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# Health challenges

Kenneth Lynch

## Introduction

The 2014 World Health Organization (WHO) report on health in the African region described the widely held perception that there has been no progress on improving health in the region as a ‘convenient untruth’ (WHO, 2014: xx). Harmonization for Health in Africa (HHA), a consortium of international organisations working on health and well-being issues in the continent, demonstrated that Africa accounted for only 11 per cent of the global population but sub-Saharan Africa accounted for 49 per cent of maternal deaths, 50 per cent of child deaths under 5 years and 67 per cent of HIV/AIDS cases (HHA, 2011). Despite the wider economic and social challenges facing the continent that are discussed elsewhere in more detail in this book, in fact considerable achievements have been made. However, this said, there is considerable room for progress, both in terms of global health indicators and in terms of wider enhancements in public health outcomes for the people of Africa. This chapter sets out to briefly discuss the major developments in health and identify the health challenges facing the continent. This comprises a brief discussion of the background to health issues in Africa, examining some of the latest data, in order to discern some patterns or trajectories. The chapter then explores the relationships between health and development, before considering some of the latest trends in the area of health.

## Background

The relationship between health and development in Africa, and indeed globally, has been considered over a long period. After Dr Ronald Ross’ discovery in 1898 of the life cycle of the mosquito and of its link with malaria, he levelled criticism at the British West Africa administration’s woeful neglect of sanitation in the cities of the colonies (Nye and Gibson, 1997). Ross visited Freetown in Sierra Leone in 1899 and in 1902, when he substantially advanced the understanding of the malarial virus. As a result of this, Ross made three main recommendations that were to have an impact on future urban planning:

These are (1) scrupulous drainage of the soil; (2) pending this, the persistent treatment of *Anopheles*’ breeding-pools by culicicides; (3) the segregation of Europeans. We also recommended the protection of public buildings, such as barracks, gaols, hospitals, and rest-houses by wire gauze screens; the isolation of the sick; and the habitual employment of mosquito-nets and *punkahs* by individuals.

(Ross, 1902: 92)

Culicicides refers to insecticides specifically used to target the *culicinae* mosquitoes, the family of mosquitoes known by then to pass on malaria. The *punkah* refers to a fan that is hand-operated by an unskilled labourer – also known at that time as a ‘coolie’ – hired to move the fan by pulling on a string to give the fan motion, and by doing so cool the colonial inhabitants of the buildings and keep mosquitoes from lying. Ross recognised the link between the environment and the living conditions of the people in Freetown and their vulnerability to disease.

Of course, the history of African health and medicine does not begin with the colonialists. David Livingstone, for example, recorded in his journals numerous observations of his encounters with healthy Africans and with African healers (Rijpma, 2015). More recent discourse around health and development focuses around two bodies of theory. The first is that research among health economists has found a relationship between life expectancy and economic growth. As Hans Rosling (n.d.) puts it in one of his Gapminder videos, there are no high-income countries with a life expectancy below 74 years and no low-income countries where it is above 64. This said, the middle-income countries, which account for a large proportion of the global population, do not follow a pattern. Acemoglu and Johnson (2007) argue that the relationship between life expectancy and economic growth suggests there is no evidence of a relationship between these two variables at this level of economic development.

Apart from the fact that African countries were excluded from Acemoglu and Johnson's (2007) analysis, Hussein (2012) argues that the development of a general model linking life expectancy and economy requires plausible causal explanations to complement any statistical patterns. He questions the underlying assumptions, in particular assumptions about the timing of countries entering an epidemiological transition (Omran, 1971). The epidemiological transition is a theory of unilinear transition from widespread infectious diseases to extended life expectancy and a rise in non-infectious diseases. Acemoglu and Johnson (2007) suggest that this began happening first in what Omran (1971) termed the 'classical model transition', the countries who entered the transition early, shortly after the end of the Second World War. Hussein (2012) cautions that the evidence suggests that this transition began in a small and inconsistent way from 1900 to the 1940s. Although available in the immediate post-war period and more widely used in advanced economies, as well as what Omran calls the accelerated epidemiological transition model, it was not until the 1970s and even the 1980s, argues Hussein, that widespread use of vaccines for polio, measles, mumps and rubella had substantial and immediate effects in the poorer countries of the world, including those in Africa. And this is when it begins to impact on these societies, or those following Omran's contemporary (or 'delayed') epidemiological transition model. More recent interpretations of Omran's theory suggest that the unidirectional model simplifies complex relationships between health, disease, technological, environmental and sociocultural changes, and that these relationships may result in reverse and overlap. This characterisation of the relationship between health and development as complex has significant implications for our understanding of health and development in Africa.

The most recent global and regional collection of health and development indicators suggests that most countries in Africa have made considerable progress on key areas of health concern. For example, the indicators summarised in Table 12.1 show significant progress across the WHO Africa region.

*Table 12.1 Health indicators for the WHO Africa region*

<i>Indicator</i>	<i>2000</i>	<i>2015</i>	<i>MDG target</i>
Under-five mortality rate (per 1,000 live births)	154	81	59
Infant mortality (per 1,000 live births)	94	55	n/a
Maternal mortality rate (per 1,000 live births)	840	542	205
Female life expectancy at birth (years)	51	60*	n/a
Male life expectancy at birth (years)	49	57*	n/a
Measles-containing vaccine coverage	54	73*	90
Population of underweight children (%)	23.6	17.7	17

*Source:* Adapted from WHO (2016, 2017).

Notes: Morocco, Tunisia, Egypt, Sudan, Djibouti and Somalia are excluded as they are part of the WHO Eastern Mediterranean region.

\* 2013 data provided as latest available.

However, what Table 12.1 also shows is that the progress has fallen short of the targets linked to the Millennium Development Goals (MDGs) set in 2000 with a deadline for 2015. When examining the record of the countries' performance against the MDGs, it is evident that many countries failed to meet several targets, but some countries failed on more targets than others. The more affluent countries such as Algeria, Botswana and Mauritius met more targets, while less affluent countries such as Chad, the DRC and Togo only met two health-related targets each. There were, however, one or two surprises. Rwanda met seven of the 13 targets, while Benin and Cameroon met only four. Cape Verde met six targets, while Equatorial Guinea, Kenya and Nigeria met only one. Only two countries (Cape Verde and Rwanda) achieved the target of reducing maternal mortality, while only six countries failed to meet the target for reducing the HIV/AIDS incidence, Algeria, Cape Verde, Equatorial Guinea, Mali, South Sudan and Uganda (WHO, 2016).

What is the context for this mixed performance? The following discussion explores some of the evidence on health across the African continent – the trends, as well as some links with poverty and development.

There are a wide range of international and national agencies working in the African health sector that are responding to the health challenges facing the continent. The agencies include government, non-governmental organisations (NGOs), international non-governmental organisations (INGOs) and international agencies. This makes the institutional landscape highly complex. One of the things that distinguishes Africa from other WHO regions is a significant proportion of the investment in health is from external agencies. This can act in the continent's favour, such as in the coordinated response to the HIV/AIDS epidemic, which provides a partial explanation of the widespread achievement across the continent on this MDG target. In the response to the HIV/AIDS epidemic, the initial approach, which was developed in Western countries where the risk groups were very different, was unsuccessful and had to be revised (De Cock et al., 2002). Iliffe (2006), in a major review of the history of the HIV/AIDS epidemic, argues that the African continent has suffered the most from the HIV/AIDS epidemic. Africa had the epidemic first, and when its significance was realised, its emergence was largely found to be the result of social and sexual networks. The African response has evolved and changed along with developments in medical governance, relationships between health donors and recipients, and the emerging understanding of the means of transmission.

The result has been a substantial and sustained effort in coordinating such health initiatives focused on a particular disease. There are a number of international and regional agreements that underpin these initiatives. For example, Table 12.2 lists a selection of key regional initiatives that were intended to reinforce the focus on the health-related MDGs. This has resulted in two major trends. The first is that coordination of health sector institutions has been focused around an increasing number of time-bound and coordinated sets of intentions. This provides a framework for all national health systems, as well as local and international agencies operating in the African health sector. The evidence above suggests that this is having measurable impacts, ensuring progress on specific targeted health issues. However, Makuta and O'Hare (2015) argue that the relationship between public health and health outcomes is weak. They go on to argue that there is evidence that this weak impact of public health spending may be partly explained by the quality of health governance. For example, their analysis can detect variations in governance that show where good governance can lead to improved outcomes for health indicators such as under-five mortality.

Table 12.2 African regional health initiatives

Year	Initiatives
2001	Abuja Declaration on the allocation of 15 per cent of public expenditure to health
2005	Maputo Declaration on tuberculosis as an emergency
2006	Year of Acceleration of HIV Prevention in Africa
2008	Ouagadougou Declaration on Primary Health Care and Health Systems
2010	Universal Access to HIV and AIDS Prevention, Treatment, Care and Support in Africa

Table 12.3 Major health challenges and opportunities facing the African region

Challenge	Opportunity
Chronic under-resourcing of health provision	HHA (2011) demonstrated that investing an additional US\$21–36 per person in sub-Saharan Africa could save states US\$100 billion by 2015.
Complex inequalities, leaving some populations more vulnerable to health problems	Urban–rural inequalities not as large as inequalities affecting children between educated and uneducated mothers. Wealth inequalities have significant impact on access to health.
Africa bears a disproportionate burden of several global health crises	Strategic investments in selected evidence-based interventions and targeted health systems strengthening in some areas (Heaton <i>et al.</i> , 2016).
Changes taking place, leading to improvements in some areas and new challenges (epidemics, non-communicable disease, climate change)	The adoption of integrated approaches providing an interdisciplinary response that can yield good results to complex health challenges (Smith <i>et al.</i> , 2015; Lebov <i>et al.</i> , 2017).

A second major trend illustrated in the regional health initiatives mentioned above relates to the way in which the influence of these initiatives poses barriers to African countries being able to take responsibility for integrated healthcare provision and establish governance over their own public health service. The initiatives outlined in Table 12.2 suggest that Africa is rising to meet specific major regional challenges, but some of these can pose a barrier to achieving widespread health and well-being for all Africans. For example, Table 12.3 illustrates a number of major health-related challenges facing the region that require more sustained and integrated approaches than a campaign to tackle a single disease might be able to achieve. Some of these challenges are exacerbated by the widespread involvement and influence of so many organisations. As the continent with the most number of low-income countries and a high proportion of the world's fragile states, this evidence demonstrates that there is still considerable work that needs to be done at the national level. For example, the WHO estimates that approximately one-third of Africa's disease burden can be attributed to environmental hazards, particularly relating to lack of access to safe water, indoor air pollution, and lack of access to sanitation and hygiene. These can combine with what are described as modern environmental health hazards, such as water pollution, air pollution and emerging infectious diseases. These traditional and modern disease burdens place a kind of double health burden on poor but developing societies (Nweke and Sanders, 2009).

There is some evidence therefore of beneficial impacts on the economy of improved health in a population. For example, the WHO (2014) estimates that for every 10 per cent increase in life expectancy at birth, there is a corresponding rise in economic growth of 0.4 per cent per year. If correct, this suggests that the beneficial economic impact of improved morbidity would cover the costs of investment in bringing about an improved situation. In fact, the HHA (2011) estimated that improved health investment of between US\$28 and 30 billion per year over the period 2011 to 2015 could save the lives of 3.1 million people, prevent stunting in approximately 4 million children, increase the number of health workers by almost 1 million, and bring about economic benefits of almost US\$100 billion in 2015 alone. In other words, provide a fourfold economic return on investment and save lives, employ health workers and improve the health prospects of millions of children (WHO, 2014). It can be argued that an African child has as much right to health and well-being as a child growing up in England, the US or New Zealand. Improved health and well-being is therefore beneficial to the slippery concept of human rights, as well as to economic development.

There has been a considerable decline in child, maternal and adult mortality rates, and substantial decreases in the burdens of several diseases.

Two major population trends are likely to have a significant impact on the continent's ability to respond to the health challenges it faces. The first is that the declining levels of population growth and parallel declines in female fertility rates mean that health outcomes for African infants, children and mothers have been improving. The second is that as the population works through a transition to a majority urban-based population, a larger proportion of the population will be closer to primary healthcare, pharmacy and hospital facilities. This will result broadly in quicker and more accessible medical assistance and greater access to specialist medical treatments, though clearly proximity does not necessarily mean easy access. It will also provide the potential for public health and planning administrations to provide healthier living conditions for a larger share of the population.

The evidence shows that the continent is still some way behind the rest of the world, with health indicators lagging. For example, life expectancy at birth is around 15 years behind the global situation. While enormous improvements in child mortality have been achieved, Africa still has the highest levels of any region – with almost double the rates of the nearest other WHO regions (WHO, 2016). Similar patterns exist on many of the health indicators, but as discussed above, some of the positive achievements are the result of approaches tackling particular diseases or health issues rather than achieving system-wide healthcare provision. Small-scale successes do also achieve impact that can be challenging to scale up to national-level health systems.

## **Infectious diseases**

In Africa, communicable diseases account for two-thirds of the disease burden. There have been significant successes in efforts to tackle this burden, resulting in halving malarial deaths through the application of simple and affordable interventions such as increased availability and use of insecticide-treated bed nets, diagnosis-based treatment, community-based vector control and innovative combination therapies (Nweke and Sanders,

2009). Similarly, there are a number of other elements of the infectious disease burden that can be reduced with relatively inexpensive solutions, focused on access to clean water and sanitation facilities. However, more complex infectious diseases, particularly newly emergent diseases such as HIV/AIDS and Ebola (see Box 12.1), pose more complex challenges to health systems. In all these cases, integrated and universal health provision and prevention is cheaper and more effective, but ultimately requires the institutional support from national health services.

### **Box 12.1 Zoonotic disease in African urban areas: the case of Nairobi**

Zoonotic diseases are diseases that affect animals. The risk to human health arises from the possibility of them jumping from animals to humans. A number of recent epidemics that have been categorised as Public Health Emergency of International Concern (PHEIC) have been diseases that fall within this category, including Ebola, avian influenza and swine flu. One example of a response to this emergence of the risk to human health of zoonotic diseases has been the rise of the One Health (OH) approach. It has been adopted because of the challenges experienced while addressing the enormous burden of endemic zoonotic diseases, including in the areas of laboratory diagnosis, surveillance and response to outbreaks.

For example, in Kenya, the OH approach has gained support and been successfully applied in response to disease outbreaks of human African trypanosomiasis (April 2012), rabies (March 2012) and anthrax (October 2012). Kenyan prevention and control strategies for rabies and Rift Valley fever are also at advanced stages of development.

Another related approach illustrating the complexity of zoonotic disease transmission is in the UrbanZoo research project, which adopts an interdisciplinary research approach that addresses the links between social-environmental and spatial conditions and the microbial diversity to which people are exposed in rapidly growing urban and peri-urban areas, particularly where large proportions of the population are living in slum conditions where livestock, dogs and rodents are present. The project also addresses planning, economic development and the institutional context in which zoonotic diseases develop in Nairobi and how this is shaped by social and spatial fragmentation. This involves the collection of samples of food, water and stools in order to carry out a battery of biochemical, biological and genetic tests to understand the disease transmission routes and barriers. For example, strands of the research focus on goat's milk value chains, human nutrition in poor urban residents, molecular phylogenetics of bacteria, food chain risk assessment, and delivery of integrated surveillance and disease control activities. The project also mapped the movement of livestock in order to gain a better understanding of exposure of children to animals in two of Nairobi's slums. Over several years, the project aims to understand the link between keeping livestock (farm animals: cows, chicken, pigs, etc.), consuming livestock products (milk, meat, eggs, etc.) and children getting diarrhoea in informal settlements.

Nairobi has been transformed into a city with a growing human population. This population growth and the pace of change raises many questions about the vulnerability of this population to zoonotic disease risk. In essence, the livestock food system context (the 'milieu') is a major piece of the puzzle of understanding disease emergence and planning improved systems of managing livestock food systems. Livestock health and human health are therefore intricately linked.

*Source:* Hassell et al. (2016) and Alarcon *et al.* (2017).

## **Healthcare provision**

Herrick (2017) points out that while Africa bears 24 per cent of the world's disease burden, it has only 3 per cent of the world's health workers. This places the region at a significant disadvantage in terms of the human resources available to tackle its health burden. Heaton et al. (2016) argue that the presence of a skilled health

attendant at birth is associated with better health of the child. However, they also found that higher levels of wealth increased the likelihood of a medical attendant at birth, suggesting that wealth benefits health. So, this results in the irony that increased spending on training birth attendants may improve the health prospects of the wealthy before it benefits the poor. Heaton *et al.* (2016) argue therefore that significant reductions in health disparities will not necessarily occur unless this becomes an explicit goal of health policy.

Ruckert and Labonté (2014) argue that one response to the health challenges facing the lowest-income countries, and related to the change in aid architectures, has been a rise in global health partnerships (GHPs). A key strand of this response has been the rise of public–private partnerships (PPPs) as a tool for global health. Ruckert and Labonté (2014) argue that on the one hand, the rise of GHPs and PPPs have resulted in additional resources that would otherwise be unavailable to the health systems. On the other hand, such initiatives have served to undermine the alignment of aid, international health interventions and local health policies, leading to a complex governance of health responses. Herrick (2017) argues that a further effect of this is to focus initiatives around campaigns and specific diseases at a global level, rather than fostering the development of integrated national-level health policy and governance. Such an approach assumes that the only response to such diseases relies on clinical, market-based solutions, and a focus on diseases that are a global-level concern, and makes response to national- and local-level health issues more challenging if they are not covered by GHPs. This does not build national healthcare systems that are integrated, and it can interfere with this, for example by distracting from system-wide initiatives, or by recruiting health professionals out of national health systems. A stark example of this is illustrated in the 2013 response to a TB epidemic in Sierra Leone. This epidemic was brought under control and declared as finished through the combined efforts of international TB partnerships and the national health service. The following year, the country's health system was found wanting in the face of the Ebola epidemic of 2014–2015.

Patel (Chapter 15, this volume) discusses international partnerships focused around access to medicines. This is particularly successful in the establishment of vaccination programmes. However, some GHPs have failed to coordinate with national health systems or even donor countries. Ruckert and Labonté (2014) report on a study in which almost half a Tanzanian medical officer's time was spent writing reports for 11 different funders.

## **Rising issues**

The latest research in health-related issues in Africa suggests a small number of key developments in health risks, research and treatment. This section will now briefly touch on each of these as areas that merit future attention.

## **Vulnerability to epidemics**

Ilife (2006) maintains that the history of HIV/AIDS is part of Africa's history of human colonisation on the continent. The zoonotic dimension is also important because in the case of these diseases, an integrated approach to health will optimise the interventions, in particular where a high proportion of the population lives in close proximity to animals that could form the zoonotic disease pool or vector, which leaves them vulnerable to infectious diseases. In Africa, a high proportion of the population is directly dependent on agriculture, which can include husbanding animals among their agricultural activities. In urban areas, a high proportion of the population – particularly those living in slums and squatter settlements – live close to disease vectors, such as livestock, dogs, fowls, insects and rodents (see Box 12.1). The major health challenges summarised in Table 12.4 illustrate the importance of combining human and environmental factors and the need for integrated public health systems.

## **One Health approach**

Calvin Schwabe, known as the 'father of modern veterinary epidemiology', traced the origins of Western medicine to the 'one medicine' of ancient Egyptian and Dinka priests. He argued for a return to those roots, identifying in a detailed case study of southern Sudanese specialists treating animals and people (Schwabe and Kuojok, 1981). More recently, Lebov *et al.* (2017) outlined the One Health approach as a complex and

multidisciplinary approach that acknowledges the integrated nature of human, animal and environmental health. In 2015, the WHO designated 15 diseases that were at risk of severe outbreak, two-thirds of which involve an animal pool or transmission vector, indicating the importance of the need for more research on this type of health risk (WHO, 2015; see also Box 12.1). Leach *et al.* (2017) present analysis of a range of disease cases studies from across Africa that link ecosystems, livelihoods and well-being. They argue that this evidence suggests that these links represent synergies, tensions and trade-offs that need to be better understood in order to inform One Health approaches to reduce disease burdens and maximise access to well-being.

### **Social and economic circumstances**

The social and economic development in Africa is leading to an increasing proportion of the population dwelling in urban areas. It is well documented that the population of the continent will generally shift from a physically demanding agricultural livelihood, consuming subsistence-produced agricultural commodities, to predominantly urban scenarios, where a significant proportion of the population rely on access to low-cost processed foods, sometimes pre-prepared, and spend long periods of the day physically inactive as a result of long commutes, or pursuing jobs that do not require physical labour. The increased consumption of tobacco and alcohol, as well as sodium and sugar in processed foods, contributes to this trend. This change in lifestyle, combined with improved access to water and sanitation, means that there is an emerging burden of non-communicable diseases (NCDs), including strokes, hypertension and diabetes. In fact, some of the latest research on these describe an NCD epidemic. This can also result in a double burden where residents of low-income slum areas – normally defined by their lack of services, including sanitation, water and electricity – suffer from communicable diseases associated with higher levels of poverty and higher vulnerability and exposure to environmental health risks, combined with the NCD risks associated with their urban lifestyle (Ramin, 2009; Joubert, 2015).

### ***Introduction of continental centre for disease control based on the model of the US CDC***

The examples of the health challenges facing the continent, some of which are illustrated in Table 12.4, show the scale of the future challenges. There is therefore a need to share practice, research and resources across the continent. The inception in January 2017 of the Pan-African Africa Centres for Disease Control and Prevention (Africa CDC) in Addis Ababa, Ethiopia is the latest response to this need. The centre is modelled on and supported by the US Center for Disease Control. Its main functions are:

- 1 health surveillance and improving capacity for surveillance, disease prediction, and decision- making and action on public health;
- 2 clinical and public health laboratory networks across Africa;
- 3 supporting preparedness and response planning for public health emergencies; and
- 4 strengthening the science underpinning public health practice.

This will build on the successful experience of peer support during the epidemics, for example the support provided by the African Union to Sierra Leone, Guinea and Liberia during the 2014–2015 Ebola epidemic. Some 862 African volunteers from 20 countries were deployed under the Africa Union Support to the Ebola Outbreak in West Africa (ASEOWA) programme (AAEST, 2016). Their work comprised the tracing of disease contacts, training over 6,500 medical personnel, the management of emergency treatment units, achieving a 52 per cent survival rate, with no medical personnel affected with the disease.



Table 12.4 One Health approach to researching diseases of high outbreak risk in Africa

Health threat	Environmental factors	Animal factors	Human factors	African
Crimean-Congo haemorrhagic fever	Tick habitat – bushes and tall grasses	Ticks Livestock infections	Use of insect repellent Contact with livestock	Endemic throughout Africa – co-located with the <i>Hyalomma</i> tick
Ebola virus and Marburg virus	Climatic conditions associated with outbreaks	Fruit bats are reservoirs Seroprevalence in dogs as sentinels Impacts on animal populations	Cultural practices in caring for the sick Treatment of the deceased	Guinea, Sierra Leone and Liberia (2014-2015), DR Congo
Lassa fever	Household conditions Poor sanitation	Rodent urine or faeces	Grain storage practices Hygiene Disposal of contaminated materials in hospitals	Endemic in Benin, Ghana, Guinea, Liberia, Mali, Sierra Leone
Middle East respiratory syndrome (MERS) coronavirus	Persistence of MERS on environmental surfaces and air	Dromedary camels	Early diagnosis Medical countermeasures (such as isolation) to prevent transmission Personal protective equipment for healthcare staff	Egypt, Tunisia
Nipah virus	Haze deforestation and drought forced bats to migrate to areas where pig farming was common	Pigs affected and may be hosts Bats are reservoirs	Pig slaughtering methods Consumption of raw date palm sap (liquor) Prevention of nosocomial infection	Ghana
Rift Valley fever	Heavy rainfall affected by ocean temperatures Land use degradation (crop irrigation providing mosquito breeding sites)	Mosquitoes Livestock	Contact with animal fluids (e.g. birth or slaughter) Irrigation practices	Niger (2016), Mauritania (2012), South Africa (2010)

Source Adapted : from WHO (2015) and Lebov *et al.* (2017).

## Conclusion

This chapter has identified a number of strategic challenges that need to be overcome to improve the health outcomes for Africans. These include increasing national investment levels and increasing the number of health professionals per head of the population. Some of this will be made easier as a greater percentage of Africans live in the city. As African economies have grown over the last decade, more efforts have gone into raising tax revenue so there is money to invest in improved health infrastructure.

This chapter discusses contradictory evidence of both considerable progress in health outcomes for Africans and evidence that simply by the accident of being born an African, health outcomes are still considerably worse than in any other region. Much of the progress has been on health challenges focused around single issues such as child mortality, HIV/AIDS or recent epidemics. These have benefited from global and regional partnerships mobilising human and financial resources for targeted outcomes. There is no doubt this has saved lives and improved health outcomes. However, as African societies modernise and grow their economies over the next 20 years, they will also experience health transitions, changes in social and demographic structures, and climate change that will require development of robust public health services that focus as much on prevention and well-being as on responding to health crises.

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