproportionate number of these deaths occur in low- and middle-income countries (LMICs), where rising incomes and the globalization of industry marketing and trade are making these products more available and more affordable. As a result, consumption of all three products is rising.

Well-designed excise taxes, and high and increasing tax rates, are highly effective at reducing consumption of tobacco, alcohol and sugary beverages and can provide much needed domestic revenues to further improve health. Yet in most low- and middle-income countries these taxes remain low, contributing to rising rates of consumption. We found that governments face strong opposition from industry and lobby groups to raising taxes on tobacco, alcohol and sugary beverages over concerns about the impact of tax increases on revenues, employment, illicit trade, and the poor. Evidence from around the world demonstrates that these arguments are either false or greatly exaggerated, and none justify inaction.

The UK's efforts to use tobacco, alcohol and most recently sugary beverage taxes, to reduce consumption, provide a powerful example for other countries seeking to develop effective tax systems. The UK's best practices cover three key areas: well-designed tax structures, high/increasing tax rates as well as strength in tax administration and enforcement. Evaluations of these policies and lessons learned serve to inform LMICs' efforts to reform taxes.

The UK, through its financial contribution to global health and wider international engagement, has extraordinary convening and agenda setting power to influence and support countries to implement effective fiscal policy for health. Few countries boast a comparable capacity to influence the global agenda having taken both bold domestic action as well as providing resources for global action.

As a group, the Task Force calls on all countries to act now to implement reforms to significantly increase excise taxes on these products to save lives and fulfill the world's aspirations for a sustainable healthy future. The Commission's estimates show that a one-time global tax increase large enough to raise tobacco, alcohol and sugary beverage prices by 50% would prevent about 50 million premature deaths over the next 50 years. These tax increases would also generate significant fiscal revenues for their respective governments that could contribute to funding better health systems and other priorities.

The Task Force also calls on the international community to support countries to adopt, implement, and significantly raise effective health taxes. This includes actions to support governmental capacity to implement evidence-based health tax policies, to disseminate evidence on the effectiveness of health taxes, to refute misinformation, and to provide technical assistance and political support to governments that face industry opposition.

Within this, there are multiple opportunities for the UK Government to take a global lead on this issue:

- Use their convening power for high-level engagements with Ministers of Finance to promote engagement on effective excise tax policies.
- Support public awareness and education campaigns about the harmful effects of tobacco, alcohol and sugary beverages to complement changes in fiscal policy.
- Provide technical assistance and support to Ministers of Finance and Health to enable the UK to share its own and other countries' best practices and expertise with counterparts in low- and middle-income countries.
- Integrate tobacco, alcohol and sugary drinks taxes into existing country-level technical assistance programs, including support to tax administration agencies in low- and middle-income countries with a mandate to assist with implementing effective excise tax policies on tobacco, alcohol and sugary beverages.

I believe the UK Government has huge capacity to improve health outcomes around the world by sharing its own experience, through its own aid efforts and by using its influence on the international stage.

Yours sincerely,

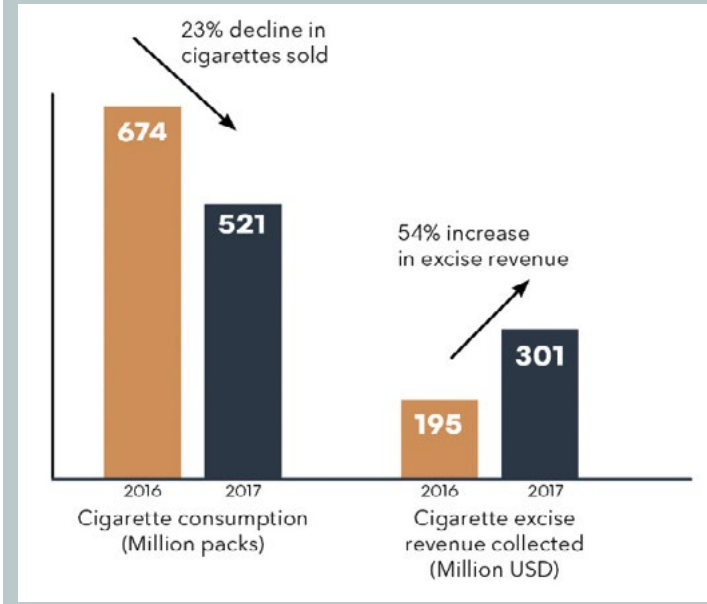
Dame Minouche Shafik on behalf of the Global Task Force for Fiscal Policy

Tobacco and alcohol taxes in Colombia

Colombia's recent experience with both tobacco and alcohol taxes has had a significant impact on consumption and revenues. In 2016, Colombia increased the specific tax on cigarettes by 200 percent and established a 4 percentage point annual increase on top of inflation. Cigarette consumption decreased by 23 percent in 2017 relative to 2016, while tobacco tax revenues increased by 54 percent.

Another reform in the same year increased taxes on alcohol, adopting a combination of a 25 percent ad valorem tax and a specific tax based on alcohol content. The reform increased revenues from these taxes by 17 percent in 2017.

Packs of Cigarettes Sold and Tobacco Tax Revenue, Before and After Tax Increase, Colombia, 2016-2017



Source Ministry of Finance, Colombia

Dr Karl Blanchet, Director, Health in Humanitarian Crises Centre, London School of Hygiene and Tropical Medicine

Dr Karl Blanchet is the Director of the Health in Humanitarian Crises Centre at the London School of Hygiene and Tropical Medicine. Karl has been engaged in several humanitarian crises as a relief worker: war in Bosnia, genocide in Rwanda, refugee camps in Tanzania, Somaliland and more recently has conducted research in Lebanon, Syria, Afghanistan, or South Sudan. Karl has extensively published articles in peer-reviewed journals or newspaper on the state of countries at war and the impact of conflicts on populations.

Karl is a member of the technical working group on Research on Global Health Emergencies at the Nuffield Council on Bioethics. Karl is also a core member of the UHC2030 Technical Working Group on support to countries with fragile or challenging operating environments, and a member of the WHO technical working group on Health Systems Assessment and the WHO technical working group on SRH in emergencies.

Modern armed conflicts require profound transformation of the humanitarian system with strong global leadership

Dear Dame Sally,

Failing to keep pace with modern conflicts

Contemporary conflicts, driven by access and control over natural resources (water and land), state failure and connectedness of the global world continue in low-income countries and increasingly in middle-income countries with the rise in non-state armed groups. This is accompanied by increasing violation of the rules-based international order such as the Geneva Conventions and International Humanitarian Law, which used to help shape behavior of states and non-state actors during conflicts and resolve violent disputes through a set of common rules and agreements.[1]

Armed conflicts have had tremendous impact on the social development and economy of countries, by reducing the availability of basic services, creating food insecurity, and high inflation. This reduces the gross domestic product (GDP) growth of a country in conflict by an average of 2% per year. Unfortunately, conflicts are often endemic in most fragile states, trapped in a cycle of violence and economic under-development, with 90% of countries experiencing civil war being more likely to experience similar violence within a period of 30 years.

The impact of conflict is staggering when looking at human cost. The number of people who have lost their lives or experienced traumatic situations, leaving durable physical and psychological scars, has increased. Health professionals have now become a target. In 2018 alone, at least 973 attacks on health workers, health facilities, ambulances and patients were reported in 23 countries in conflict.[2] Armed conflicts have forced populations to leave their homes, abandoning everything behind them. At the end of 2018, 68.5 million people were reported as forcibly displaced, almost doubling in 10 years, with half of refugees being children.[3]

Humanitarian crisis requires an aid response. International donors spend about $25 billion a year on humanitarian aid; however, there is a global annual shortfall of at least $15 billion. Following the World Humanitarian Summit in 2016, the humanitarian system has been described as broken[4] and characterized by an absence of global leadership, the marginalizing of frontline local organizations who are being siloed from development initiatives, and a weak evidence base for effective interventions.[5]

The way forward for the UK

The UK is at the forefront of humanitarian assistance, spending over £1.4 billion annually in the last two fiscal years on humanitarian assistance, including providing the second largest bilateral funding to the Syrian response since 2012. The UK has also provided leadership through development of the UK Public Health Rapid Support Team in 2017 to respond to global health emergencies, including humanitarian crisis and conflict situations.

However, the scale and cost of the humanitarian and public health response in emergencies will continue to challenge donor countries, and there is more the UK can do. It is important to mitigate the risks of these crises and the scale of the response by properly investing in fragile states' health systems to build long-term health system capacity.

Forced migration has been a growing issue for health systems, humanitarian agencies and donors. Area-based approaches where all vulnerable populations are provided assistance according to transparent and simple vulnerability criteria are needed, while respecting their legal rights according to status (e.g. refugee) – be it overseas or in the UK.

Rapid mobilisation of human resources to respond to critical crises is also essential, as demonstrated during the Ebola outbreak in West Africa in 2014. We call for an NHS England strategy facilitating NHS staff deployment in humanitarian settings to provide support to global health emergencies and a drive to embed humanitarian medicine across training pathways and Royal Colleges.

Global accountability and transparency in terms of allocation of Overseas Development Assistance spending are urgently required. The UK should become the champion for improving performance and accountability in humanitarian response by supporting and investing in strengthened performance standards and monitoring and evaluation capacity. This should go hand in hand with the promotion of evidence-based interventions for humanitarian response. The UK could become a lead in funding and promoting high quality global humanitarian research and creating a global evidence-based movement for humanitarian response. To achieve this, humanitarian medicine and public health in humanitarian crises should be considered as a key part of NIHR strategy for global health and for UK Research and Innovation (UKRI) as a whole. This would ensure dedicated, sustainable long-term funding for research alongside capability building in humanitarian crises.

Local organisations are the first responders in an increasingly insecure environment for health professionals in conflict-affected countries; however, they are only currently eligible for UK funding if they have an approved 'Rapid Response Facility' partner. The UK should collaborate with other international donors to create specific funding mechanisms to ensure local organisations can be funded directly to deliver humanitarian assistance and not only through international NGOs.

The UK has demonstrated strong commitment to humanitarian response through sustained funding and support to international relief agencies. It is now time for the UK to show leadership in global humanitarian response to champion evidence-based interventions, transparency and accountability.

Yours sincerely,

Karl Blanchet on behalf of the co-authors

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Prof. Richard Sullivan, Co-Director of Conflict & Health Research Group at King's College

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Epilogue

Professor Dame Sally C Davies FRS FMedSci, Chief Medical Officer (CMO) for England and Chief Medical Advisor to the UK Government

Dame Sally was appointed Chief Medical Officer (CMO) for England and Chief Medical Advisor to the UK Government in March 2011, having held the post on an interim basis since June 2010. Dame Sally is an independent advisor to the UK Government on medical matters, with particular responsibilities regarding Public Health.

From 2004-2016, Dame Sally was the Chief Scientific Adviser (CSA) for the Department of Health (DH), where she was actively involved in NHS R&D from its establishment and founded the National Institute for Health Research (NIHR). In 2013, Dame Sally became a Non-Executive Director of Genomics England Ltd, wholly owned and funded by DH, with the aim to sequence 100,000 whole genomes from NHS patients by 2017.

Dame Sally was a member of the World Health Organization (WHO) Executive Board 2014-2016 and has led delegations to WHO summits and forums since 2004. She advises many governments and organisations on health and policy, holding positions on a number of Boards.

Dame Sally advocates globally on AMR. She has spoken on AMR at numerous events including the World Health Assembly side events, the G8 Science Ministers' meeting in 2015, the Global Health Security Initiative in 2015, and the UN General Assembly side event in 2016. She was chair of the 2013 AMR forum at the World Innovation Summit for Health (WISH) and is chair of the WHO Strategic and Technical Advisory Group on AMR. Dame Sally was appointed a co-convener of the UN Inter-Agency Co-ordination Group on AMR, set up in response to the AMR declaration made at UNGA 2016 and in 2019 was appointed the UK's Special Envoy on AMR.

Dame Sally received her DBE in 2009. She was elected Fellow of the Royal Society in 2014 and a member of the National Academy of Medicine, USA in 2015.

Health, our global asset – partnering for progress

Dear Friends,

Thank you for writing to me. I am proud of the multitude of ways in which the UK contributes to improving health around the world and it has been humbling to read your contributions. The UK must continue to engage globally in a way that ensures equity, sustainability and security for all.

Your letters remind us all of the tremendous progress we, as a global health community, have made. These gains were hard won and are threatened by insufficient funding issues such as climate change and antimicrobial resistance (AMR). You have also raised some important questions and suggested ways that we could all do better. It is clear that as the world changes, health systems must adapt to new threats and seize the opportunities that emerge.

It is in all our interests to ensure that the health system of every country can provide for local populations, delivering universal health coverage and addressing the challenges of the future. To do this we need a global health system that puts national priority setting and need at the forefront but one that is also transparent, accountable and effective.

As the Chief Medical Officer for England, I believe we must have a global conversation about how best to deliver these systems, and with the deadline to achieve the Sustainable Development Goals (SDGs) on the horizon, I invite you to join me.

Challenges and opportunities

Reading these letters and reflecting on my nine years as Chief Medical Officer, I consider some of the major, global health challenges facing us to be;

- a changing global burden of disease;
- emerging global threats which are inter-generational such as climate change and AMR;
- a lack of action on the wider determinants of health, especially the commercial determinants;
- the vulnerability of health systems;
- and continued inequality within and between countries.

These challenges also bring opportunities including;

- harnessing the private sector as a force for good;
- innovation in science, genomics, technology and artificial intelligence;
- civil society engagement, including ensuring the user voice is heard
- and recognising increasing synergies between issues, for example climate change and non-communicable disease.

The current global health system

I recognise that much of the progress in health has been achieved while operating in a system that most of us find unduly complex. I hear from colleagues of the challenges many LMICs face working with multiple donors whilst simultaneously trying to set a country-led agenda, balance vertical and disease-specific funding streams and strengthen their own health systems. I also hear of a need for more collaborative approaches to global data and epidemiology with a focus on developing national capacity to provide good data that can be used to monitor trends and inform the response.

If we were to start from scratch, we would not design the system as it is.

We need a more co-ordinated and effective way of supporting national governments. I recognise that we cannot start again but there are certain questions we must ask ourselves, starting with consideration of what we need to change. Importantly we must reinvigorate efforts towards the health-related SDGs and particularly universal health coverage. We challenge all players to do this.

Which guiding principles could set the direction of travel?

The current system is complex, and we cannot start again. But we can discuss, and come to agreement on, common principles to guide the direction of travel. The key is ensuring that 'no one left behind' is a reality and not just a catchphrase.

We must support **countries to take ownership** of their own national health needs and continue to push so universal health coverage happens for all.

We must recognise the inter-dependencies of health and move to a true '**health in all policies'** agenda where there is systematic consideration of the health implications of all government/policy decisions.

Delivery on **health security** is essential and keeping populations safe from threats to their health must continue with recognition of the changing threats and opportunities, including the commercial determinants of health.

Furthermore, we need to implement a true **'one health'** perspective, recognising the inter-dependency of people, animals and the environment.

Data is a global public good and we must prioritise agreement on standards, with development of shared datasets and metrics to track progress, inform future programming and identify trends.

Evaluation of interventions to improve health is vital to ensure value for money but we need to get smarter with how this is done. More frequent use of mixed methods, civil society engagement and the application of real-world data is required.

Lastly, we need **governance** and **accountability** structures to ensure national delivery of international priorities, for example the recent Interagency coordination group (IACG) recommendations on AMR.

What does a global health system need to provide?

There are various functions a global health system **could** provide but when thinking about what it **needs** to do I see five main functions:

1. Provision of norms and standards – If the world is to be successful in meeting the SDGs, we need to use the best available evidence globally to develop guidance and standards. The international system must respond to what countries want and need and prioritise high-impact guidance and supporting implementation.

2. Monitoring of progress and trend analysis – building national capacity to provide good quality data so that it can be used to develop and monitor services at national level, and enable good global monitoring and advice

3. Health system strengthening towards universal health coverage – well-coordinated expert technical support and financing for countries to progress towards universal health coverage. This needs to be offered to countries directly in support of their own national plans and priorities, and co-ordinated behind these to have maximum effect.

4. Emergency response – supporting countries to be able to prevent, detect and respond to their own emergencies, and to stand by to help if the emergency exceeds the country's capacity to do so. I recognise the considerable efforts made on this over the years since the West Africa Ebola Outbreak.

5. Approaches to disease control – coordinated efforts to end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases, and ongoing eradication efforts.

These functions must be underpinned by a strong evidence base. I recognise that separating these functions does not reflect the current system in terms of decision making and delivery but looking afresh allows us to think creatively about how to maximise value for money and impact.

Who are the decision makers and delivery agents and where should they operate?

The global health system is complex and includes many different stakeholders. I have heard colleagues suggest that we should separate the normative functions of global health from the operational. Others have queried the number of different agencies involved and suggested we combine some based on the function they provide, for example merging all agencies concerned with disease control and even combining these with health system strengthening.

Closing remarks

As I have said before, investing in health is the smart thing to do, because it is in our mutual interest, it creates a better world for us and for future generations and helps to keep our populations safe. Health is a personal, national and global asset underpinning prosperity and happiness. We must ensure that we are investing in the right way and maximising all the global investment to make sure the gains we achieve in health are more equitable, secure and sustainable, ensuring that no one is left behind.

I know the UK will stand ready to work with other donors and multi-laterals to ensure that we make the most of the world's resources on health – I call on those interested to rally together behind an increased effort on the SDGs, working with everyone.

Yours sincerely

Dame Sally

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Acknowledgements

The production of this report has, as always, been a collaborative process, calling on the expertise of many contributors in academia, government, the civil service and business. I planned this report to stimulate further conversation about UK engagement in global health and conversation about how we work together globally to protect and improve health and health systems.

Editors

Firstly, I would like to thank my Editor-in-Chief, Catherine Falconer, for her excellent work on this report. I congratulate her for her sharp intellect, resilience and ability to deliver. Catherine approached this vast topic with determination and showed herself exceptional at bridging gaps, analysing complex issues and working with the most senior stakeholders. I believe Catherine is a future public health leader in the making. I thank Orla Murphy, my Project Manager and Editor, who has delivered each of my annual reports over the last eight years. Orla has shown greater depth of knowledge and policy acumen each year, adapting to an entirely new field of study every 12 months. Her enthusiasm and flexibility have been extremely impressive, and I know she will distinguish herself in her next policy role.

Contributors and their colleagues

I would like to express my sincere thanks to all those who contributed text, images and data to support this report, most particularly letter authors. What an extraordinary roll call of international health leaders! I am grateful for the time each has taken to lay out their opinions and concerns in their letters to me and hope that this report reflects our mutual desire for improved health and education systems, improved R&D and continuing UK engagement in global health.

Of course, given the seniority of the main contributors, my team have been assisted by contributors' staff and colleagues in the collation of the letters in report.

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My private office

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