COUNTRY PROFILE: LIBERIA

Overview of Liberia's health system

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LIST OF ABBREVIATIONS

AIDS	Acquired immune deficiency disease
EPHS	Essential Package of Health Services
EPSS	Essential Package of Social Services
HDI	Human development index
HIV	Human immunodeficiency virus
JFKMC	John Fitzgerald Kennedy Medical Centre
MDG	Millennium Development Goal
MOHSW	Ministry of Health and Social Welfare
NPFL	National Patriotic Front of Liberia
OOP	Out-of-pocket
UN	United Nations
US	United States
US$	United States dollar
WHO	World Health Organization

EXECUTIVE SUMMARY

Liberia was founded as a haven for freed slaves from the Americas with settlement starting in the early 19th Century. Liberia is found on the coast of West Africa with the capital at Monrovia and is bounded by Sierra Leone to the northwest, Guinea to the north, Côte d'Ivoire to the east, and the Atlantic Ocean to the south and west. The people of Liberia include indigenous people who migrated from western Sudan in the late Middle Ages, black immigrants from the United States and the West Indies, and black immigrants from neighbouring western African states. More than two dozen languages are spoken in Liberia and English is the official language. About two-fifths of Liberians are Christian, one-fifth are Muslim and roughly two-fifths follow traditional African religions. The Ebola crisis eroded some important gains that Liberia has made in reducing poverty and is expected to have a substantial impact on Liberia's economy over the medium term in addition to the effects of declining global commodity prices. Liberia successfully attained Millennium Development Goal (MDG) 4, but progress in MDGs 5 and 6 is modest, with maternal and neonatal mortality remaining high. Communicable diseases, including malaria, tuberculosis, respiratory infections, HIV/AIDS, and most recently, the Ebola virus outbreak, contribute significantly to Liberia's burden of disease, in addition to the increasing prevalence of non-communicable diseases. Liberia generally lacks waste collection and sanitation infrastructure. While the proportion of public expenditures in the health sector has increased to nearly 36% as of 2013, Liberia remains dependent on external donors, which comprise over half of total funding. Still, a number of innovative platforms have emerged in recent years.

1. COUNTRY AT A GLANCE

Component	Details/indicator/year	Data
Population	Total population (2014)	4 396 554[a]
	Percentage of urban vs. rural (2014)	Urban: 49, rural: 51[a]
Geography	Liberia's terrain has four main features in parallel: coastal plains, rolling hills, a dissected plateau with scattered low mountains, and mountainous northern highlands. The climate is generally warm and humid, with a dry season from November to April and a rainy season from May to October.[b]	
Ethnic composition	Liberia has three main ethnic groups: indigenous people, who migrated from western Sudan in the late Middle Ages and comprise the majority, black immigrants from the United States and the West Indies otherwise known as Americo-Liberians, and other black immigrants from neighbouring states who migrated during the anti-slave-trade campaign and European colonial rule.[b]	
Government	The government of Liberia is largely patterned after that of the United States, and is considered a multiparty republic. The country has 15 counties with the capital at Monrovia. The president serves as head of state and government and is directly elected for a six-year term. The legislature, also called the National Assembly, is comprised of the House of Representatives and the Senate; representatives serve six-year terms, while senators serve nine-year terms. The judicial system is composed of the Supreme Court, an appeals court, magistrate courts, criminal courts, and in some communities, traditional courts.[b]	
Economic and infrastructure data	GDP per capita (purchasing power parity) (2014)	US$ 842.4 (current international dollars)[a]
	Economic growth as percentage of GDP (2014)	0.7[a]
	Gini-index (2013)	38.2[c]
	HDI (2014)	0.430 (ranked 177)[d]
	Percentage of people below national poverty line (2007)	63.8[a]
	Percentage of unemployment (2014)	3.8[a]
	Percentage of adult literacy (2007)	43[a]
	Education gender parity index (2014)	0.88[a]
	Percentage of population with access to sanitation (2015)	Access to improved drinking water: 76 (urban: 89, rural: 63)[a] Access to improved sanitation facilities: 17 (urban: 28, rural: 6)[a]
	Percentage of population with access to electricity (2012)	9.8[a]

Health system	Health expenditure as percentage of GDP (2014)	10.0[a]
	Annual public expenditure on health as percentage of total health expenditure (2014)	31.5[a]
	Health expenditure per person (2014)	US$ 46 (current US$)[a]
	Number of physicians per 1 000 population (2010)	0.014[a]
	Number of nurses and midwives per 1 000 population (2010)	0.3[a]
	Percentage of births with skilled attendants (2013)	61[a]
	Average life expectancy in years (2014)	61[a]
Disease burden	HIV prevalence as percentage among adults aged 15–49 (2014)	1.2[e]
	Deaths due to AIDS (2014)	2 000[e]
	Deaths due to non-communicable diseases (2012)	11 700[f]
	Deaths due to homicide (2012)	469[f]
	Maternal mortality rate per 100 000 births (2015)	725[a]
	Infant mortality rate per 1 000 births (2015)	53[a]
	Under-five mortality rate per 1 000 births (2015)	70[a]
Top five causes of mortality as percentage of deaths (2012)[g]	1. Lower respiratory infections	12.2
	2. Malaria	8.4
	3. Tuberculosis	5.6
	4. HIV/AIDS	5.6
	5. Stroke	5.3
Top five causes of DALYs (2012)[g]	1. HIV/TB/malaria	ND
	2. Maternal/neonatal/nutritional	ND
	3. Other infectious diseases	ND
	4. Acute respiratory infections	ND
	5. Other non-communicable diseases	ND

GDP: gross domestic product; gini-index: measures the extent to which the distribution of income (or consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution; HDI: human development index; DALYs: disability-adjusted life years.
Sources: [a] World Bank (2015); [b] Holsoe and Jones (2014); [c] UNDP (2013); [d] UNDP (2015); [e] Joint United Nations Programme on HIV and AIDS (2014); [f] WHO (2012); [g] WHO (2015c).

2. COUNTRY CONTEXT

2.1 COUNTRY HISTORY AND POLITICAL SYSTEM

Liberia was founded as a haven for freed slaves from the Americas with settlement starting in the early 19th Century. In 1847, settlers issued a declaration of independence and drew up a constitution largely modeled on that of the United States (US). In 1926, the Firestone Tyre and Rubber Company opened a rubber plantation on land granted by government and rubber production became the backbone of the economy. In 1943, William Tubman was elected president and in 1944 the government declared war on the Axis powers. Racial discrimination was outlawed in 1958 and in 1971 Tubman died, succeeded by William Tolbert Jr. In 1974, the government accepted aid from the Soviet Union for the first time and signed a trade agreement with the European Economic Community in 1978. Years of instability followed, with Master Sergeant Samuel Doe carrying out a military coup in 1980 in which President Tolbert and 13 of his aides were publicly executed. A People's Redemption Council headed by Doe suspended the constitution and assumed full powers and Doe won presidential elections in 1985 (BBC, 2015).

The National Patriotic Front of Liberia (NPFL), led by Charles Taylor, began an uprising against the government in 1989 and in the following year, the Economic Community of West African States sent a peacekeeping force resulting in the execution of Doe by a splinter group of the NPFL. After several years of fighting, Taylor won a presidential election supported by international observers and deemed as free and fair. Border fights began at the turn of the millennium. Both Ghana and Nigeria accused Liberia of supporting Revolutionary United Front rebels in Sierra Leone causing Britain and the US to threaten to suspend aid to Liberia. In 2001, the United Nations (UN) Security Council re-imposed an arms embargo to punish Taylor for trading weapons for diamonds from rebels in Sierra Leone. In the following year, more than 50 000 Liberians and Sierra Leonean refugees fled fighting in the region, with Taylor declaring a state of emergency. In 2003, talks in Ghana aimed at ending the rebellion were overshadowed by an indictment, which accused President Taylor of war crimes over his alleged backing of rebels in Sierra Leone. Fighting intensified in 2003, and rebels battled for control of Monrovia. Nigerian peacekeepers arrived later that year, and Charles Taylor left Liberia after handing power to Moses Blah, his deputy. The interim government and rebels signed a peace accord and Gyude Bryant was chosen to head the interim administration. US forces pulled out of Liberia at the end of 2003 and the UN deployed thousands of troops in a peacekeeping mission (BBC, 2015).

In 2005, Ellen Johnson Sirleaf became the first woman to be elected as an African head of state. In February of the following year, a Truth and Reconciliation Commission was set up to investigate human rights abuses between 1979 and 2003. Former president Charles Taylor appeared before a UN-backed court in Sierra Leone in 2006 on charges of crimes against humanity and the Netherlands-based International Criminal Court agreed to host his trial. The UN Security Council lifted its ban on Liberian diamond exports in 2007 after the ban was imposed in 2001 to stem the flow of “blood diamonds”, which helped to fund the civil war. Charles Taylor’s war crimes trial started in The Hague in June 2007 and in 2012, Taylor was found guilty of war crimes for aiding and directing rebels in Sierra Leone and sentenced to 50 years in jail; to be served in Britain (BBC, 2015).

Municipal elections had not been held in Liberia since 1985 because of financial constraints and successive civil wars. As such, and in 2008, the Supreme Court ruled that the president could appoint local mayors as the government could not afford to hold municipal elections. The Truth Commission submitted its report to parliament in 2009, recommending the prosecution of 200 people and listing

others who should be barred from public office, including President Johnson Sirleaf. The following decade saw a period of increased religious tension, especially after fighting erupted between Christians and Muslims in the northern province of Lofa in which a Christian student was killed. In 2010, the International Monetary Fund and World Bank devised a plan to relieve Liberia of its heavy debt burden; the 19-nation Paris Club of creditor countries pardoned Liberia of US$ 1.2 billion worth of debt. In 2010, President Johnson Sirleaf dismissed the cabinet—reportedly to start with a "clean slate"—and in presidential elections the following year, she was re-elected. In 2012, the President suspended the chief of forestry, launching a probe into recent timber deals amid concerns of widespread fraud; but in spite of this, campaign group Global Witness reported in 2013 that half the forest in Liberia was being logged illegally. The UN Refugee Agency completed its programme to assist over 155 000 Liberians in returning home (BBC, 2015).

Liberia announced emergency measures to combat the spread of an outbreak of the Ebola virus in July 2014. As a result, the World Health Organization (WHO) declared the spread of Ebola in West Africa an international public health emergency, calling for a coordinated response. US President Obama announced that 3 000 US military personnel would be sent to West Africa to build new health facilities and to train health workers (BBC, 2015). Over 11 000 people died of the disease in West Africa since December 2013, with 4 810 of these deaths occurring in Liberia (CDC, 2016). In January 2016, the UN declared Liberia and the whole of West Africa provisionally free of Ebola (BBC, 2015).

2.2 POPULATION

Liberia's population of approximately 4.4 million is split almost evenly between urban and rural areas (World Bank, 2015). The people of Liberia are classified into three major groups: indigenous people who migrated from the western Sudan in the late Middle Ages take up the majority; black immigrants from the US (known historically as Americo-Liberians) and the West Indies form the second group; and other black immigrants from neighbouring western African states form the third group. The Americo-Liberians are most closely associated with founding Liberia and most of them migrated to Liberia between 1820 and 1865, controlling the government until a military coup in 1980. Liberia's indigenous ethnic groups may be classified into three linguistic groups—all belonging to the Niger-Congo language family—namely: the Mande, Kwa, and Mel. The Mande are located in the northwest and central Liberia as well as in Senegal, Mali, Guinea, and Sierra Leone. Prominent among them are the Vai, who invented their own alphabet and who, in addition, use Arabic and English. The Kwa-speaking group occupies the southern half of the country and the Mel group includes the Gola and Kisi, who are also found in Sierra Leone and are known to be the oldest inhabitants of Liberia. More than two-dozen languages are spoken in Liberia but English is the official language. Predominant languages include: Kpelle, Bassa, Grebo, Dan, Kru, Mano, Loma, and Mandingo. About two-fifths of Liberians are Christian, one-fifth are Muslim, and roughly two-fifths profess other religions; primarily traditional African beliefs (Holsoe, Jones, and Petterson, 2014). Life expectancy is 61 years (World Bank, 2015) and the median age is quite young at 18.4 years (United Nations, 2015).

2.3 ECONOMY

Table 1. Economic measures of Liberia

Indicator/year	Data
GDP per capita (purchasing power parity) (2014)	US$ 842.4 (current international dollars)[a]
Economic growth as percentage of GDP (2014)	0.7[a]

Debt as percentage of GDP (2014)	33.3[b]
Gini-index (2013)	38.2[c]
HDI (2014)	0.430 (ranked 177)[d]
Percentage of people below national poverty line (2007)	63.8[a]
Percentage of unemployment (2014)	3.8[a]

GDP: gross domestic product; gini-index: measures the extent to which the distribution of income (or consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution; HDI: human development index.
Sources: [a] World Bank (2015); [b] IMF (2015); [c] UNDP (2013); [d] UNDP (2015).

The Ebola crisis has eroded some of the important gains that Liberia has made in reducing poverty and vulnerability, with real gross domestic product (GDP) estimated at 8.7% in 2013 and projected at 6% for 2014 before the crisis, subsequently estimated to be less than 1%. Rubber production and exports had already slowed as a result of lower international prices and were further affected by the quarantines and curfews implemented owing to the Ebola crisis. Growth in manufacturing has continued to be constrained by inadequate electricity and the generally weak business environment coupled with the epidemic has resulted in disruption of production processes across several sectors. The Ebola outbreak is expected to have a substantial impact on Liberia's economy over the medium term. Expenditures directly related to the crisis pushed up the fiscal deficit to 10% of GDP in FY15 and is projected to ease down to 5.4% in FY16. The effective implementation of Liberia's Post-Ebola Economic Recovery Plan is critical to mitigating the twin effects of the Ebola virus and declining global commodity prices (World Bank, 2014).

2.4 ENVIRONMENT

Liberia is bounded by Sierra Leone to the northwest, Guinea to the north, Côte d'Ivoire to the east, and the Atlantic Ocean to the south and west. The four physiographic regions of Liberia parallel the coast. The coastal plains are low and sandy, extending for approximately 560 km along the coast and 40 km inland. Parallel to the coastal plains is a region of about 30 km of rolling hills, which is suitable for agriculture and forestry. Most of the country's interior is a dissected plateau with scattered low mountains ranging from 180 to 305 metres in elevation. Major rivers in Liberia include the Mano, Morro, and Cavalla rivers, which form sections of Liberia's boundaries, with the Farmington River used as a source of hydroelectric power. Waterfalls, rapids, rocks, and sandbanks limit river navigation inland to short distances. Severe flooding often occurs in the coastal plains during the rainy season. The climate is warm and humid year-round, dominated by a dry season from November to April and by a rainy season from May to October. Deforestation and drought in the Sahel have affected the climate, lengthening the dry season by almost a month in some areas. Mean annual temperatures range between 18 °C in the northern highlands to 27 °C along the coast. Rainfall is irregular, with about 5 200 mm occurring at Cape Mount and diminishing inland to about 1 800 mm. The interior has hot but pleasant days and cool nights during the dry season (Holsoe, Jones, and Petterson, 2014).

3. HEALTH SYSTEM

3.1 OVERVIEW

While Liberia has achieved Millennium Development Goal (MDG) 4, it was unable to achieve MDGs 5 and 6 and as such, maternal and neonatal mortality remain quite high. Communicable diseases, including malaria, tuberculosis, respiratory infections, HIV/AIDS, and most recently, the Ebola virus outbreak, represent major contributors to Liberia's burden of disease, in addition to the increasing prevalence of non-communicable diseases (WHO, 2014). Liberia generally lacks waste collection infrastructure and has low improved sanitation coverage (WHO, 2009). Liberia is highly dependent on funding from external donors (WHO, 2015a) and has limited infrastructure and shortages in human resources, in spite of the surge in production of nurses. Resources tend to be inequitably distributed, with understaffing at some health facilities and overstaffing at others (Government of Liberia, 2011). In the wake of the Ebola epidemic, Liberia aims to pool funds and strengthen its health system to prevent future outbreaks and has renewed commitments to improving its overall health status (Government of Liberia, 2011; WHO, 2014).

3.2 ORGANIZATION

The Ministry of Health and Social Welfare (MOHSW) is the principal national overseer of the health sector and leads other ministries and departments, including the Civil Service Agency and Ministries of Finance, Justice, Internal Affairs, and Planning and Economic Affairs. The Ministries of Education, Gender and Development, and Youth and Sports are also involved in developing service delivery strategies. Under the National Decentralization Policy established in 2009, the County Health and Social Welfare Team acts as the operational arm of the MOHSW, managing all Ministry resources and implementing national policy within their county (Government of Liberia, 2011).

Liberia's national health system is delivered at three main levels (Government of Liberia, 2011):

1. **Primary level**: this includes community- and facility-based services. Facility-based services include essential preventive, curative, and health promotion services, including maternal and newborn health, child health, communicable diseases, sexual and reproductive health, mental health, and basic emergency care. Community-based services focus on preventive and promotion services, provide linkages to facility-based services, and attempt to maximise overall participation. Clinics offer the Essential Package of Health Services (EPHS), though care may be provided elsewhere as well, such as at mobile clinics or by community-based providers. Community Health Volunteers, Household Health Promoters, and Trained Traditional Midwives also provide care and link to facilities, though they are not formally compensated.

2. **Secondary level**: this encompasses all aspects of the primary level of care and also includes 24-hour care, hospitalisation, emergency services, diagnostic services, comprehensive emergency obstetrics care, and emergency surgical services, among others. Service is provided through either a health centre or a hospital, overseen at the district or county level. Health centres serve as the transition between primary and secondary levels of care, providing primary care and a small laboratory and inpatient services for a population of up to 25 000 to 40 000. County hospitals serve up to 200 000, providing primary care and laboratory and basic radiology services.

3. **Tertiary level**: this encompasses all aspects of the secondary level of care and also includes specialised consultative care, and is overseen at the national level. It also provides training and

teaching support by contributing to clinical guidelines and technical support to regional referral hospitals, which serve a catchment population of about 500 000. John Fitzgerald Kennedy Medical Centre (JFKMC) is the national referral facility and is intended to be the top teaching hospital for physicians by operating a residency programme and covering specialties such as cardiology and oncology.

3.3 CAPACITY

Table 2. Number of facilities and health workers per population, Liberia

Indicator/year	Data
Number of clinics (2011)	343[a]
Number of health centres (2011)	31[a]
Number of county hospitals (2011)	24[a]
Number of beds per 1 000 population (2010)	0.8[b]
Physicians per 1 000 population (2010)	0.014[b]
Nurses and midwives per 1 000 population (2010)	0.3[b]
Community health workers per 1 000 population (2004)	0.04[b]

Sources: [a] Government of Liberia (2011); [b] World Bank (2015).

The two main packages of services delivered are the EPHS and Essential Package of Social Services (EPSS). While the EPHS focuses on prevailing disease conditions, the EPSS prioritises social wellbeing, particularly that of vulnerable populations. On average, health centres have 40 beds, county hospitals have 100 beds, and regional referral hospitals have 100 beds. In addition, JFKMC is the national referral hospital based in the capital Monrovia, and is limited in capacity to retain its status as a modest teaching hospital. Policy has dictated infrastructure to be distributed such that a few larger facilities serve large populations in urban areas and many small facilities and temporary service delivery points serve rural areas. In 2010, 80% of public health facilities met minimum facility accreditation criteria, while only 31% of private facilities did so. Although several health workers, such as Community Health Volunteers, exist at the community level, this is generally done on a volunteer basis and is not well supervised, resulting in an inefficient referral process and unnecessary burden on the secondary level of care. Hospitals also suffer from suboptimal distribution, with some small hospitals serving large catchment areas with inadequate resources and other hospitals too large for their patient populations. Policy has recommended reorganisation of the secondary level of care to allow improvement of physical conditions, staffing levels, and quality of care in hospitals (Government of Liberia, 2011).

Human resources in the health sector are not matched to population needs. A census conducted in 2009 reported that nearly 70% of the health workforce was either non-clinical or unskilled. Furthermore, staffing distribution has not accounted for variations in population sizes, with either under- or over-staffing of facilities. While the number and quality of pre-service training institutions have increased, there is a shortage of health workers; the exception being of registered nurses which are now in oversupply (Government of Liberia, 2011). Deploying health professionals to work in rural areas has also proven to be a challenge due to inadequate incentives and an inflexible salary scale (Government of Liberia, 2011).

3.4 POLICY ENVIRONMENT

The World Health Organization (WHO) (2014) states:

> Liberia has established a national vision of becoming a middle-income country by 2030 and the health and social welfare of the population are critically important to reach that vision. Therefore, in order to substantially improve the health status and social welfare of the population, the government led a participatory process of establishing a holistic, evidence-based policy framework and Plan (2011-2021) explicitly aimed at guiding decision makers through the next ten years. The National Health and Social Welfare Policy has been formulated at an important juncture in Liberian history. Within a context of stability and economic growth under a legitimate, accountable government, the country is shifting its focus from short-term recovery to long-term national development. Therefore the National Health and Social Welfare Policy focuses upon nationally set priorities on which all concerned partners are asked to concentrate their efforts in order to develop the accessible, responsive system necessary to substantially improve the health and social welfare of the population. In terms of service provision, the plan's main aims are: ensuring basic health services within 5 km of most communities, strengthening the existing services to increase coverage and utilization, and expanding the Essential Package of Health Services; and also increasing Human Resources for Health from 8 000 to 15 000 by 2021. However, the country faces a number of major challenges such as limitation of financial resources, shortage of essential health workers, etc. In addition, the country has also ratified the FCTC, and is making some progress in banning smoking in public places.

WHO (2014) lists the following as strategic priorities for Liberia:

1. Intensifying the prevention and control of communicable and non-communicable diseases.
2. Promoting health through the life-course (putting the health of mothers and children first).
3. Health systems strengthening based on the primary health care approach.
4. Preparedness, surveillance, and response.

3.5 HEALTH FINANCING

Table 3. Health financing data for Liberia, 2014

Indicator	Data
Total health expenditure (current US$)	US$ 203 430 000
Public expenditure on health as percentage of total expenditure	31.5
Public expenditure on health as percentage of general government expenditure	11.9
OOP expenditure on health as percentage of total private expenditure	44.8
Private insurance expenditure on health as percentage of total private expenditure	5.4

Expenditure of non-profit institutions serving households as percentage of total private expenditure	49.7
External funding (current US$)	US$ 99 818 000
Health expenditure as percentage of GDP	10.0

OOP: out of pocket; GDP: gross domestic product.
Source: WHO (2015a).

While the proportion of public expenditures in the health sector has increased over the years from about 15% in 2007-2008 (Government of Liberia, 2011) to nearly 36% as of 2013, Liberia remains highly dependent on external donors, which comprise over half of total funding (WHO, 2015a). The proportion of out-of-pocket payments remains relatively high, but has decreased from 35% in 2007-2008 (Government of Liberia, 2011) to 26% as of 2013 (WHO, 2015a). The majority of donor funds are directed towards contracts with non-governmental organisations (NGOs) and are often used to support government health facilities based on performance (Government of Liberia, 2011).

Liberia has explored possible additional forms of taxation to maintain current levels of government expenditure in the health sector, with pooling of resources through a sector budget and medium-term expenditure framework that collects both donor and government funds. Liberia has also explored prepayment schemes, such as community-based financing and social insurance, though this form of financing remains low in comparison to private expenditure. Liberia's policy framework prioritises primary health care and the implementation of evidence-based interventions and innovative payment mechanisms has also been prioritised (Government of Liberia, 2011).

3.6 COUNTRY DISEASE PROFILE

Table 4. Disease profile for Liberia

Indicator/year	Data
Age-standardized DALYs per 100 000 for communicable diseases (2012)	31 939[a]
Age-standardized DALYs per 100 000 for non-communicable diseases (2012)	26 045[a]
Age-standardized DALYs per 100 000 for injuries (2012)	4 388[a]
Under-five mortality rate per 1 000 live births (2015)	70[b]
Infant mortality rate per 1 000 live births (2015)	53[b]
Maternal mortality rate per 100 000 live births (2015)	725[b]
Estimated cases of malaria (2013)	1 600 000[a]
Estimated deaths due to malaria (2013)	2 200[a]
Prevalence of TB per 100 000 (2014)	510[a]
Incidence of TB per 100 000 (2014)	308[a]
Deaths due to TB among HIV-negative people per 100 000 (2014)	68[a]
Prevalence of HIV as percentage among adults aged 15–49 (2014)	1.2[c]
Deaths due to AIDS (2014)	2 000[c]
Deaths due to non-communicable diseases (2012)	11 700[a]
Deaths due to homicide (2012)	469[a]

Percentage of top five causes of mortality (2012)[d]		
1.	Lower respiratory infections	12.2
2.	Malaria	8.4
3.	Tuberculosis	5.6
4.	HIV/AIDS	5.6
5.	Stroke	5.3
Top five causes of DALYs (2012)[d]		
1.	HIV/TB/malaria	ND
2.	Maternal/neonatal/nutritional	ND
3.	Other infectious diseases	ND
4.	Acute respiratory infections	ND
5.	Other non-communicable diseases	ND

DALYs: disability-affected life years; TB: tuberculosis; ND: not determined.
Sources: [a] WHO (2015b); [b] World Bank (2015); [c] Joint United Nations Programme on HIV and AIDS (2014); [d] WHO (2015c).

Liberia has made significant strides towards improving child health and has successfully achieved MDG 4, with infant mortality decreasing from 144 deaths per 1 000 live births in 1986 (WHO, 2014) to 53 in 2015 (World Bank, 2015). Under-five mortality has decreased from 220 per 1 000 live births (WHO, 2014) to 70 in the same respective years (World Bank, 2015). However, maternal and neonatal mortality rates remain quite high and MDGs 5 and 6 have not been met. Communicable diseases represent a significant component of Liberia's disease burden, particularly malaria, tuberculosis, acute respiratory infections, diarrhoeal diseases, and HIV/AIDS. Liberia has made progress with respect to vaccine preventable diseases, as maternal and neonatal tetanus and polio have been eliminated and measles has been effectively controlled. Non-communicable diseases are increasing and the government has developed a policy and strategic plan to address these despite limited disease-specific data (WHO, 2014).

The recent Ebola virus outbreak began in 2014 and at last count resulted in 10 678 cases and 4 810 deaths in Liberia, with similarly significant figures in neighbours Guinea and Sierra Leone (CDC, 2016). At the time, Ebola had no cure and spread quickly across the West African region, drawing extensive media coverage and highlighting the lack of capacity of the health systems in the region. This resulted in focused efforts by a number of countries and NGOs to curtail the epidemic and strengthen the local health systems (Thomas, 2016). Liberia was declared Ebola-free on 9 May 2015, but a case reportedly occurred afterward on 29 June (Burki, 2015).

Socioeconomic, gender, and geographical disparities contribute significantly to Liberia's health status (WHO, 2014), in addition to environmental determinants of health. Access to potable water has improved significantly, though Liberia's previous war devastated the country's sewage systems and access to improved sanitation remains quite low at 17% overall. Lack of capacity has also resulted in largely deficient waste collection services, which is largely restricted to Monrovia (WHO, 2009; World Bank, 2015).

4. INNOVATION ECO-SYSTEM

According to Liberian Assistant Minister of Health, Tolbert Nyenswah:

> The Ebola crisis did not only affect the health sector. Every facet of our society was affected. From women and children to social protections, our economy and financial system; the GDP suffered hugely because of Ebola. But in particular, multilateral donors and banks should attend to our top government priority: roads, power and energy. Those are the three things that we need funded. (Anders, 2015)

Still, while the country needs basic infrastructure, platforms have sprung up to increase capacity for innovation. iLab Liberia, for instance, is a non-profit computer laboratory looking to increase capacity in information technology through free trainings and access to appropriate technology (iLab Liberia, 2012). Another example is U-Report, a free text-message-based platform launched during the Ebola epidemic to help users share information at the grassroots level, empowering communities and increasing information available about their status (Wilson, 2016). In other words, efforts are certainly being made at innovating for social impact, but for a robust innovation ecosystem to flourish, Liberia will need the infrastructure mentioned by Nyenswah and a supportive government with appropriate regulations. Multinational corporations and universities can also serve as enablers on the African continent in general (Pasquier, 2016).

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