

Following the 2001 Abuja Declaration of committing 15 percent government expenditure on health, is Africa making progress towards universal health coverage?

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Academic Year 2018 – 2019

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Project performed within the framework of the **Master in Health Economics and Pharmacoeconomics** program taught by Barcelona School of Management, a centre associated with Pompeu Fabra University

Following the 2001 Abuja Declaration of committing 15 percent government expenditure on health, is Africa making progress towards universal health coverage?

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I formally declare that I have written the submitted piece of work independently. I did not use any outside support except for the quoted literature and other sources mentioned in the paper.

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Abstract

Background: In 2001, 46 African Union nations signed the Abuja Declaration, committing 15 percent of their public expenditures to health.

Objectives: In this paper, I was motivated to determine if government spending on health could significantly predict the African countries’ progress towards universal health coverage service coverage (UHC-sc).

Methods: The nature of the term paper was primarily of qualitative descriptive research with limited inferential analysis. I explored the research question around the relations between domestic resources and progress towards UHC in Africa in two phases: literature review and secondary data analysis and interpretation.

Results: In 2018, only three countries have reached or exceeded the Abuja Declaration target, and no country has achieved the universal health coverage service coverage index threshold value of 80. The findings show that government health spending, particularly absolute per capita expenditure, does explain improvements in UHC-sc. Therefore, I rejected the primary and secondary null hypotheses indicating that linear coefficient is not equal to zero at the 5 percent p-value. Moreover, I determined that absolute expenditure per person has a stronger correlation and explanation for progress towards UHC-sc compared with government health spending as a proportion of government expenditures in African countries.

Discussion and conclusions: In moving forward, African leaders should institutionalize their commitments to attaining universal health coverage (UHC) through legislations and prioritize

health by striving towards the Abuja Declaration target while ensuring a minimum per capita spending required for provision of basic health services. Given the wide variations in performance despite same level spending, African countries should concurrently address allocative and technical efficiencies and strengthen financial management systems. Finally, at least in the short to medium terms, international and donor communities should support the African countries' path towards UHC with sufficient development assistance for health to bridge the expected domestic shortfalls.

Introduction

In 2015, total global health spending was estimated at 9.7 trillion US\$, accounting for 10 percent of world's total economy. (1) South Asia and sub-Saharan Africa regions have 37 percent of the world's populations and 50 percent of the global disease burden, but they accounted for only 2 percent of global health spending. (2) On the other hand, six high-income countries¹, accounting for less than 1 percent of the world's population, spent over 40 percent of the total. (3) Despite the advancements in global health and steady growth in total health spending (3.1 percent annually since 1995) across all regions, nearly 100 million people were pushed into extreme poverty due to health care expenses in 2010; 5.6 million children under 5-years of age died in 2016; and the incidence of infectious diseases – including malaria and dengue fever – is on the rise. (1)

In recent years, universal health coverage (UHC) has reemerged as a critical path for improving health outcomes, equity and financial protection. The World Health Organization (WHO) defines UHC as "all people have access to services and do not suffer financial hardship paying for them." (4) Currently WHO estimates that at least half of the population globally do not have full coverage of essential health services. Additionally, more than 800 million people spend at least 10 percent of their household budgets for health care. (5)

UHC has been framed as a multi-dimensional legal, humanitarian social, health economics, and public health concept. (6) The path towards UHC gained momentum following the second World War with the adoption of the Universal Declaration of Human Rights and the formation of WHO in 1948 and the Alma Ata Declaration in 1978. It achieved further prominence when codified as a key target in the 2030 Sustainable Development Goals (SDGs), supporting the notion of a 'grand convergence in health' in the next generation. (7) It is inevitable that progress towards UHC will have positive implications on other SDGs beyond health, such as

poverty alleviation, equity, social inclusion and cohesion, education and economic development.

In defining and measuring UHC, it is important to determine what is meant by 'access to services' and by 'financial hardship'. The general agreement is that essential and quality services range from health promotion and prevention, to treatment, rehabilitation, and palliative care, extending beyond a minimum package of health services and expanding as more resources become available. UHC includes not only individual treatment but also population-based services, such as promotional campaigns and water and sanitation. Moreover, protecting people from financial hardship ensures that people are not being pushed into poverty due to unexpected illness or that they are prohibited in utilizing health services due to financial barriers. However, UHC is not about free coverage for all possible health interventions and services as it will not be sustainable given the scarce resources and competing priorities.

Moreover, achieving UHC transcends health financing as it encompasses all components of the health system which according to WHO is defined as "all organizations, people and actions whose primary intent is to promote, restore or maintain health. This includes efforts to influence determinants of health as well as more direct health-improving activities." (8) Nevertheless, health financing, particularly from public sources, plays a key part in ensuring quality and quantity of health workforce, timely information management system, sustainable flow of essential commodities, availability of and access to health services and protection against catastrophic expenditures.

In 2001, following the Millennium Declaration, 46 Heads of State of African Union countries committed to allocating at least 15 percent of their annual public budget to improve the health sector. According to a WHO 2011 report, only one country had achieved the target, but 26 countries had increased the proportion of government expenditures allocated to health. (9) In 2014, four countries (from the WHO African region) had met or exceeded the 15 percent target but 19 countries were spending less on health as a proportion of their government spending than the early 2000s. **Various reports conclude that it is less about the ratio and trend of government health spending and more about the per capita health expenditure which is often too low to meet the national and global targets. In contrast, others argue that while absolute spending levels are important, the "emphasis should be on promoting a gradual growth in the relative allocation of**

government funds to the health sector” to avoid sending the message to countries that progress cannot be made at lower spending level. (10)

There are myriad studies analyzing the relations between various explanatory variables, such as gross domestic products, total health expenditures and general government revenues, and attaining UHC as a response variable. (11) (12) However, to the best of my knowledge, there is no specific analysis exploring the linkage between the Abuja Declaration target and UHC-service coverage (sc) index progress in Africa. In this term paper, therefore, I first review the socioeconomic context, global health status, and the current landscape of the Abuja Declaration’s proposed target of 15 percent general government health expenditure (GGHE) as a proportion of the general government expenditure (GGE). I then investigate the relations between an African country’s public expenditure and its advancement towards UHC only from the service coverage lens by separately analyzing the GGHE ratio and the absolute GGHE per capita as possible predictors. The overall null hypothesis is that government resources for health does not significantly explain the progress towards UHC-sc in the African nations.

This paper is organized into the following five sections: 1) background which focuses on the global health status, UHC, health financing and the Abuja Declaration; 2) hypothesis and objectives; 3) data and methods; 4) results; 5) discussion and conclusions.

Background

Global health status

According to the latest World Health Statistics report, more than 300,000 women died due to maternal causes in 2015, with nearly two thirds in the sub-Saharan Africa region. Also, the highest rate of adolescent birth rate (101 per 1000 women aged 15 to 19) is found in sub-Saharan Africa (compared to 44 globally). More than 20 percent of live births globally occurred without the presence of skilled health personnel, determined mainly by socioeconomic factors.

Moreover, under-five mortality rate dropped from 93 per 1000 live births in 1990 to 41 per 1000 live births in 2016; however, nearly half of the 5.6 million deaths were within the first month of life and point to the sub-optimal levels of neonatal care and services particularly in low-income settings. In 2017, 151 million and 6 percent of children under-five were too short for their age (stunted) and overweight, respectively.

In 2015, an estimated two million people were newly infected with HIV, which is one third lower than the new infections in 2000; however, antiretroviral therapy only reached 53

percent of people living with HIV (2016). Additionally, nearly quarter of a billion cases of malaria occurred in 2016, claiming the lives of close to half a million people, with only 60 percent of the population at risk having access to an insecticide-treated net.

In terms of non-communicable diseases (NCDs), 41 million deaths (71 percent of total deaths globally) were reported in 2016, majority of which were caused by cardiovascular disease, cancer, chronic respiratory disease, and diabetes. Compared to 1990, the total global disability-adjusted life-years or DALYs have remained unchanged at around 2.39 billion (2016) with increases to NCDs offset by decreases in infectious, maternal and neonatal and nutrition-related diseases.

Furthermore, there were nearly 800,000 suicide deaths (2015), 1.25 million road traffic injuries (2013) – as the leading cause of death for people aged 15 to 29 years – and 1.1 billion people smoked tobacco (2016). In 2012, indoor and outdoor air pollution contributed to more than six million deaths globally and nearly 900,000 deaths occurred due to unsafe water, sanitation and lack of hygiene, most of which in sub-Saharan Africa and south-east Asia regions.

Finally, almost half of all countries, including 90 percent of least developed countries, have less than one physician per 1000 people and over 60 percent fewer than three nurses/midwives per 1000 people. The World Health Organization estimates that at least half of the population globally do not have full coverage of essential health services, and in 2010, almost 12 percent of the world's population spent at least 10 percent of their household budget on health services. (5) (13) (14) (15)

In sum, despite the valiant efforts and achievements since 2000 when the Millennium Development Goals were established, the global public health community is faced with an unfinished agenda, abject inequities, and emerging challenges.

Universal Health Coverage

Historical context

"In my view," Margaret Chan, former Director General at WHO said in her May 2012 speech (accepting her second appointment), "universal (health) coverage is the single most powerful concept that public health has to offer". (16)

In the 21st century, UHC has reemerged as a 'powerful concept' in response to the global burden of disease and persistent disparities in health outcomes. However, its philosophy of 'equal access for all' to quality health services dates back centuries to the teachings of religious denominations and traditional healers. (17) The origins of contemporary UHC – which is to ensure that all people, regardless of their circumstances, should have access to the health services they 'need', rather than their ability to pay or without jeopardizing financial hardship – go back to late 19th century when Chancellor Otto von Bismarck introduced a series of bills guaranteeing access to health care and established the 'sick funds' in Germany. (18) (19)

Following the second World War, a sequence of key events and milestones shaped the development of 'health for all' movement. First, the Universal Declaration of Human Rights was adopted in 1948 and its article 25 states "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services." (20) The same year WHO came into existence when its constitution was ratified with the overall objective of "attainment by all people of the highest possible level of health." (21) Then in 1976, the multilateral treaty of International Covenant on Economic, Social and Cultural Rights, granting the 'right to health', among others, came into full force. (22) Two years later, in September 1978, the Alma Ata Declaration was adopted at the International Conference on Primary Health Care (PHC), which underlined the importance of PHC and urged actions to protect and promote the health of all. (23)

The eighties and nineties were fraught by two parallel ideologies with those promoting the strengthening of health systems and PHC delivery on the one hand, and others, led by UNICEF and the World Bank, which focused on a selective health care model based on cost-effective technologies and a vertical approach (e.g. immunization).

Following the Millennium Development Goals, the World Health Assembly passed a resolution in 2005 on sustainable health financing and universal coverage and social health insurance, which was reinforced by the release of the flagship 2010 World Health Report, entitled *Health systems financing: the path to universal coverage*. In 2012, the United Nations General Assembly adopted the resolution *Global health and foreign policy* which urged “governments to move towards providing all people with access to affordable, quality health-care services.” (24) Most recently, in 2015, 193 nations agreed to the 17 Sustainable Development Goals (SDGs) with health as the third goal, and importantly, UHC included as target 3.8, highlighting its prominent role in the global conversations and supporting the notion of a ‘grand convergence in health’ by 2030 when investments in health would make the health status of the least developed countries comparable with the wealthiest nations. (5) (7)

This movement towards expanded health coverage, concurrent with a significant rise in total health spending in the past seven decades, has been driven by increasing incomes and sustained social factors. (25) Experimentation with and implementation of UHC has taken off with varying pace and scope in several nations, including in the United Kingdom (1948), Sweden, Iceland, Norway, Denmark and Finland (1955-1964), Japan (1961) and more recently in South Korea (1989) and Thailand (2001). (26)

Theory and rationale

UHC can be viewed from a multi-dimensional framework, including legal, humanitarian social, public health and health economics. According to Stuckler, et al, as of 2009, 75 countries had legislation that provided a legal mandate for UHC. (27) Particularly from a health economics’ perspective, income growth as measured by gross domestic products (GDP),² creates both the resources and the demand for expansion of quality health services and financial protection from catastrophic health events.

The rationale for both investing in health and consuming health services draws heavily from the human capital theory, popularized by Gary Becker in his 1962 article entitled: *Investment in Human Capital*. (28) The prevailing recognition of the importance of technological advancements and the role of education in the generation and dissemination of this progress eventually paved the way for Michael Grossman to broaden the definition and model of human capital to include population’s health. (29) He maintained that individuals demand health both as a function of utility (consumption) and to have more healthy time (investment) which in turn can be dedicated to producing leisure and obtaining income. A recent publication in the Lancet Journal attempts to standardize and quantify the expected human capital in a new

measure which comprises the four components of educational attainment, learning, health and survival. According to the article, Libya is highest ranked African country on the list sitting at 68, while majority of the sub-Saharan African countries are in the bottom third. Importantly, the study highlights that “improvements in the production of human capital are associated with faster economic growth.” (30)

Therefore, the significance of UHC extends beyond moral or ethical grounds as it contributes to social cohesion, stability, protection and security as prerequisites for longer and more productive lives, higher earnings, averted health care costs and overall economic growth. (31) (32) For example, per 2001 report of the Commission on Macroeconomics and Health (CMH), a 10 percent improvement in life expectancy at birth is associated with annual economic growth increases of 0.3 to 0.4 percent. Moreover, the Lancet Commission on Investing in Health highlighted that “around one quarter of economic growth between 2000 and 2011 in low- and middle-income countries resulted from the value added by improvements in the health of the population. The estimated return on investment in health from improved economic growth was nine to one.” (33) Investments in UHC and health sector also add direct economic value by creating new jobs, financing infrastructure and supplies and promoting innovation and diversification. For example, scientific and social innovations and the production of pharmaceuticals, medical devices and services has been a key force in economic growth in many countries. (34)

As health is a social phenomenon, investments in UHC are also expected to pay dividends for other SDGs, including poverty reduction (SDG1), nutrition (SDG2), education (SDG4) and gender equality (SDG5). However, despite UHC’s residual impact on the other SDGs, governments should also commit to directly address the other productions or social determinants of health and of health inequities. In this regard, during the First International Conference on Health Promotion in 1986, governments discussed and signed off on ‘healthy public policies’ which included “health considerations in policy making across different sectors that influence health, such as transportation, agriculture, land use, housing, public safety, and education.” This strategy has since evolved into ‘Health in All Policies’ which capitalizes on the concepts embedded in its predecessor. (35) It should be noted that from a health economics perspective, direct and indirect (those affecting the productions of health) health policies have varying marginal benefits as they partly depend on a country’s relative starting point or baseline. For example, UHC will probably provide higher marginal health benefits in a hypothetical country where the basic infrastructures, including roads, electricity, water, are

mostly in place because the dispersed communities would also have access to the universal health care/services. On the other hand, in another country facing inadequate basic infrastructure, majority of the population and 'healthy' workforce may concentrate in urban areas where they can utilize the available health services, and thus compromise not only the economic benefits of UHC but also its principles of fairness and justice.

In sum, UHC is not a panacea for health and social justice, however, it can be a social equalizer and a sound investment in human capital, health security, and a driver for economic growth and job creation in the health sector.

Determinants

Adopting UHC is a socio-political matter at its core, rather than only technical. The relevant dialogue, negotiations and decisions are typically undertaken in a complex context which includes considerations for governance, macroeconomy, social and public policies, culture and social values and epidemiological conditions. (36) In recent decades, increasing incomes, and importantly, sustained social pressures have driven the governments towards legislating UHC.

It is widely believed through empirical analysis that political commitment (e.g. through legal mandates), greater democratic representation and social cohesion and stronger governance/administration capacity are associated with translating increasing GDPs into higher tax revenues and public (health) financing. For example, existence of legal (UHC) mandates are on average associated with higher public allocation of around two percentage point of GDP. Also, countries with higher levels of democratic scores tend to allocate more public resources to health.

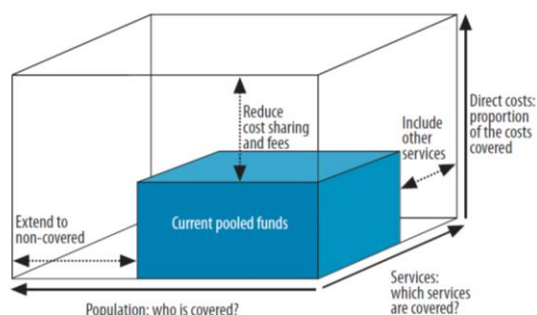
Two additional and relevant factors include the initial configuration of nation's health system and institutions which influences its reform path over time and the 'political windows of opportunity' – often created by exceptional social upheaval and turmoil or financial crisis – which can help break the institutional and political inertia. (26) (27)

Components

According to the 2010 World Health Report, moving towards UHC means considerations for the population (who is covered), services (which services are covered), and direct costs (what is the proportion of costs covered). There will always be tradeoff among these dimensions (Figure 1). In other words, moving towards UHC means that the country would have to provide coverage to more people, offer more services, and/or pay a greater portion of the

cost. And so far, no country has been able to cover 100 percent of its population with 100 percent of the breadth and depth of services and for 100 percent of the cost – and without a waiting list. (4) Joseph Kutzin of WHO mentions, “strictly interpreted, UHC is a utopian ideal that no country can fully achieve.” (37) Nevertheless, all countries can move towards UHC; ergo, UHC can be thought of as a direction rather than a destination.

Figure 1: Three dimensions of universal health coverage



Linked to the above considerations are UHC’s three key components of service availability, financial protection and *organization of healthcare delivery*. The latter which also examines the role of the private sector in healthcare delivery is beyond the scope of this paper. Coverage of the population with **quality³ essential health services** is currently adopted as one of the SDG indicators (3.8.1).

The general agreement is that essential and quality services range from health promotion and prevention, to treatment, rehabilitation, and palliative care, and as more resources become available, the range of health services based on needs increases. However, given that most excess disease burden is concentrated in marginalized populations, and most of these diseases and conditions have effective and low-cost health interventions to prevent or treat them, UHC should be defined partly in terms of a minimum basic health package which covers both individual and population-based services.

Although it’s continuously evolving, and faces serious limitations, such as **bearing questionable relevance to both developing and developed settings**, SDG indicator 3.8.1 is currently measured by using an index of 16 tracer indicators of health services (13) which averages the coverage value of all indicators when relevant. The tracer areas include reproductive, maternal, newborn and child health; infectious diseases; noncommunicable diseases; and service capacity and access (Table 1). The index is highly associated with

Human Development Index ($p=0.91$), life expectancy ($p=0.88$) and under-five mortality ($p=0.86$). (5)

Table 1 Universal health coverage service coverage tracer indicators

Tracer area	Tracer indicator	Key definitional or methodological challenges
Reproductive, maternal, newborn and child health		
a. Family planning	Demand satisfied with a modern method among women aged 15–49 years (%)	Unmarried women are typically excluded
b. Pregnancy and delivery care	Antenatal care – four or more visits (%)	Quality of antenatal services not captured
c. Child immunization	One-year-old children who have received three doses of a vaccine containing diphtheria, tetanus and pertussis (%)	Does not capture all vaccines in national schedule
d. Child treatment	Care-seeking behaviour for children with suspected pneumonia (%)	Small sample sizes and respondent errors
Infectious diseases		
a. TB treatment	TB cases detected and treated (%)	Determining rate of under-reporting of cases from facility data and/or routine surveillance systems
b. HIV treatment	People living with HIV receiving ART (%)	Mixture of different data sources on HIV prevalence and people receiving ART
c. Malaria prevention	Population at risk sleeping under insecticide-treated bed nets (%)	Defining at-risk population
d. Water and sanitation	Households with access to improved sanitation (%)	“Improved” facilities may not be safely managed
Noncommunicable diseases		
a. Treatment of cardiovascular diseases	Prevalence of non-raised blood pressure (%)	Not specific to health system response – conditional on background prevalence
b. Management of diabetes	Mean fasting plasma glucose (FPG) (mmol/l)	Not specific to health system response – conditional on background FPG levels
c. Cervical cancer screening	Cervical cancer screening among women aged 30–49 years (%)	Does not capture whether effective treatment is available
d. Tobacco control	Adults aged ≥ 15 years not smoking tobacco in last 30 days (%)	Inconsistent indicator definition measured across surveys
Service capacity and access		
a. Hospital access	Hospital beds per capita (in relation to a minimum threshold)	Optimal level unclear and may vary depending on health system structure
b. Health worker density	Health professionals per capita (in relation to a minimum threshold): physicians, psychiatrists and surgeons	Nurses/midwives should be included but hard to measure and define comparably across countries
c. Essential medicines	Proportion of health facilities with basket of essential medicines available	Establishing sampling frame of public and private facilities; confirming quality of medicines in stock
d. Health security	IHR core capacity index	Key informant data

Global data from 2017 show that the UHC service coverage (UHC-sc) index, which reflects **only the width – services – in Figure 1**, has a value of 64 (out of 100) with sub-Saharan African ranked the lowest index value of 42. This value translates into roughly half of the world’s population not receiving the essential health services they need. Although coverage of essential services has steadily increased since 2000 (1.3 percent per annum), there are large and persistent coverage inequalities in low and lower-middle income countries. (5)

The SDG3 has also adopted the second component of UHC which focuses on population coverage with **financial protection** (indicator 3.8.2). There are two aspects to financial protection: catastrophic expenditures and impoverishment incidence. However, SDG3 only captures or monitors catastrophic expenditures. Nevertheless, the second aspect (impoverishment incidence) links UHC directly to the first SDG (poverty reduction).

Catastrophic health expenditure is generally defined as when direct out-of-pocket (OOP) payments, without reimbursement by a third party, for treatment or care exceed a 10 percent and a 25 percent household total income or consumption threshold. Globally 808 million

people (11.7 percent of global population) experienced catastrophic spending beyond the 10 percent and 179 million beyond the 25 percent thresholds. Asia was the region with the highest concentration of people facing catastrophic spending at 531 million, with Africa as the second highest at 119 million (at 10 percent threshold). There are many approaches in calculating the catastrophic spending, for example based on income, consumption, certain deductions; however, this issue is beyond the scope of this paper.

Usually people make OOP payments, including cost-sharing or informal (i.e. under the table), at the time of receiving health services. As such OOP payments, which are funded out of a household's income (including savings or borrowing), are the least equitable form of health financing regressively affecting the low-income families. In high-income countries, public funding makes up around 70 to 85 percent of total health expenditures (THE). (38) In contrast, in many developing countries, OOP payments represented more than 50 percent of THE in 2007. (4) In Africa, in 2014 it was estimated that OOP was 38 US\$ per capita, an increase of more than 150 percent since 1995 (15 US\$ per capita). (39) Many people face debt or selling of assets when making OOP payments. (4) As a result, high OOP payments on health care can either reduce healthcare utilization or contribute to impoverishment as measured through the incidence and severity of poverty.⁴

According to the recent WHO and World Bank Global Monitoring Report, in 2010, an estimated 97 million people were pushed into poverty due to healthcare expenditures (1.4 percent of global population), with Africa and Asia having the highest rates and accounting for 97 percent of the total impoverished populations due to OOP health spending. (5) This figure would be more than 25 percent higher at 122.3 million if the international poverty line of 3.10 US\$-a-day were used.

It is estimated that only when the OOP payments are less than 20 percent of the total health expenditures that the financial catastrophe and impoverishment incidence becomes insignificant. (4) The good news is that compared to the year 2000, the global and regional incidence of impoverishment on health has been falling per the extreme poverty line threshold. **However, a low or decreasing incidence rate does not imply that people are protected from financial hardship, rather as mentioned, they may not be accessing or affording care to begin with.**

In this paper, I use UHC-sc index as the dependent variable because a composite UHC indicator is currently unavailable. **It should be reiterated that this index is mostly a reflection of the service coverage dimension (Figure 1) and does not capture the full breadth, scope and spirit of UHC, which would otherwise include the population (who is covered) and direct costs (what is the proportion of costs covered) as well.**

Health financing

In addition to political will, economic growth, social pressures and other key drivers already discussed, achieving UHC requires a strong health system and a coordinated approach to governance, health workforce, information management, medicines and other health technologies and service delivery anchored in the principles of responsiveness, efficiency, fairness, quality and resilience. Inevitably though, a strong health system as a means towards UHC requires money.

The 2010 World Health Report explains the role of health financing systems as revenue generation/ collection, risk pooling and strategic purchasing. However, health financing is not only about raising *sufficient* funds for health. **Efficient use and the source of health financing are also key ingredients behind sustainable, equitable and quality service delivery and catastrophic protection.**

Sufficient health financing

The estimated cost of providing essential health services has been a major topic of discussion for several decades. In 2001, the CMH report found that government spending of around 34-38 US\$ per capita was required annually for a set of essential interventions in low-income countries. (40) The High-Level Taskforce on Innovative International Financing for Health Systems (HLTF) examined a broader range of services and suggested a figure at 54 US\$ per capita per year. The 2010 World Health Report proposed a little more than 60 US\$ per capita by 2015 which included the cost of expanding the health system. The Chatham House Report in 2014 estimated that 86 US\$ per capita per year is the appropriate minimum level of government spending (and donor funding if necessary) for providing health services in low-income countries. This Chatham estimate was based on the equivalent of HLTF proposed 54 US\$ per capita expressed in 2012 terms. (41)

The variation among these estimates is indicative of, among other factors, the breadth and scope of services and the coverage assumptions. Inevitably, as the health system, demand

for services and the nature of UHC in a country evolve, particularly led by economic growth, the cost of providing a quality and relevant service package will more than likely increase. For this paper, I will use the 86 US\$ per capita per year as a benchmark because this estimate considers a broad range of essential health services for chronic and neglected tropical diseases (and relevant essential drugs), mental health, primary health care, water and sanitation and health promotion. It also accounts for the necessary health system investment, such as additional facilities, workforce, enhanced supply chain and improved governance and regulation. Therefore, I believe that this benchmark, despite its limitations including the fact that it does not account for all health services and it only reflects the low-income settings, best encapsulates the financial inputs required for a country to make progress towards UHC, at least at the PHC level.⁵

So, what is considered sufficient health financing? In other words, what should be the health spending target to meet the above minimum cost of providing essential services while avoiding financial hardship or deterrence from using services? **In short, there is 'no magic number' and this issue has been at the center of policy debates for many years.** In the 1980s, following the Alma Ata Declaration, WHO suggested a target of 5 percent for THE as a proportion of the gross national product (GNP).

Total Health Expenditure is the sum of general government health expenditure (GGHE) and private health expenditures in a given year, and has a direct positive correlation with economic growth – generally with elasticity greater than one in all countries but less than one in low-income countries. (42) (43) Total Health Expenditure growth is also associated with evolving technology (influenced by insurance coverage) and medical practices (including variations), high prices (Baumol's 'cost disease') and institutions that finance and manage healthcare. (11) In the recently released Global Health Expenditures Database, WHO separated THE into 'current expenditures' and 'gross capital formation' to distinguish between goods and services consumed in a given year and medium to long-term investments in health infrastructure.

General Government Health Expenditure includes direct expenditures earmarked or distributed through various financing agents, including the social security schemes. It could also include external resources (development assistance for health or DAH) channeled through the national budget. As with THE, GGHE is also directly correlated with the GDP and exhibits similar elasticity patterns. (42) Private health expenditures, on the other hand,

include private insurance schemes, private enterprises and non-profit outlays, and importantly, OOP spending.

Recent publications have coined the term '**health financing transition**', analogous to demographic and epidemiologic transitions, which indicates that most countries are exhibiting parallel trends in increasing THE per person accompanied by decreasing share of OOP health spending. The in-depth analysis of health financing transition is beyond the scope of this paper; however, it should be noted that the decline in OOP share is mostly determined by a growing government spending and its (pooled) financing arrangements rather than by rising income. For instance, a 10 percent increase in the share of general government expenditure (GGE)⁶ is associated with a nearly 2 percent decline in OOP share. (11)

Back to 'no magic number'! In 2001, 46 African Union signatories of the Abuja Declaration agreed to a GGHE of 15 percent as a share of GGE. As the economy grows, GGHE as share of GGE tends to increase but there is a wide range in elasticity between high-income (0.366) and lower middle-income countries (0.08). (42) Generally, in low-income countries, GGE is around 30 to 35 percent of GDP. (44) Therefore, a 15 percent GGHE target is roughly around 4 to 5 percent of GDP.

Since 2009, there have been a number of proposed benchmarks and targets for health expenditures, ranging from 5-6 percent of GGHE/GDP to 4-5 percent of THE/ GDP. In 2010, WHO Regional Office for the Eastern Mediterranean with purview over six north African countries proposed a GGHE/ GGE of 8 percent. (45) **This paper mainly focuses on the proposed Abuja Declaration 15 percent GGHE as a share of GGE and the GGHE per capita in relation to the estimated cost of 86 US\$ for providing essential health services.**

Efficient use of health financing

Even with sufficient funds and removal of financial barriers, UHC may not be ensured if the resources are used inefficiently. Both allocative (are the appropriate combination of inputs used to achieve the target outputs) and technical (are we maximizing the outputs for a given level of inputs) efficiencies are pertinent to health systems and financing. The 2010 World Health Report conservatively estimated that 20 to 40 percent of resources spent on health are wasted. (4) Efficiency gain is not just about cutting costs, rather it can also be about containing costs and/or extending health coverage or financial protection for the same cost. For example, both Rwanda and Kenya governments' spending as part of THE is around 40

percent; however, 1 percent and 5 percent of people in Rwanda and Kenya face catastrophic expenditure, respectively, which is a 5-fold difference. (10)

The leading causes of inefficiency in healthcare include the categories of medicines (underuse of generics; use of substandard and counterfeits; inappropriate use); healthcare products and services (overuse led by induced demand); health workers (costly mix; unmotivated); healthcare services (inappropriate hospital admissions and size; medical errors); health system leakages (corruption; fraud); and health interventions (inefficient and inappropriate mix of strategies). (46)

If low-income countries address these inefficiencies, particularly the intervention mix and human resources, they could gain annual savings of 12 to 24 percent of their total health spending. (4) At the same time, countries are failing to fully execute their existing annual budgetary allocations. For example, it is estimated that up to 100 million US\$ is unused across African countries, indicating significant deficiencies in public financial management systems. (10) Further analysis of efficiencies and incentives, including the providers' payment mechanisms such as capitation or case-based management, is beyond the scope of this paper.

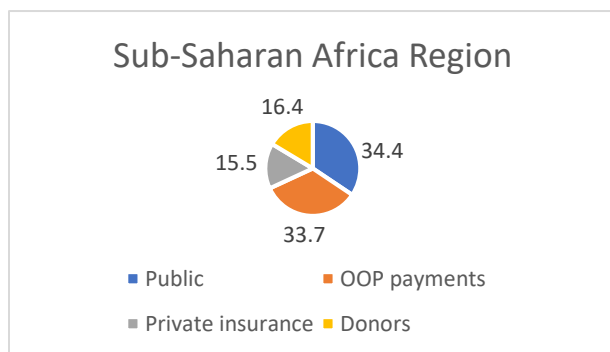
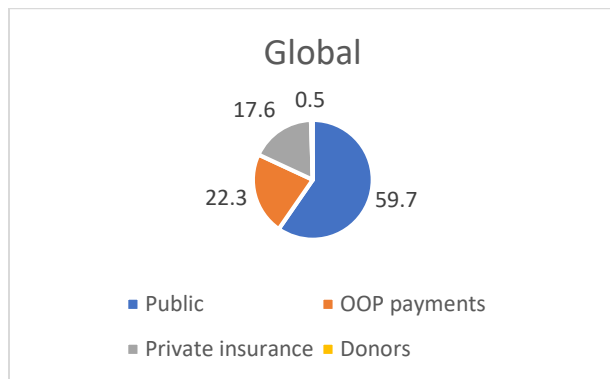
Sources of health financing

Generally, health financing is sourced through government revenues (e.g. taxes); social health insurance (usually compulsory, prepaid and involves government transfers); private health insurance (usually voluntary and prepaid); non-profit and enterprise schemes; OOP payments (from household revenues); and external resources or DAH.

In 2015, almost 60 percent of global health spending was financed through public sources, 22 percent from OOP payments, 18 percent through private insurance and less than 1 percent by donors. However, the sub-Saharan Africa's total health expenditure was estimated at only 190 billion US\$ (~2 percent of global total spending) with public and OOP resources each amounting to around 34 percent (68 percent total) and DAH at 16.3 percent of the total health spending. (

Figure 2) (1) The direct correlation between OOP payments and financial catastrophe and impoverishment is well documented and discussed earlier.

Figure 2: Global and Sub-Saharan Africa Region Health Spending by Source (percent)



Does the source of health financing matter? Evidence shows that the composition of health financing is integral to a country’s ability in making progress towards UHC. **Public funds from domestic sources, such as taxes (as opposed to DAH or external which usually gets lumped into public funds), do affect health systems performance and inevitably progress towards UHC.** According to Joseph Kutzin of WHO, “predominant reliance on compulsory or public financing is essential for universal coverage.” (47) (48) In fact, “no country has made significant progress towards UHC without relying on dominant share of public funds to finance health,” avers Barroy, et al, in a 2018 WHO publication. (49)

In a 2015 Lancet article, Reeves, et al, demonstrated that tax revenues were a major determinant of progress towards UHC. For example, “in countries with low tax revenues, an additional 100 US\$ tax revenue per year substantially increased the proportion of births with a skilled attendant present by 6.74 percentage points.” (50) Novignon and Lawanson’s 2017 research published in the *African Review of Economics and Finance* showed a positive and

significant association between health expenditure (particularly from public sources) and child health outcomes with elasticities of -0.11 for infant mortality, -0.15 under-five mortality, and -0.08 neonatal mortality. (51)

Moreover, in the same 2015 Lancet study, the authors showed that an additional 100 US\$ tax revenue increased the “extent of financial coverage by 11.4 percentage points”. In countries where public financing is less than 80 percent of total health spending, there is evidence of a step increase in the number of households facing a serious financial burden and/or avoiding health services altogether. Empirical data also point to the fact that when GGHE is higher than 5 to 6 percent of GDP, the households’ financial difficulties related to seeking healthcare diminish. (48) **So, the source of health financing matters and it matters a lot.**

Then the next question is what makes public funds so important? From a health financing perspective, public funds share the three key characteristics of **being compulsory (versus voluntary), pre-paid (versus at the point of contact or OOP) and pooled (versus fragmented)** which can help with ensuring stability and predictability, long term planning and purchasing, and risk-sharing.

Being compulsory implies that some or all people are required to make payments regardless of service utilization; hence, these payments are pre-paid usually through taxes and/or insurance. Pooling is the accumulation and redistribution of the compulsory and prepaid revenues, in principle, from relatively healthier and wealthier people to those with the greatest health needs and financial vulnerabilities. However, evidence from various sources, such as the Demographic and Health Surveys and Multiple Indicator Cluster Surveys, suggests that populations in wealthier quintiles and urban areas tend to absorb a larger proportion of health services. (52) Having said that, increased pooling can promote equitable and efficient use of services, and thus, it is one key prerequisite for achieving UHC. For example, a recent publication in the Lancet reported a significant positive association between UHC index performance and pooled resources per capita: “a 10 percent increase in pooled resources per capita was associated with a 1.4 percent increase in the UHC index.” In most lower-middle income countries, increases in pooled spending was predicted as the main driver for improvements in UHC performance. ⁷ (12)

The complex issues of health insurance schemes and taxation are beyond the scope of this paper; however, it is worth noting that the role of government in accounting for the informal employment sector, as well as, in subsidizing and regulating the insurance market is critical

in addressing the implications of market failures (e.g. moral hazard, adverse selection and cream skimming). Also, the type of taxation (e.g. direct versus indirect) can have an impact on equity in financing (e.g. progressive versus regressive).

The Abuja Declaration

In 2008, Archbishop Desmond Tutu of South Africa, a Nobel Peace Prize winner stated, "The African Union Abuja 15 percent pledge is one of the most important commitments African leaders have made to health development and financing, and our Heads of State should strive to meet this pledge without further delays." (53)

As mentioned, no country has moved towards to UHC without devoting a higher share of their incomes to health and expanding their domestic pooled share of health spending. Note that OOP payments are not considered as pooled resources and high level of OOP spending for health is contrary to the notion and principles of UHC. Also, all countries making progress towards UHC have done so through widespread government involvement in financing and regulations – in part to respond to market failures and to assure customer protection and quality services.⁸ In this spirit, following the Millennium Declaration in 2001, 46 Heads of State of African Union⁹ countries committed to allocating at least 15 percent of their annual public budget to improving the health sector.

Today, the African Union consists of 55 countries in the African continent, and among its several objective, it aims to "promote sustainable development at the economic, social and cultural levels as well as the integration of African economies" and "work with relevant international partners in the eradication of preventable diseases and the promotion of good health on the continent." (54) In April 2001, during the 'African Summit on HIV/AIDS, Tuberculosis (TB) and other related infectious diseases' held in Abuja, Nigeria, the signatories pledged "to set a target of allocating at least 15 percent of our annual budget to the improvement of health sector." (55) This public (funding) commit, in the context of then rapid spread of HIV infection and millions of AIDS and TB-related deaths, reflected the priority of health in the national agenda. In 2014, the average annual government health spending on health or GGHE was around 10 percent with only four countries meeting or exceeding the Abuja target.¹⁰ In fact, 19 countries were spending less on health as a proportion of government spending since the early 2000s. (10)

At the summit, the African leaders also urged the donor nations to fulfill the target of 0.7 percent of their GNI¹¹ as Official Development Assistance (ODA) to developing countries and cancel external debt. (55) As of 2017, only seven donor countries had met the ODA/GNI target and the total DAH (which is a component of the ODA but specifically on health) estimated to 37.4 billion US\$ or around 25 percent of the total ODA. (56) In low-income countries, DAH comprised a wide range (0.7 to 91.8 percent) of the total health spending. (1) Evidence is ambiguous on the notion of 'fungibility' where DAH funds are speculated to substitute the domestic resources intended for health. (10) (57) (58) Sub-Saharan African countries received nearly 33 percent of the DAH funds, but on average, health is predominantly financed by domestic resources (76 percent in 2014). (10)

Nonetheless, a key point of debate around equitable and effective provision of health services remains between how the public funding is measured – governments' health spending as a proportion of the general revenue and/or the translation of that proportion into absolute spending per person. **This paper explores both the Abuja Declaration's target and further delves into these dichotomies.**

Hypothesis and objectives

The primary objective of this term paper is to investigate the relations between the Abuja Declaration's proposed target of 15 percent GGHE as a proportion of government revenue and an African country's progress towards UHC. In other words, I analyze if higher proportion of government resources significantly correlates with and explains the progress towards UHC service coverage index. **However, my aim is not to determine if the 15 percent target is the adequate threshold or 'magic number' in achieving UHC.** In this scenario, the GGHE as a proportion of government revenue (GGHE/GGE) is the independent or explanatory variable and the progress towards UHC (as defined by the service coverage index) is the dependent or response variable. As mentioned, UHC service coverage index is currently measured by combining 16 tracer indicators of health services and averages the coverage value of all indicators when it's relevant and data are available. It is a continuous value, and there appears to be a tacit understanding and acceptance around the target value of 80. ¹²

A secondary objective is to explore the linkage between GGHE per capita (p.c.) purchasing power parity (PPP) in 2011 and an African country's progress towards UHC. **Although the benchmark for the second objective is 86 US\$ p.c. (as an estimated cost of providing a basic health service package in low and low-middle income settings), as above, I**

do not aim to determine if this figure is the adequate threshold or 'magic number' in achieving UHC. In this scenario, the GGHE p.c. PPP is the explanatory variable and the progress towards UHC was the response variable.

For both objectives, **the null hypothesis is as follows: linear correlation coefficient is equal to zero at a significance level of 5 percent.** In other words, there is no significant prediction of UHC by allocation of domestic resources for health (either GGHE/GGE or GGHE p.c. PPP). The alternative hypothesis is that linear correlation coefficient is not equal to zero at a significance level of 5 percent. As such, the independent variables do significantly explain the progress towards UHC.

If both null hypotheses are rejected, then I will compare the two explanatory variables to determine the strength of their prediction values.

Data and methods

The nature of the term paper is primarily of **qualitative descriptive research with limited inferential analysis**. I explore the research question around the relations between domestic resources and progress towards UHC in Africa in two phases: literature review and secondary data analysis and interpretation.

I conducted an online targeted review of journal publications, reports, white and grey papers and presentations. Although the literature review was not technically systematic, I strategically accessed and reviewed key series of journal publications and reports on global health status, health financing and UHC with particular focus on Africa and the African Union members.

The literature review focused on four main subject areas: global health status; UHC; health financing; and the Abuja Declaration. For global health status, I referenced the WHO World Health Statistics 2018 and the Institute of Health Metrics and Evaluation (IHME) global burden of disease reports and Lancet publications. For UHC, I studied all the relevant September 2012 Lancet Series publications and the relevant references from these articles. For historical and theoretical background on UHC, I reviewed the UPF courses, particularly on health economics, and did a thorough Google Scholar search and perused the selected publications, reports, grey and white papers and presentations. For health financing, I first read through the WHO World Health Report 2010 entitled *Health systems financing: the path to universal*

coverage and then studied majority of the background papers published to inform this report. Additionally, the Global Burden of Disease Health Financing Collaborator Network, funded by the Bill and Melinda Gates Foundation and coordinated through the IHME, has been publishing mostly in the Lancet pertinent articles on health expenditures in recent years. I selected and reviewed all the relevant articles (and their references) published since 2016. Finally, regarding the Abuja Declaration, I did an internet search with key terms to access any pertinent publications and reports.

Furthermore, I analyzed four categories of secondary data (no primary data collected) – socioeconomic, health status, health financing and UHC-sc – focusing on the continent of Africa. For socioeconomic data, I referred to the: World Bank databases for Gross National Income (GNI)¹³ and income categories, governance, and Country Policy and Institutional Assessment (CPIA); United Nations Development Programme (UNDP) for the Human Development Index; and Democracy Ranking Association for the democracy rankings. For health status, I used the WHO Global Health Observatory for majority of the data (though WHO database compiles data from various sources and agencies) and IHME for the DALYs. For health financing, I accessed the 2015 WHO Global Health Expenditure Database, which was released in December 2017. These data are mostly consolidated from the National Health Accounts using the framework of System of Health Accounts 2011. Finally, the UHC-related data (service coverage and financial protection) are produced through a collaborative effort between the World Bank and WHO. The UHC service coverage index is a composite measure of 16 tracer essential health service indicators comprising four tracer categories. The indicators are selected based on their relevance, feasibility, soundness and usability, but a major challenge is availability of data for all chosen indicators. Moreover, financial protection is measured through two indicators: catastrophic spending in health and impoverishing spending on health. There are several approaches in measuring catastrophic spending. For example, the third goal of SDG has adopted OOP health expenditures as catastrophic when they exceed either 10 or 25 percent income or consumption; however, others use health expenditures as a proportion of income or consumption less deduction of the necessities. The second indicator, impoverishing health spending, is not included as part of the SDG targets, however, it is very much linked to financial protection component of UHC. This indicator describes impoverishment caused when households' consumption (including OOP spending) is more than the poverty line. I accessed the latest available data from the WHO Global Health Observatory, UHC Data Portal, released in 2017.

To undertake the statistical analysis, I used the Excel software and focused on the latest available data sets: 2017 UHC service coverage index (SDG 3.8.1) and 2015 national health expenditures. I prepared several columns of raw secondary data in Excel with the list of countries, GGHE p.c. PPP (independent), GGHE/GGE (independent), and UHC-sc (dependent). First, I drew two scatter plots between the dependent and two separate independent variables to check for visual directionality (linear or non-linear patterns) and deviations from the pattern (outliers). I noticed that the scatter plot for GGHE p.c. PPP and UHC-sc did not seem to show a linear pattern so I used a logarithm trendline function in Excel which transforms the dependent variable. I then did two separate simple regression analyses between the 1) GGHE/GGE and UHC and 2) GGHE p.c. PPP and UHC-sc. The Excel analysis provided the correlation coefficient (Multiple R) which is the strength of the linear relationship; coefficient of determination or R-squared; and the standard error or the estimate of the standard deviation of the error.

The regression analysis also gave the best fit lines using the method of least squares estimation and importantly provided the linear regression equation: $y = mx + b$ or $y = \text{slope} * x + \text{intercept}$. In this equation, 'y' is the dependent variable, 'x' the independent variable, 'b' the constant or intercept, and 'm' the slope of the regression line. For the GGHE p.c. PPP independent variable, the equation included the natural logarithm of x (level-log approach). The tests of significance for the model and coefficients were given by the student t-stat and F-test estimations, respectively. The output also included p-values and the confidence interval for the slope. I checked the residual plot to determine heteroskedasticity and it appeared that the variances were scattered equally. Finally, I compared the findings between the two simple regressions to determine which independent variable had a stronger explanation for a country's progress towards UHC-sc.

Finally, I accessed the updated list of African Union members online and noted that this entity came into existence in 2002, replacing the Organization of African Unity whose original members were the initial signatories of the Abuja Declaration in 2001. Since the membership has evolved over the years, I focused the analysis on the African continent and at times on the WHO-defined regions.

Results

This section is organized into descriptive and inferential sub-sections with the former further divided into socioeconomic context, health status, health financing and UHC. The latter presents the findings of two simple regression analyses between the explanatory and dependent variables.

Descriptive analysis

Socioeconomic context

The following indicators and dataset are selected primarily because they explain or correlate with a country's path towards UHC (refer to the background section under determinants).

As indicated in table 2, in 2017, majority of African nations were ranked as low or lower-middle income countries, with only nine categorized as upper-middle or high-income countries. Since 1990, overall economic growth has been on the rise in Africa and particularly in the sub-Saharan region. However, since 2011, following the aftermath of the Arab Spring, African nations, including the sub-Saharan region, have had decreasing rate of incomes (Figure 4). **National income is correlated with total health spending and speaks to the overall capacity of the governments' revenue generation and budgetary room (or fiscal space).**

Table 2: Gross national income per capita (GNI p.c.), Atlas method (current US\$), 2010 – 2017, World Bank

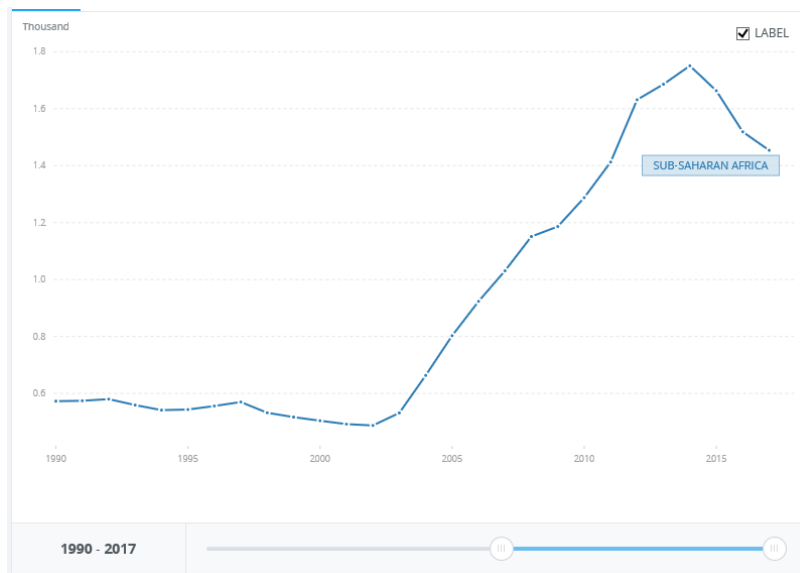
Country	Income Group ¹⁴	2010	2011	2012	2013	2014	2015	2016	2017
Eritrea	Low income	410	520	Not available	Not available	Not available	Not available	Not available	Not available
Somalia	Low income	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available
South Sudan	Low income	Not available	Not available	Not available	1,100	1,190	1,020	390	Not available
Burundi	Low income	210	230	260	280	290	280	280	Not available
Malawi	Low income	430	470	440	390	350	340	320	320
Niger	Low income	350	360	390	400	420	390	370	360
Liberia	Low income	250	320	340	370	370	380	370	380
Central African Republic (CAR)	Low income	470	480	500	330	340	360	380	390
Madagascar	Low income	420	420	430	440	440	420	400	400
Mozambique	Low income	460	480	520	590	620	580	480	420
Democratic Republic of Congo (DRC)	Low income	320	340	380	410	440	460	460	450
Gambia	Low income	580	510	510	500	460	440	430	450

Sierra Leone	Low income	420	420	530	650	690	550	480	510
Uganda	Low income	540	600	610	620	660	670	630	600
Burkina Faso	Low income	570	600	650	690	680	620	610	610
Togo	Low income	450	450	470	490	540	610	600	610
Chad	Low income	910	890	960	980	980	890	720	630
Guinea-Bissau	Low income	570	620	610	620	630	620	640	660
Rwanda	Low income	560	610	660	680	700	710	710	720
Ethiopia	Low income	380	390	410	470	550	600	660	740
Comoros	Low income	790	800	810	830	830	790	770	760
Mali	Low income	690	730	730	770	810	790	780	770
Benin	Low income	790	800	820	890	930	870	820	800
Guinea	Low income	620	600	630	640	680	690	720	820
Tanzania	Low income	690	730	770	840	920	910	900	905
Zimbabwe	Low income	490	690	810	890	900	890	890	910
Senegal	Low income	1,050	1,020	1,040	1,050	1,030	980	950	950
Mauritania	Lower middle income	1,130	1,200	1,310	1,410	1,380	1,230	1,130	1,100
Lesotho	Lower middle income	1,330	1,420	1,550	1,490	1,380	1,320	1,270	1,280
Zambia	Lower middle income	1,320	1,390	1,670	1,730	1,770	1,560	1,360	1,300
Cameroon	Lower middle income	1,350	1,380	1,390	1,450	1,510	1,470	1,400	1,360
Congo, Rep.	Lower middle income	2,070	2,060	2,330	2,430	2,520	2,350	1,700	1,360
Kenya	Lower middle income	980	1,010	1,070	1,150	1,260	1,310	1,380	1,440
Ghana	Lower middle income	1,250	1,400	1,560	1,730	1,590	1,490	1,390	1,490
Cote d'Ivoire	Lower middle income	1,200	1,130	1,240	1,340	1,460	1,490	1,520	1,540
Sao Tome and Principe	Lower middle income	1,170	1,230	1,270	1,480	1,680	1,690	1,730	1,770
Djibouti	Lower middle income	Not available	Not available	Not available	Not available	Not available	1,740	1,840	1,880
Nigeria	Lower middle income	1,470	1,730	2,480	2,700	2,980	2,850	2,450	2,080
Sudan	Lower middle income	1,250	1,480	1,720	1,220	1,830	2,000	2,140	2,379
Morocco	Lower middle income	2,930	3,000	2,970	3,080	3,050	3,020	2,870	2,863
Swaziland	Lower middle income	3,070	3,570	3,930	4,010	3,670	3,280	2,960	2,960
Cabo Verde	Lower middle	3,330	3,450	3,380	3,440	3,310	3,160	3,040	2,990

	income								
Egypt	Lower middle income	2,330	2,520	2,790	2,990	3,180	3,310	3,410	3,010
Angola	Lower middle income	3,240	3,390	3,800	4,340	4,440	4,030	3,450	3,330
Tunisia	Lower middle income	4,130	3,980	4,090	4,130	4,130	3,930	3,690	3,500
Algeria	Upper middle income	4,460	4,580	5,140	5,480	5,470	4,830	4,360	3,960
Namibia	Upper middle income	4,400	5,020	5,510	5,800	5,740	5,320	4,720	4,600
South Africa	Upper middle income	6,160	6,970	7,540	7,340	6,760	6,070	5,490	5,430
Libya	Upper middle income	12,440	4,730	11,710	10,960	7,800	5,970	5,110	6,540
Gabon	Upper middle income	7,750	8,040	9,040	9,330	9,360	8,040	7,170	6,610
Botswana	Upper middle income	5,570	6,630	7,310	7,580	7,350	6,680	6,760	6,820
Equatorial Guinea	Upper middle income	9,890	11,440	13,760	13,930	13,140	10,780	8,250	7,060
Mauritius	Upper middle income	8,250	8,580	9,260	9,790	9,790	9,780	9,780	10,140
Seychelles	High income	10,190	11,060	11,540	12,700	13,340	14,010	14,100	14,180

* Ranked by 2017 GNI p.c.

Figure 3: Gross national income per capita (GNI p.c.) of sub-Saharan Africa, Atlas method (current US\$), 1990 – 2017, World Bank



As per table 3, except for seven African countries, the rest exhibit negative scores for majority of the governance categories.¹⁵ All countries are ranked below score of one in terms of performance for government effectiveness which speaks to the quality of public services and policy formulation. **Strong governance/ administration capacity is associated with translating increasing GDPs into higher tax revenues and public (health) financing.**

Table 3: Governance indicators, 2016, World Bank

Country*	Government Effectiveness ¹⁶	Voice and Accountability ¹⁷	Political Stability and Absence of Violence/Terrorism ¹⁸	Regulatory Quality ¹⁹	Rule of Law ²⁰	Control of Corruption ²¹
South Sudan	-2.26	-1.67	-2.42	-1.86	-1.69	-1.58
Somalia	-2.18	-1.83	-2.33	-2.27	-2.37	-1.69
Libya	-1.89	-1.37	-2.21	-2.27	-1.87	-1.57
CAR	-1.77	-1.13	-1.74	-1.43	-1.84	-1.28
Eritrea	-1.69	-2.10	-0.88	-2.19	-1.53	-1.13
Guinea-Bissau	-1.64	-0.70	-0.50	-1.24	-1.49	-1.56
Comoros	-1.54	-0.18	-0.02	-1.05	-1.13	-0.64
DRC	-1.51	-1.39	-2.20	-1.32	-1.61	-1.33
Chad	-1.49	-1.34	-1.21	-1.18	-1.43	-1.45
Equatorial Guinea	-1.41	-1.93	-0.19	-1.38	-1.44	-1.81
Sudan	-1.41	-1.80	-2.38	-1.49	-1.26	-1.61
Burundi	-1.40	-1.51	-2.08	-0.83	-1.39	-1.18
Liberia	-1.32	-0.10	-0.55	-0.95	-0.97	-0.71
Sierra Leone	-1.20	-0.13	-0.16	-0.93	-0.79	-0.82
Madagascar	-1.17	-0.27	-0.40	-0.69	-0.74	-0.90
Zimbabwe	-1.16	-1.11	-0.61	-1.72	-1.32	-1.28
Congo	-1.10	-1.16	-0.57	-1.17	-1.04	-1.21
Nigeria	-1.09	-0.30	-1.85	-0.92	-1.05	-1.04
Togo	-1.08	-0.51	-0.20	-0.79	-0.68	-0.68
Angola	-1.04	-1.17	-0.39	-1.00	-1.08	-1.41
Guinea	-1.01	-0.73	-0.41	-0.87	-1.29	-0.94
Mali	-0.99	-0.18	-1.55	-0.59	-0.78	-0.67
Djibouti	-0.97	-1.32	-0.63	-0.70	-0.97	-0.65
Mozambique	-0.85	-0.39	-1.05	-0.70	-1.02	-0.87
Gambia	-0.84	-1.28	-0.52	-0.51	-0.75	-0.80
Lesotho	-0.80	0.03	-0.25	-0.39	-0.18	-0.02
Gabon	-0.79	-0.96	-0.07	-0.80	-0.58	-0.75
Mauritania	-0.79	-0.83	-0.74	-0.74	-0.78	-0.80
Cameroon	-0.76	-1.03	-0.95	-0.79	-1.02	-1.14
Malawi	-0.73	0.04	-0.06	-0.84	-0.37	-0.75
São Tomé and Príncipe	-0.68	0.45	0.23	-0.81	-0.69	-0.06
Côte d'Ivoire	-0.67	-0.28	-0.90	-0.36	-0.67	-0.54
Egypt	-0.66	-1.23	-1.42	-0.92	-0.41	-0.63
Zambia	-0.66	-0.30	0.18	-0.48	-0.30	-0.40
Ethiopia	-0.64	-1.45	-1.57	-1.10	-0.39	-0.44
Niger	-0.59	-0.34	-1.08	-0.67	-0.64	-0.64
Benin	-0.57	0.50	0.05	-0.53	-0.65	-0.48
Uganda	-0.57	-0.71	-0.72	-0.21	-0.24	-1.06
Swaziland	-0.56	-1.42	-0.49	-0.58	-0.32	-0.44
Burkina Faso	-0.55	0.04	-0.95	-0.40	-0.45	-0.13
Tanzania	-0.55	-0.18	-0.41	-0.44	-0.39	-0.51
Algeria	-0.54	-0.88	-1.14	-1.17	-0.85	-0.69
Senegal	-0.47	0.37	-0.27	-0.14	-0.19	-0.03
Kenya	-0.31	-0.15	-1.33	-0.30	-0.53	-0.90
Tunisia	-0.21	0.33	-0.99	-0.47	0.02	-0.12
Ghana	-0.20	0.64	-0.16	-0.23	0.00	-0.17
Morocco	-0.10	-0.65	-0.29	-0.23	-0.14	-0.15
Cape Verde	0.10	1.02	0.88	-0.30	0.35	0.88
Rwanda	0.11	-1.21	-0.05	0.11	0.07	0.69
Namibia	0.17	0.61	0.74	-0.14	0.39	0.37
South Africa	0.27	0.64	-0.13	0.21	0.07	0.05
Seychelles	0.36	0.16	0.72	-0.26	0.13	0.79
Botswana	0.51	0.42	1.09	0.53	0.52	0.93
Mauritius	0.96	0.86	1.05	1.03	0.80	0.32

* Ranked by government effectiveness

Table 4 shows that majority of African countries score between three and four in terms of the overall Country Policy and Institutional Assessment (CPIA) rating²² and 14 countries rate below three, exhibiting weak economic, policy, management and social institutional capacity. Rwanda is the only African country which scores above four. **Country Policy and Institutional Assessment provides an overview of a country's institutional capacity.**

Table 4: Country Policy and Institutional Assessment (CPIA), 2017, World Bank

Country*	economic management cluster ²³	structural policies cluster ²⁴	policies for social inclusion/ equity cluster ²⁵	public sector management and institutions cluster ²⁶	Overall rating**, 27
South Sudan	1.00	2.00	1.70	1.40	1.53
Somalia	1.83	1.67	2.00	1.80	1.83
Eritrea	1.33	1.17	2.40	2.50	1.85
Sudan	2.17	2.67	2.50	2.20	2.38
Guinea-Bissau	2.67	2.83	2.30	2.00	2.45
CAR	2.83	2.50	2.30	2.30	2.48
Chad	2.67	2.67	2.60	2.70	2.66
Congo	2.67	2.83	2.80	2.50	2.70
Zimbabwe	2.33	2.50	3.50	2.80	2.78
Comoros	2.83	3.00	2.80	2.60	2.81
DRC	2.83	3.00	3.00	2.50	2.83
Burundi	2.67	3.17	3.50	2.30	2.91
Djibouti	3.00	3.17	3.00	2.70	2.97
Gambia	2.33	3.33	3.30	2.90	2.97
Sao Tome and Principe	3.00	3.17	3.10	3.20	3.12
Togo	3.17	3.17	3.40	2.80	3.13
Liberia	3.50	3.00	3.10	2.90	3.13
Mozambique	2.83	3.33	3.40	3.10	3.17
Guinea	3.50	3.00	3.30	2.90	3.18
Nigeria	3.33	3.17	3.50	2.80	3.20
Sierra Leone	3.50	3.17	3.20	3.10	3.24
Malawi	3.00	3.17	3.60	3.20	3.24
Madagascar	3.67	3.33	3.30	2.80	3.28
Cameroon	3.67	3.33	3.10	3.00	3.28
Zambia	2.83	3.83	3.30	3.20	3.29
Niger	3.67	3.50	3.20	3.10	3.37
Lesotho	3.33	3.50	3.40	3.30	3.38
Cote d'Ivoire	3.67	3.33	3.30	3.20	3.38
Mauritania	3.50	3.17	3.60	3.30	3.39
Mali	4.00	3.50	3.10	3.00	3.40
Ethiopia	3.50	3.00	3.70	3.50	3.43
Benin	3.83	3.33	3.40	3.30	3.47
Ghana	3.33	3.50	3.80	3.60	3.56
Burkina Faso	3.67	3.50	3.70	3.40	3.57
Uganda	4.17	3.83	3.50	3.00	3.63
Tanzania	4.00	3.50	3.70	3.40	3.65
Kenya	4.00	3.83	3.70	3.40	3.73
Cabo Verde	3.33	3.83	3.90	3.90	3.74
Senegal	4.17	3.83	3.70	3.60	3.83
Rwanda	4.00	4.17	4.30	3.70	4.04

*countries are rated on a scale of 1 (low) to 6 (high)

**Ranked by the overall rating

According to table 5, only four African countries are ranked in top 100 globally as majority are ranked 150 and above. **Human Development Index²⁸ is highly correlated with UHC service coverage index (0.91)**. In Africa, the association is similarly strong at 0.85.

Moreover, per table 5, majority of the African countries are within the lowest third countries (red). The countries in blue indicate that they are within the medium third countries. Data for democracy ranking are not available for all countries. **Democratic scores²⁹ are a significant determinant of public health allocations.**

Table 5: Human Development Index (HDI), 2015, UNDP and Democracy Ranking, 2016, Democracy Ranking Association

Country	HDI score	Global ranking*	Country	Overall Democracy score	Global ranking*
Seychelles	0.782	63	Mauritius	65.1	39
Mauritius	0.781	64	Ghana	57.8	51
Algeria	0.745	83	Namibia	57.2	54
Tunisia	0.725	97	Tunisia	56.6	56
Libya	0.716	102	Botswana	56.3	58
Botswana	0.698	108	Senegal	55.3	64
Gabon	0.697	109	South Africa	52.2	71
Egypt	0.691	111	Malawi	52.1	72
South Africa	0.666	119	Benin	51.7	73
Cabo Verde	0.648	122	Tanzania	49.5	78
Morocco	0.647	123	Sierra Leone	48.3	81
Namibia	0.64	125	Madagascar	48.1	83
Congo	0.592	135	Liberia	47.4	87
Equatorial Guinea	0.592	135	Lesotho	46.9	89
Ghana	0.579	139	Kenya	46.4	90
Zambia	0.579	139	Zambia	45.5	92
Sao Tome and Principe	0.574	142	Burkina Faso	45.3	93
Kenya	0.555	146	Niger	43.2	94
Swaziland	0.541	148	Morocco	42.5	98
Angola	0.533	150	Mozambique	42.5	99
Tanzania	0.531	151	Mali	39.5	101
Nigeria	0.527	152	Guinea	39.4	102
Cameroon	0.518	153	Togo	39.4	103
Zimbabwe	0.516	154	Nigeria	39.3	104
Mauritania	0.513	157	Cote d'Ivoire	38.1	108
Madagascar	0.512	158	Egypt	35.7	109
Rwanda	0.498	159	Libya	29.5	111
Comoros	0.498	160			
Lesotho	0.497	160			
Senegal	0.494	162			
Uganda	0.493	163			
Sudan	0.49	165			
Togo	0.487	166			
Benin	0.485	167			
Malawi	0.476	170			
Côte d'Ivoire	0.474	171			
Djibouti	0.473	172			
Gambia	0.452	173			
Ethiopia	0.448	174			
Mali	0.442	175			
DRC	0.435	176			
Liberia	0.427	177			
Guinea-Bissau	0.424	178			
Eritrea	0.42	179			
Sierra Leone	0.42	179			

Mozambique	0.418	181
South Sudan	0.418	181
Guinea	0.414	183
Burundi	0.404	184
Burkina Faso	0.402	185
Chad	0.396	186
Niger	0.353	187
CAR	0.352	188

*Ranked from highest to lowest scores

Global health status

The following indicators and dataset are selected because they provide an overview of Africa's health profile and disease burden. They also align closely with the SDG3 targets and indicators, and point to the underlying inequities in availability and distribution of resources and health services.

Table 6 demonstrates that the WHO African Region (Algeria and sub-Saharan countries) has the lowest life expectancy at birth (61.2) compared to other regions (69.1 to 76.9) and globally (72). Not surprisingly, the African Region also ranks the lowest in terms of healthy life expectancy at birth (53.8) compared to other regions (59.7 to 68.9) and globally (63.3). On the other hand, the African region has the highest adolescent birth rate at 99.1 per 1000 women aged 15-19 years which is more than double the next highest region at 48.6.

At the global level, life expectancy at birth is highly correlated with UHC service coverage index (0.88). In Africa, the association is not as strong though it's still high at 0.70. The lower correlation may be due to statistical artifacts (limited sample size) or explained by the role of multiple factors of health production, such as roads or sanitation, which go beyond the health system and services. For example, if other factors or determinants of health are better developed, then role of health system/ services may not be as pronounced in increasing life expectancy.

Table 6: Total population, life expectancy at birth, healthy life expectancy at birth, adolescent birth rate, 2016, WHO

Country ³⁰	Total population (000s)	Life expectancy at birth (years)			Healthy life expectancy at birth (years)	Adolescent birth rate (per 1000 women aged 15-19 years) 2007-2016*
		Male	Female	Both sexes		
Somalia	14 318	53.7	57.3	55.4	50.0	Not available
CAR	4 595	51.7	54.4	53.0	44.9	229
Chad	14 453	53.1	55.4	54.3	47.2	179
Equatorial Guinea	1 221	57.9	61.7	59.5	53.8	176
Mali	17 995	57.5	58.4	58.0	50.7	174
Mozambique	28 829	57.7	62.3	60.1	52.2	167
Angola	28 813	60.3	64.9	62.6	55.8	163
South Sudan	12 231	57.7	59.6	58.6	50.6	158
Madagascar	24 895	64.6	67.6	66.1	58.3	152

Congo	5 126	63.0	65.6	64.3	56.7	147
Guinea	12 396	59.4	60.2	59.8	52.2	146
Niger	20 673	59.0	60.8	59.8	52.5	146
Nigeria	185 990	54.7	55.7	55.2	48.9	145
Uganda	41 488	60.2	64.8	62.5	54.9	141
Zambia	16 591	60.2	64.4	62.3	54.3	141
DRC	78 736	58.9	62.0	60.5	52.5	138
Malawi	18 092	61.4	66.8	64.2	56.2	136
Tanzania	55 572	62.0	65.8	63.9	56.5	132
Côte d'Ivoire	23 696	53.6	55.7	54.6	48.3	129
Sierra Leone	7 396	52.5	53.8	53.1	47.6	125
Burkina Faso	18 646	59.6	60.9	60.3	52.9	122
Cameroon	23 439	56.7	59.4	58.1	51.1	119
Zimbabwe	16 150	59.6	63.1	61.4	54.4	110
Guinea-Bissau	1 816	58.4	61.2	59.8	51.7	106
Liberia	4 614	62.0	63.9	62.9	54.5	105
Kenya	48 462	64.4	68.9	66.7	58.9	96
Benin	10 872	59.7	62.4	61.1	53.5	94
Lesotho	2 204	51.0	54.6	52.9	46.6	94
Sao Tome and Principe	200	66.7	70.7	68.7	60.7	92
Gabon	1 980	64.8	68.2	66.4	58.7	91
Gambia	2 039	60.6	63.3	61.9	54.4	88
Sudan	39 579	63.4	66.9	65.1	55.7	87
Swaziland	1 343	55.1	59.9	57.7	50.2	87
Togo	7 606	59.7	61.5	60.6	53.9	85
Namibia	2 480	61.1	66.1	63.7	55.9	82
Cabo Verde	540	71.1	75.0	73.2	64.5	80
Ethiopia	102 403	63.7	67.3	65.5	57.5	80
Senegal	15 412	64.7	68.7	66.8	58.8	80
Mauritania	4 301	62.6	65.2	63.9	56.4	77
Eritrea	4 955	62.9	67.1	65.0	57.4	76
South Africa	56 015	60.2	67.0	63.6	55.7	71
Comoros	796	62.3	65.5	63.9	56.6	70
Seychelles	94	69.0	78.0	73.3	65.7	66
Ghana	28 207	62.5	64.4	63.4	56.4	59
Burundi	10 524	58.5	61.8	60.1	52.6	58
Egypt	95 689	68.2	73.0	70.5	61.1	56
Rwanda	11 918	66.1	69.9	68.0	59.9	45
Botswana	2 250	63.6	68.4	66.1	57.5	38
Morocco	35 277	74.8	77.0	76.0	65.3	32
Mauritius	1 262	71.6	78.1	74.8	65.8	24
Djibouti	942	62.2	65.5	63.8	56.6	21
Libya	6 293	69.0	75.0	71.9	62.3	11
Algeria	40 606	75.4	77.4	76.4	65.5	9
Tunisia	11 403	74.1	78.1	76.0	66.3	3
African Region	1 019 922	59.6	62.7	61.2	53.8	99.1
Region of the Americas	992 155	73.8	79.8	76.8	67.5	48.6
South-East Asia Region	1 947 632	67.9	71.3	69.5	60.4	33.0
European Region	916 315	74.2	80.8	77.5	68.4	16.6
Eastern Mediterranean Region	664 336	67.7	70.7	69.1	59.7	44.5
Western Pacific Region	1 889 901	75.0	78.9	76.9	68.9	14.2
Global	7 430 261	69.8	74.2	72.0	63.3	43.9

*Ranked from highest adolescent birth rate

According to table 7, the WHO African Region (Algeria and sub-Saharan countries) has the highest under-five mortality rate (76.5) than any other regions, which range from 9.6 to 51.7), and it is almost double the global rate (40.8). Moreover, it has the second highest neonatal mortality rate at 27.2 just below the WHO Eastern Mediterranean Region which

contains six north African countries (27.7). The African Region's maternal mortality rate (542) is almost three times higher than the next highest region (166) and more than double the global average (216). As mentioned earlier, **globally, under-five mortality is highly correlated with UHC service coverage index (.086)**. In Africa, the association is similarly strong at 0.78 (though this is an indirect or negative correlation).

Table 7: Under-five, neonatal and maternal mortality rates, WHO

Country ³¹	Under-five mortality rate (per 1000 live births) (2016)*	Neonatal mortality rate (per 1000 live births) (2016)	Maternal mortality ratio (per 100 000 live births) (2015)
Somalia	132.5	38.8	732
Chad	127.3	35.1	856
CAR	123.6	42.3	882
Sierra Leone	113.5	33.2	1 360
Mali	110.6	35.7	587
Nigeria	104.3	34.1	814
Benin	97.6	31.4	405
DRC	94.3	28.8	693
Lesotho	93.5	38.5	487
Côte d'Ivoire	91.8	36.6	645
Niger	91.3	25.7	553
Equatorial Guinea	90.9	32	342
South Sudan	90.7	37.9	789
Guinea	89	25.1	679
Guinea-Bissau	88.1	38.2	549
Burkina Faso	84.6	25.6	371
Angola	82.5	29.3	477
Mauritania	81.4	33.7	602
Cameroon	79.7	23.9	596
Togo	75.7	26	368
Comoros	73.3	32.8	335
Burundi	71.7	24.2	712
Mozambique	71.3	27.1	489
Swaziland	70.4	21.4	389
Liberia	67.4	22.8	725
Gambia	65.3	27.5	706
Sudan	65.1	29.4	311
Djibouti	64.2	32.8	229
Zambia	63.4	22.9	224
Ghana	58.8	26.9	319
Ethiopia	58.4	27.6	353
Tanzania	56.7	21.7	398
Zimbabwe	56.4	22.9	443
Malawi	55.1	23.1	634
Congo	54.1	20.5	442
Uganda	53	21.4	343
Kenya	49.2	22.6	510
Gabon	47.4	21.8	291
Senegal	47.1	20.6	315
Madagascar	46.4	18.6	353
Namibia	45.2	17.8	265
Eritrea	44.5	17.7	501
South Africa	43.3	12.4	138
Botswana	40.6	25.5	129
Rwanda	38.5	16.5	290
Sao Tome and Principe	33.8	15	156
Morocco	27.1	17.8	121
Algeria	25.2	15.6	140
Egypt	22.8	12.8	33
Cabo Verde	21.4	10.2	42
Seychelles	14.3	9	-
Mauritius	13.7	8.4	53
Tunisia	13.6	8.1	62
Libya	12.9	7.1	9
African Region	76.5	27.2	542
Eastern Mediterranean	51.7	27.7	166

Region			
South-East Asia Region	38.9	22.6	164
Region of the Americas	14.2	7.5	52
Western Pacific Region	12.9	6.5	41
European Region	9.6	5.1	16
Global	40.8	18.6	216

*Ranked by highest under-five mortality rate

Per table 8, the WHO African Region (Algeria and sub-Saharan countries) has the highest incidence of HIV, tuberculosis and malaria infections than any other WHO regions. The Region is also laden with nearly five times the global new HIV, twice the tuberculosis, and thrice the malaria infections.

Table 8: Incidence of selected infectious diseases, 2016, WHO

Country ^{*,32}	New HIV infections (per 1000 uninfected population)	Tuberculosis incidence (per 100 000 population)	Malaria incidence (per 1000 population at risk)
Algeria	0.02	70	0.0
Angola	0.94	370	120.3
Benin	0.34	59	297.3
Botswana	5.52	326	2.4
Burkina Faso	0.19	51	423.3
Burundi	0.20	118	156.2
Cabo Verde	0.31	137	0.7
Cameroon	1.39	203	271.3
CAR	1.80	407	311.6
Chad	0.34	153	167.6
Comoros	<0.01	35	1.8
Congo	1.65	378	204.7
Côte d'Ivoire	0.86	153	223.2
DRC	0.17	323	291.9
Djibouti	0.58	335	9.6
Egypt	0.02	14	-
Equatorial Guinea	2.71	181	238.8
Eritrea	0.15	74	17.2
Ethiopia	0.33	177	53.1
Gabon	0.92	485	206.2
Gambia	0.65	174	129.6
Ghana	0.78	156	285.6
Guinea	0.67	176	386.5
Guinea-Bissau	0.72	374	73.0
Kenya	1.46	348	85.3
Lesotho	12.68	724	-
Liberia	0.66	308	237.0
Libya	-	40	-
Madagascar	0.18	237	64.4
Malawi	2.29	159	249.1
Mali	0.33	56	459.7
Mauritania	0.12	102	88.5
Mauritius	-	22	-
Morocco	0.03	103	-
Mozambique	3.63	551	307.8
Namibia	4.37	446	29.3
Niger	0.09	93	378.9
Nigeria	1.23	219	349.6
Rwanda	0.70	50	392.7
Sao Tome and Principe	-	99	11.2
Senegal	0.08	140	49.0
Seychelles	-	15	-
Sierra Leone	0.86	304	303.5
Somalia	0.17	270	60.2
South Africa	5.58	781	1.1

South Sudan	1.35	146	159.0
Sudan	0.13	82	35.3
Swaziland	9.37	398	1.9
Togo	0.59	46	360.4
Tunisia	0.03	38	-
Uganda	1.50	201	187.2
Tanzania	1.19	287	144.2
Zambia	4.08	376	189.8
Zimbabwe	3.03	208	77.9
African Region	1.24	254	239.6
Region of the Americas	0.16	27	11.3
South-East Asia Region	0.08	240	16.5
European Region	0.25	32	0.0
Eastern Mediterranean Region	0.06	114	20.5
Western Pacific Region	0.05	95	4.2
Global	0.26	140	90.8

*Ranked by alphabetical order

Table 9 shows that the WHO African Region (Algeria and sub-Saharan countries) fares better compared to other regions and even to global averages in terms of non-communicable diseases, suicide rates, alcohol consumption, and tobacco smoking. However, the Region has the highest mortality rates due to road accidents (26.6) and unsafe water and sanitation services (45.8) compared to all other regions and globally.

Table 9: Non-communicable diseases, intentional and unintentional injuries, WASH, WHO

Country ^{*, 33}	Probability of dying from any of CVD, cancer, diabetes, CRD between age 30 and exact age 70 (%) 2016	Suicide mortality rate (per 100 000 population) 2016	Total alcohol per capita (>= 15 years of age) consumption (liters of pure alcohol) 2016	Age-standardized prevalence of tobacco smoking among persons 15 years and older (%) 2016		Road traffic mortality rate (per 100 000 population) 2013	Mortality rate attributed to exposure to unsafe WASH services (per 100 000 population) 2016
				Men	Women		
Algeria	14.2	3.2	0.9	30.4	0.7	23.8	1.9
Angola	16.5	4.7	6.4	-	-	26.9	48.8
Benin	19.6	9.9	3.0	12.3	0.6	27.7	59.7
Botswana	20.3	9.3	8.4	34.4	5.7	23.6	11.8
Burkina Faso	21.7	7.7	8.2	23.9	1.6	30.0	49.6
Burundi	22.9	9.1	7.5	-	-	31.3	65.4
Cabo Verde	17.2	11.3	5.7	16.5	2.1	26.1	4.1
Cameroon	21.6	12.2	8.9	-	-	27.6	45.2
CAR	23.1	7.7	3.3	-	-	32.4	82.1
Chad	23.9	8.8	1.5	-	-	24.1	101.0
Comoros	22.9	6.8	0.9	23.6	4.4	28.0	50.7
Congo	16.7	5.9	7.8	52.3	1.7	26.4	38.7
Côte d'Ivoire	29.1	14.5	8.4	-	-	24.2	47.2
DRC	19.4	5.7	2.6	-	-	33.2	59.8
Djibouti	19.6	6.7	0.5	24.5	1.7	24.7	31.3
Egypt	27.7	4.0	0.4	50.1	0.2	12.8	2.0
Equatorial Guinea	22.0	16.4	11.3	-	-	22.9	22.3
Eritrea	23.9	7.9	1.3	11.4	0.2	24.1	45.6
Ethiopia	18.3	7.2	2.8	8.5	0.4	25.3	43.7
Gabon	14.4	7.1	11.5	-	-	22.9	20.6
Gambia	20.4	5.1	3.8	31.2	0.7	29.4	29.7
Ghana	20.8	5.4	2.7	7.7	0.3	26.2	18.8
Guinea	22.4	6.3	1.3	-	-	27.3	44.6
Guinea-Bissau	20.0	4.0	4.8	-	-	27.5	35.3
Kenya	13.4	3.2	3.4	20.4	1.2	29.1	51.2
Lesotho	26.6	21.2	5.0	53.9	0.4	28.2	44.4

Liberia	17.6	6.8	5.8	18.1	1.5	33.7	41.5
Libya	20.1	5.2	0.0	-	-	23.8	0.6
Madagascar	22.9	3.9	1.9	-	-	28.4	30.2
Malawi	16.4	3.7	3.7	24.7	4.4	35.0	28.3
Mali	24.6	4.8	1.3	23.0	1.6	25.6	70.7
Mauritania	18.1	4.4	0.0	-	-	24.5	38.6
Mauritius	22.6	7.8	3.6	40.7	3.2	12.2	0.6
Morocco	12.4	2.9	0.6	47.1	0.8	20.8	1.9
Mozambique	18.4	4.9	2.4	29.1	5.1	31.6	27.6
Namibia	21.3	8.7	9.8	34.2	9.7	23.9	18.3
Niger	20.0	4.6	0.5	15.4	0.1	26.4	70.8
Nigeria	22.5	9.5	13.4	10.8	0.6	20.5	68.6
Rwanda	18.2	6.7	9.0	21.0	4.7	32.1	19.3
Sao Tome and Principe	18.5	2.3	6.8	-	-	31.1	11.4
Senegal	18.1	6.0	0.7	16.6	0.4	27.2	23.9
Seychelles	21.2	9.3	12.0	35.7	7.1	8.6	0.2
Sierra Leone	30.5	9.7	5.7	41.3	8.8	27.3	81.3
Somalia	21.8	4.7	0.0	-	-	25.4	86.6
South Africa	26.2	11.6	9.3	33.2	8.1	25.1	13.7
South Sudan	19.8	3.7	-	-	-	27.9	63.3
Sudan	26.0	8.1	0.5	-	-	24.3	17.3
Swaziland	26.7	13.3	9.9	16.5	1.7	24.2	27.9
Togo	23.6	9.6	3.1	14.2	0.9	31.1	41.6
Tunisia	16.1	3.4	1.9	65.8	1.1	24.4	1.0
Uganda	21.9	9.9	9.5	16.7	3.4	27.4	31.6
Tanzania	17.9	5.4	9.4	26.7	3.3	32.9	38.4
Zambia	17.9	6.1	4.8	24.7	3.1	24.7	34.9
Zimbabwe	19.3	10.7	4.8	30.7	1.6	28.2	24.6
African Region	20.6	7.4	6.3	17.5	2.2	26.6	45.8
Region of the Americas	15.1	9.8	8.0	21.4	12.4	15.9	1.1
South-East Asia Region	23.1	13.2	4.5	31.6	2.2	17.0	15.4
European Region	16.7	15.4	9.8	38.1	20.7	9.3	0.3
Eastern Mediterranean Region	22.0	3.9	0.6	34.0	2.2	19.9	10.6
Western Pacific Region	16.2	10.2	7.3	46.0	3.0	17.3	1.0
Global	18.3	10.6	6.4	33.7	6.2	17.4	11.7

*Ranked by alphabetical order

According to table 10, majority of the DALYs in Africa are in the sub-Saharan region (89 percent) and overall Africa comprises nearly 25 percent of the global DALYs. Central African Republic (CAR) has the highest DALYs rate (per 100,000 population) which is nearly 400 percent higher than Algeria which has the lowest rate in Africa.

Table 10: DALYs per 100,000 and total DALYs per selected regions, 2016, IHME

Country ³⁴	DALYs per 100,000*
CAR	89,404
Lesotho	78,427
South Sudan	69,381
Chad	68,834
Mali	64,739
Sierra Leone	64,657
Niger	63,709
Burkina Faso	62,095
Guinea	58,723
Mozambique	58,483
Cameroon	58,107
Swaziland	57,771

Somalia	57,730
Guinea-Bissau	57,590
Cote d'Ivoire	57,404
Burundi	56,631
Nigeria	56,262
DRC	56,040
Malawi	55,654
Zambia	53,887
South Africa	52,152
Zimbabwe	51,955
Madagascar	50,125
Uganda	49,069
Benin	48,521
Togo	47,508
Congo	46,150
Liberia	45,891
Angola	43,628
Tanzania	43,517
Equatorial Guinea	42,737
Djibouti	41,718
Namibia	41,023
Ghana	40,268
Gabon	39,820
Eritrea	39,719
Botswana	38,743
Senegal	38,581
The Gambia	38,469
Ethiopia	37,292
Sudan	36,004
Kenya	35,730
Rwanda	35,728
Comoros	33,857
Mauritania	32,254
Mauritius	29,937
Sao Tome and Principe	28,841
Seychelles	28,078
Egypt	27,763
Morocco	26,545
Cape Verde	25,609
Tunisia	24,054
Libya	23,946
Algeria	23,315

*Ranked by the highest DALYs rate to lowest

Regions	Total DALYs
Sub-Saharan Africa	500,353,145
African Union	553,836,045
Africa	562,770,802
Global	2,391,258,033

Health financing

The following indicators and dataset provide an overall descriptive situation of Africa's health financing and progress towards the Abuja Declaration target. They also respond to the question of governments' level of commitment to improving health outcomes, equity and financial protection.

Table 11 shows that as of 2015, only Sudan, Madagascar and Swaziland are meeting or exceeding the Abuja Declaration's 15 percent GGHE/GGE target. Twelve countries are above 10 percent and the rest are below 10 percent and in fact 16 countries are below 5 percent.

Despite exceeding the target, Sudan (18 percent) and Madagascar's (16 percent) GGHE as a proportion of GDP is only 2 percent. In fact, four countries' GGHE/GDP is at 5 percent or above.

Although only three countries are meeting the Abuja Declaration target, 17 countries are spending at least GGHE p.c. PPP of 86 US\$ which is the estimated minimum cost of providing essential health services in low or lower-middle income settings.

Thirty-nine countries' total (current) health spending is derived from more than 20 percent OOP payments, ranging from 22 percent in Madagascar to 75 percent in Comoros. The remaining 13 countries are at 20 percent or below which is the threshold that WHO deems at having a negligible effect on financial catastrophe and impoverishment incidence. Moreover, 20 countries rely on greater than 25 percent DAH or external resources for their total health spending, ranging from 26 percent to 85 percent (Mozambique).

The tax to GDP ratio is a predictor of attaining UHC and speaks to the revenue generation and capacity of the governments. According to the World Bank database,³⁵ countries in Africa experience a wide range of tax to GDP ratio, from Nigeria at 1.5 percent to Lesotho at above 40 percent with majority of the countries below 20 percent.

Table 11: Africa scorecard on domestic financing for health, 2015, WHO and the World Bank

Country ³⁶	General Government Health Expenditure				Proportion of Total (current) health spending (2015) derived from			Revenue capacity	
	GGHE pc	GGHE pc PPP	GGHE/GGE *	GGHE/GDP	GGHE	External	OOP	Tax/GDP	year of available data
Target	≥ 86 US\$ pc		≥ 15 percent	≥ 5 percent					
Sudan	47	86	18	2	31	2	63	No data	
Madagascar	10	35	16	2	45	27	22	No data	
Swaziland	151	407	15	5	65	16	11	28.6	2012
South Africa	252	582	14	4	54	2	8	27.3	2015
Tunisia	145	436	14	4	56	0	40	21.1	2012
Namibia	266	594	13	6	63	9	8	32.5	2015
Burundi	9	25	12	3	39	41	19	12.2	2013
Algeria	206	728	11	5	71	0	28	37.2	2011
Cabo Verde	99	210	11	3	68	6	23	17.9	2012
Gambia	15	53	11	3	47	28	20	No data	
Malawi	10	31	11	3	29	54	11	15.2	2015
Sao Tome and Principe	59	115	11	4	37	49	12	14.6	2012
Guinea-Bissau	12	31	10	2	31	32	37	No data	
Mauritius	232	503	10	3	46	3	51	9	2015
Seychelles	477	841	10	3	97	0	2	29.6	2015
Botswana	215	534	9	3	55	8	5	20.8	2016
Lesotho	52	143	9	5	57	26	17	40.6	2015
Sierra Leone	10	23	8	2	9	53	38	8.6	2014
Zimbabwe	20	38	8	2	21	24	26	21.4	2012
Morocco	69	188	8	2	43	1	53	23.3	2011

Burkina Faso	9	27	7	2	28	30	36	15.8	2016
Gabon	117	283	7	2	59	1	26	No data	
Ghana	28	87	7	2	35	26	36	13.7	2010
Tanzania	11	34	7	2	35	37	26	11.9	2014
Zambia	25	74	7	2	37	24	28	16.8	2015
Chad	8	23	6	1	23	15	56	No data	
Ethiopia	7	18	6	1	27	15	38	8.8	2013
Kenya	23	52	6	2	33	19	33	16.3	2015
Mauritania	21	69	6	2	39	9	48	No data	
Rwanda	12	31	6	2	21	44	26	13.7	2015
Togo	10	27	6	2	28	15	51	21.8	2015
Uganda	6	19	6	1	13	40	41	12.9	2015
Libya (2011)	198	397	6	3	63	0	37	No data	
Côte d'Ivoire	16	41	5	1	22	26	36	15.4	2015
DRC	3	6	5	1	16	39	37	8.4	2010
Niger	5	14	5	2	21	26	52	No data	
Nigeria	16	36	5	1	16	10	72	1.5	2013
Angola	52	93	4	1	48	3	33	12.5	2015
CAR	2	4	4	1	13	44	40	9.3	2011
Comoros	8	16	4	1	13	10	75	No data	
Mali	7	20	4	1	17	36	46	14.1	2015
Senegal	11	31	4	1	32	12	44	20.6	2015
Djibouti	45	80	4	2	55	23	20	No data	
Egypt	47	149	4	1	30	0	62	12.5	2015
Benin	6	17	3	1	20	34	40	15.4	2013
Cameroon	9	24	3	1	14	8	70	No data	
Congo	25	88	3	1	43	11	44	9.4	2012
Guinea	4	10	3	1	17	25	54	No data	
Liberia	5	9	3	1	7	71	20	20.3	2013
Eritrea	7	13	2	1	23	25	52	No data	
South Sudan	6	15	2	1	21	14	61	No data	
Equatorial Guinea	66	186	1	1	24	1	72	11.5	2015
Mozambique	2	5	1	0	8	85	7	21.9	2015

*Ranked by GGHE/GGE

Universal Health Coverage

The following indicators and dataset provide an overall descriptive situation of Africa's path towards UHC. They give an overview of UHC from a multi-dimensional legal, public health and health economics framework. The UHC service coverage index and the two household expenditures indicators are also tracked as part of the SDG UHC targets.

According to table 12, five African countries have passed legislation on UHC though Ghana and Rwanda (which according to the WHO database have not passed) have made significant strides in that direction. **Passing legislation is considered a significant determinant for achieving UHC**, and although the data are limited, three of the top 10 countries in terms of UHC service coverage index have passed legislation.

In terms of service coverage index, countries range from 22 (Somalia) to 76 (Algeria), and none of the countries meet the 80 value target. The WHO African Region (Algeria and sub-Saharan countries) have the lowest overall index (44) compared to other regions (53 to 78) and globally (64).

Data for the financial protection indicators are limited to only 20 countries. According to below table, overall, 10 percent of population in the WHO African Region face greater than 10 percent household expenditures on health out of their total household expenditure or income, and 2.6 percent face greater than 25 percent. Both scores are just below the global averages, however, data should be interpreted with caution.

Table 12: UHC legislation, service coverage and household expenditures, WHO

Country ³⁷	Legislation ^{38,39}	UHC service coverage index (2015)*	Population with household expenditures on health > 10% of total household expenditure or income (%) (2007-2015)	Population with household expenditures on health > 25% of total household expenditure or income (%) (2007-2015)
Algeria	Yes	76	-	-
Egypt		68	26.2	3.9
Seychelles		68	-	-
South Africa		67	1.4	0.1
Morocco		65	-	-
Tunisia	Yes	65	16.7	2.4
Mauritius		64	-	-
Libya		63	-	-
Cabo Verde		62	2	0
Botswana	Yes	60	-	-
Namibia		59	-	-
Swaziland		58	13.4	2
Kenya		57	-	-
Zambia		56	0.3	0
Zimbabwe		55	-	-
Sao Tome and Principe		54	-	-
Rwanda		53	4.6	0.7
Gabon		52	-	-
Comoros		47	-	-
Djibouti		47	-	-
Gambia	Yes	46	-	-
Equatorial Guinea		45	-	-
Ghana		45	-	-
Lesotho		45	-	-
Cameroon		44	10.8	3
Côte d'Ivoire		44	15.2	3.6
Malawi		44	1.6	0.1
Uganda		44	-	-
Burundi		43	-	-
Sudan		43	-	-
Mozambique		42	1.2	0.3
Togo		42	-	-
Benin		41	-	-
Senegal		41	3.3	0.2
DRC		40	-	-
Burkina Faso		39	3.5	0.6
Ethiopia		39	-	-
Guinea-Bissau		39	-	-
Nigeria		39	24.8	8.9
Tanzania		39	9.9	2.5
Congo	Yes	38	2	0.4
Eritrea		38	-	-
Angola		36	12.4	4.5
Sierra Leone		36	-	-
Guinea		35	7	1.2
Liberia		34	7.9	1.6
CAR		33	-	-

Mauritania		33	-	-
Niger		33	4.1	0.4
Mali		32	-	-
Madagascar		30	-	-
South Sudan		30	-	-
Chad		29	-	-
Somalia		22	-	-
African Region		44	10.3	2.6
Region of the Americas		78	11.1	1.9
South-East Asia Region		55	12.8	2.8
European Region		73	7	1
Eastern Mediterranean Region		53	9.5	1.4
Western Pacific Region		75	14.8	3.9
Global		64	11.7	2.6

*Ranked by highest UHC service coverage

Inferential analysis

Simple regression analysis of GGHE/GGE and UHC service coverage index

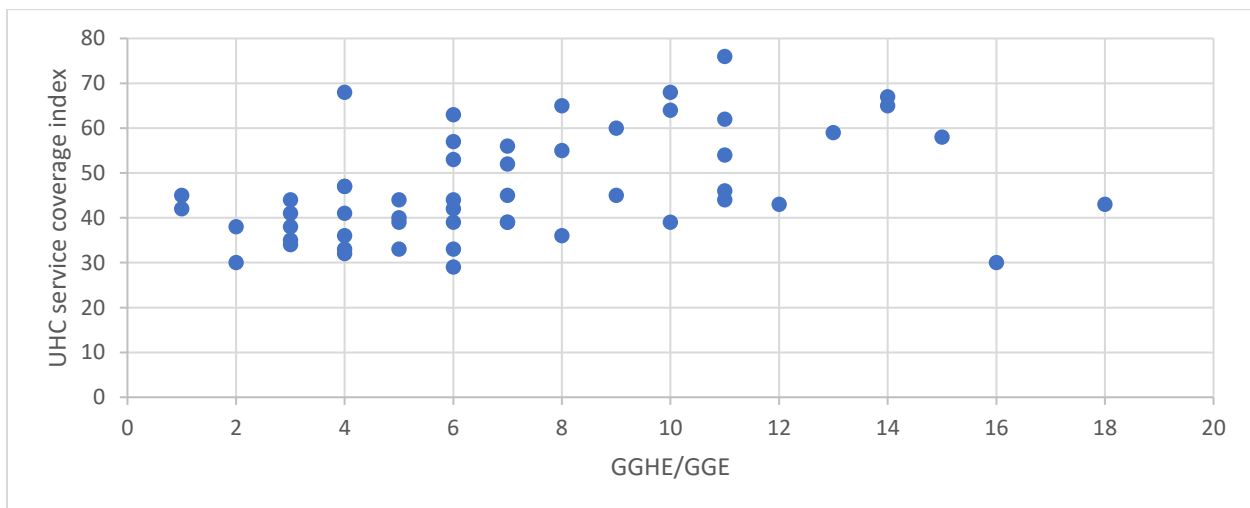
I did a simple regression analysis in Excel to determine the relations between the Abuja Declaration’s proposed target of 15 percent GGHE as a proportion of government revenue and a country’s progress towards UHC.

Independent variable: GGHE/GGE

Dependent variable: UHC service coverage index

The scatter plot in Figure 5 shows a weak linear directionality or pattern.

Figure 4: Scatter plot of GGHE/GGE and UHC service coverage index



The residual plot in Figure 6 shows equal scattering of variances and hence no heteroskedasticity.

Figure 5: Residual plot of GGHE/GGE

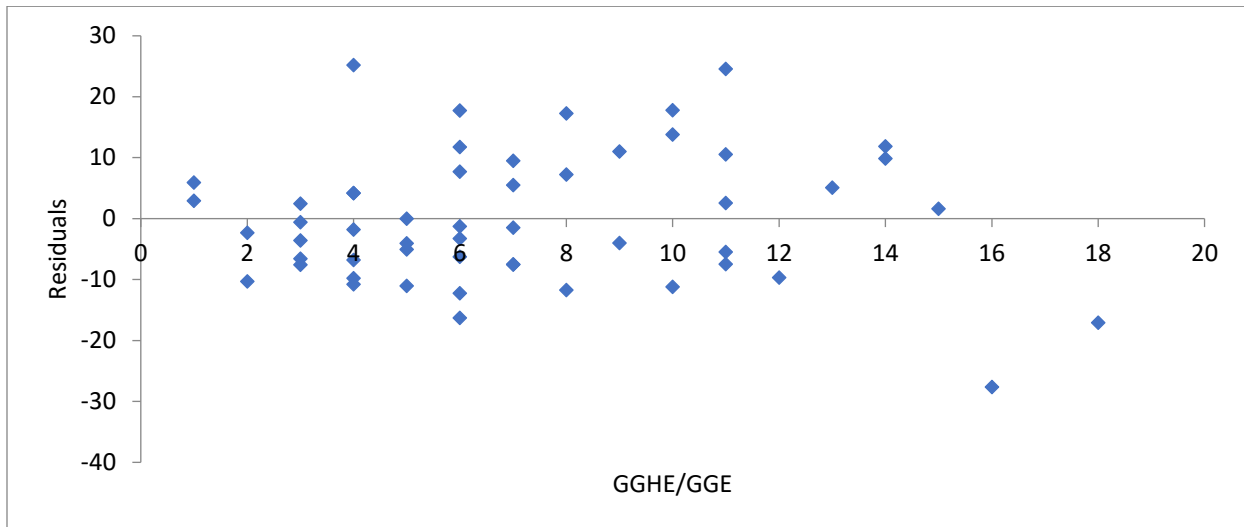


Table 13 shows a modest positive correlation between the dependent and independent variables (Multiple R=0.41). The R square or coefficient of determination demonstrates how much of the change in UHC service coverage index can be explained by the GGHE/GGE. In this analysis, R Square (R^2) is 17 percent which is not very strong. Adjusted R^2 is not relevant as I only used one independent variable. The standard error of 10.9 indicates the average distance between the observed values and the regression line.

Table 13: Regression output

Multiple R		0.415782			
R Square		0.172875			
Adjusted R Square		0.156657			
Standard Error		10.90339			
Observations		53			
<hr/>					
ANOVA	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1267.225	1267.225	10.65936	0.00196
Residual	51	6063.077	118.8839		

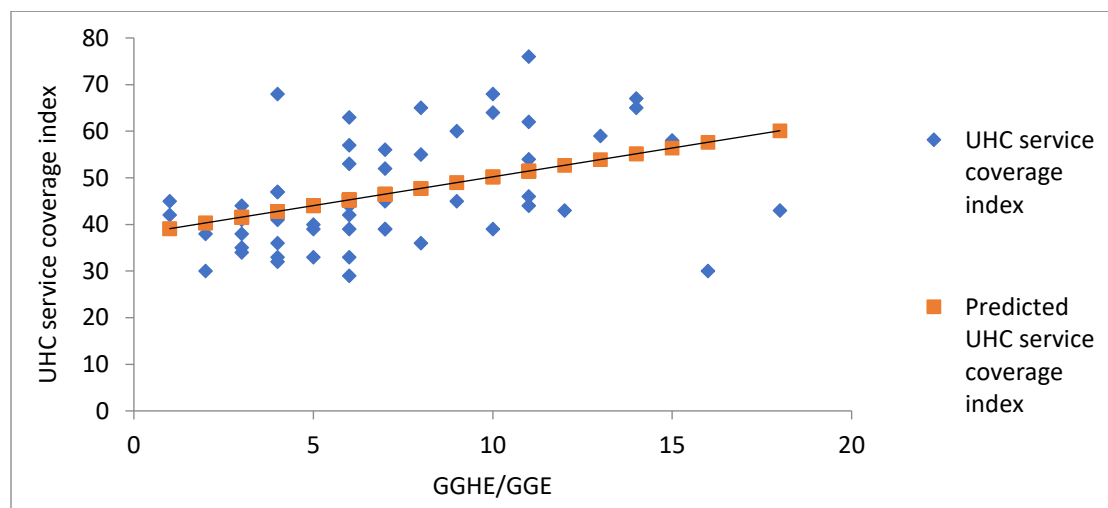
Total	52	7330.302				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	37.85392	3.10547	12.18941	9.94E-17	31.61942	44.08842
GGHE/GGE	1.235544	0.37843	3.264867	0.00196	0.475802	1.995287

The above table also provides information on the significance of the model which is significant at $F=0.00196$. Importantly it gives the regression equation: the y-intercept or constant is 37.9 and the slope of x is 1.24. Also, the p-values for both the intercept and the independent variable demonstrate significance below 5 percent.

The equation for the model is: $y=1.24x+37.9$. In other words, if we change x by one, we would predict y to change by 1.24 in the positive direction. Moreover, based on this model, a 15 percent GGHE/GGE would predict the following UHC service coverage index: $y^{\wedge}=1.24(15)+37.9$ or $y^{\wedge}=56.5$ which is well below the 80 percent global target.

Figure 7 shows the linear trendline or best fit line.

Figure 6: Linear trendline or best fit line



Overall, I reject the null hypothesis that GGHE/GGE is not a significant predictor of UHC. In other words, linear coefficient is not equal to zero at the 5 percent p-value.

Simple regression of GGHE p.c. PPP and UHC service coverage index

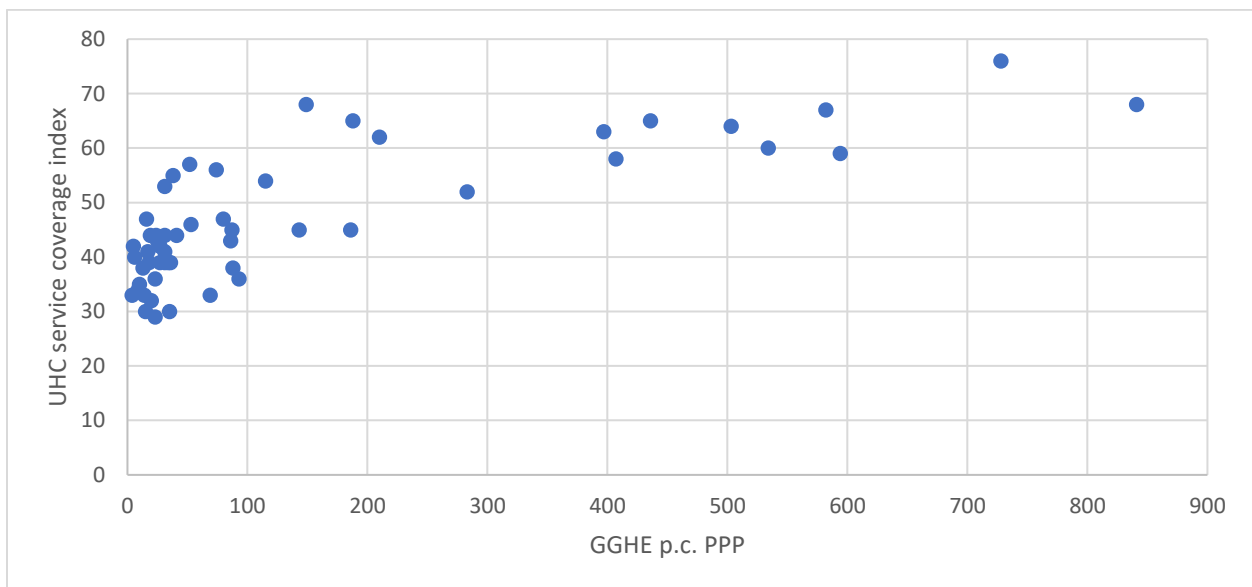
Independent variable: GGHE p.c. PPP

Dependent variable: UHC service coverage index

As part of the secondary objective, I did a simple regression analysis in Excel to determine the relations between GGHE per capita (p.c.) purchasing power parity (PPP) in 2011 and a country's progress towards UHC.

Figure 8 scatter plot shows curvature or a non-linear pattern.

Figure 7: Scatter plot of GGHE p.c. PPP and UHC service coverage index



I could either transform the GGHE p.c. PPP in natural log scale and produce the below scatter plot in Figure 9 which exhibits a linear pattern, or Excel offers an easier option by providing a logarithm trendline which gives the same exact regression output as in Figure 10. I chose the trendline option.

Figure 8: scatter plot in natural log scale

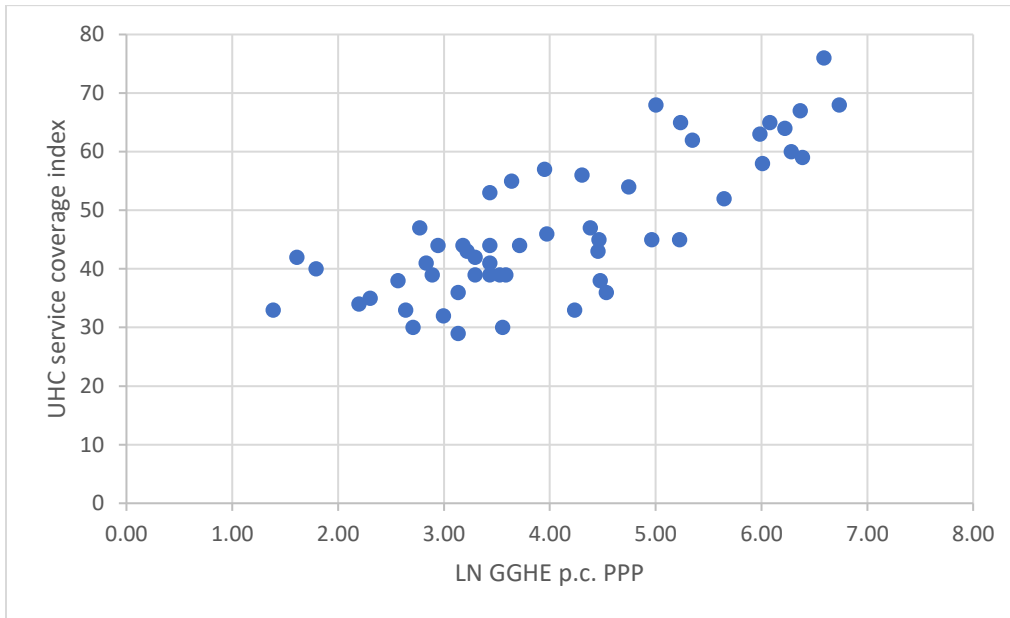
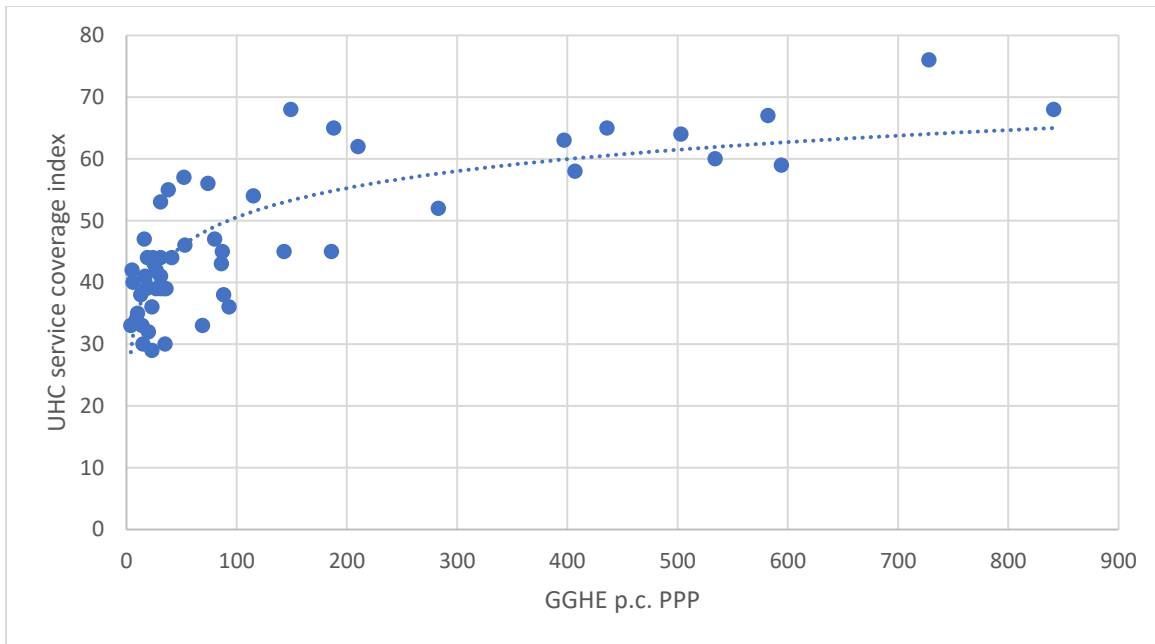


Figure 9: scatterplot with logarithm trendline



I then performed a regression analysis in Excel.

Table 14 shows a strong correlation (Multiple R) of 0.79, and the R^2 is 0.63 with standard error of 7.29. In other words, the independent variable of GGHE p.c. PPP explains 63 percent of the changes in the UHC service coverage index.

Table 14: Regression output

Multiple R	0.794169						
R Square	0.630704						
Adjusted R Square	0.623463						
Standard Error	7.28556						
Observations	53						
					Significance		
ANOVA	df	SS	MS	F	F		
Regression	1	4623.253	4623.253	87.10072	1.29E-12		
Residual	51	2707.049	53.07939				
Total	52	7330.302					
		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	19.29287	3.106124	6.211236	9.56E-08	13.05707	25.52867	
LN GGHE p.c. PPP	6.78915	0.727452	9.332777	1.29E-12	5.328729	8.249571	

The above table also provides information on the significance of the model which is significant at $F=1.29E-12$. Importantly it gives the regression equation: the y-intercept is 19.30 and the slope is 6.79. Also, the p-values for both the intercept and the independent variable demonstrate significance well below 5 percent.

The equation for the logarithm model is: $y=6.79LN(x)+19.30$. In other words, for every 1 percent change or increase in x, we would expect the y to change or increase by 6.79/100 units of y. Therefore, if a country is currently spending 18 GGHE p.c. PPP and achieving a 39 UHC service index, then by increasing the GGHE p.c. PPP to 86 US\$ or 378 percent, we would expect the country to increase its UHC index by 45 units [$y=(6.789/100)*(377)+19.3$] and predict an overall UHC service coverage index of 63 which is still well below the 80 percent target.

Overall, I reject the null hypothesis that GGHE p.c. PPP is not a significant predictor of UHC. In other words, linear coefficient is not equal to zero at the 5 percent p-value.

Moreover, GGHE p.c. PPP or absolute expenditure per person has a stronger correlation and explanation for progress towards UHC (indicated by the service coverage index) compared with GGHE as a proportion of government expenditures in African countries.

Sensitivity analysis

I conducted a sensitivity analysis on GGHE p.c. PPP by excluding the nine high and upper-middle income countries (Seychelles, Algeria, Namibia, South Africa, Botswana, Mauritius, Libya, Gabon, Equatorial Guinea) from the original simple regression analysis. The output indicated that the overall model and the p-values for the intercept and independent variable were significant at 5 percent. However, the correlation (Multiple R) and the R² were lower than the original model. For example, GGHE p.c. PPP, after removing the nine countries, went from explaining 63 percent of the changes in the UHC service coverage index, to 45 percent.

Discussion and conclusions

To the best of my knowledge this is the first study which explores the relations between the Abuja Declaration target of 15 percent public expenditure on health out of general government expenditure and progress towards UHC service coverage index, and builds on prior research in health financing and the associations between GDP, THE and GGE as explanatory variables and attaining UHC as a response variable.

This paper provides an overview of the concepts and theories, rationale, determinants and the latest publications and reports on UHC and health financing in the context Africa's socioeconomic and health profile. Moreover, it presents the historical trajectory and debates around sufficient, efficient use of, and importantly, the sources of health financing as key ingredients for the UHC journey. **According to the literature there is 'no magic number' or gold standard for public spending in relation to attaining UHC, and although this paper does not aim to settle this debate, it intimates at the considerable efforts required to arrive at a common understanding and agreement.**

Instead as the primary objective, I analyze the link between the proportion of annual government expenditure on health and progress towards UHC service coverage index (SDG 3.8.1). And as a secondary objective, I examine the explanatory significance of absolute government health expenditures per person in attaining UHC. **I reject the null hypothesis**

that linear correlation coefficient is equal to zero, and I then compare the predatory strength (R^2) of the two separate independent variables.

Undoubtedly, the political, socioeconomic and health context of Africa is complex! The sub-Saharan region is laden with the highest mortality rates, disease burden and health inequalities (Tables 7 thru 10). And despite the steady economic growth in previous decades, African countries are not benefiting from increased fiscal space and public expenditures and have the lowest domestic health spending compared with other regions and globally (Table 11). **In fact, during periods of income growth, health is often deprioritized, in large part due to majority of the countries' untenable legislative and socioeconomic context, such as limited governance and institutional capacities and lack of democratic representation and sustained social pressures** (Tables 2 thru 5). (10)

The assumed health financing transition, which speculates increasing proportion of total health spending paralleled with decreasing rate of OOP payments and catastrophic spending, is also not reflective of Africa's experiences. For example, 39 countries are deriving their total (current) health spending from more than 20 percent OOP payments with Comoros at a whopping 75 percent (Table 11). **WHO deems that only below 20 percent OOP spending will have a negligible effect on financial catastrophe and impoverishment incidence.** (4)

The Abuja Declaration was an attempt in closing these gaps through political pressures on leaders and ministries of finance to allocate sufficient domestic resources for health. Based on the latest available data, only **Sudan, Madagascar and Swaziland** are meeting or exceeding the Abuja Declaration's 15 percent target of annual public spending on health – which is one less country than what was reported in 2014. Interestingly, despite committing 18 percent of its general revenues to health (highest in Africa), Sudan's GGHE as a proportion of GDP is only 2 percent (Table 11) (benchmark 5-6 percent). This low ratio most likely reflects the government's income and fiscal space which can partly be explained by inefficiencies in mobilizing tax revenues. According to the Organisation for Economic Co-operation and Development (OECD), available data from several **African countries in 2015 show that average tax-to-GDP ratio was 19.1 percent compared to OECD members at 34.3 percent** (59)

Furthermore, none of the African countries, including Sudan, Madagascar and Swaziland, have achieved the target of at least 80 on the UHC service coverage index value. Algeria ranks first

at 76 on the index value, followed by nine countries in the 60s and majority below 50. Outside of Algeria, which is also one of only five African countries which has passed a UHC legislation and has the second highest domestic health per capita (PPP) expenditure, there appears to be a wide variation between public spending and UHC service coverage index value (Tables 11 and 12). For example, Madagascar spends 16 percent of its government expenditures on health and has only achieved a 30, which is amongst the bottom five, in UHC service coverage index value. **Of the 20 countries spending at least 8 percent on GGHE in 2015, six are in the top 10 of the UHC index value.** These data further highlight the significance of political commitment through legal mandates, strong governance and administration capacity, and persistent social pressures on political institutions to allocate sufficient and efficient use of public funds in delivering quality health services as a means towards attaining UHC.

Overall, the WHO African Region ranks the lowest and 20 points below the global average of 64 UHC service coverage index value. Also, from the limited available data, the region is on par with global averages for financial protection indicators at the 10 and 25 percent thresholds; however, **the low figures are most likely due to lack of service utilization (which also partly explains the low service coverage index) than indicative of need or presence of social safety nets.**

As mentioned already, I showed that both GGHE as a proportion of government expenditures and absolute GGHE per person signify progress towards UHC. **Clearly, however, absolute levels of government health spending per person are a stronger predictor for changes in the UHC service coverage index** (Tables 13 and 14) (0.63 R² compared to 0.17 for GGHE/GGE). Twenty countries are spending from 86 US\$ up to 841 US\$ p.c. PPP (Table 11), allocating from 1 to 18 percent of their general revenues to health. **Twelve of the 20 are also the top ranked countries in UHC index value.** In fact, only Congo and Angola appear to be anomalies in service provision despite spending 88 US\$ and 93 US\$ p.c. PPP. **This range (1 to 18 percent) also indicates a wide variation between how much GGHE as a share of GGE translates into actual expenditures.** For example, as mentioned Sudan is allocating 18 percent of its general revenue to health amounting to 86 US\$ p.c. PPP. On the other hand, Equatorial Guinea's domestic health expenditure is only 1 percent of government revenues yet it's estimated at 186 US\$ p.c. PPP.

The main question then becomes *why absolute expenditure per capita is a stronger explanatory variable for attaining UHC than GGHE as a share of GGE (although both are*

significant at p-value 5 percent)? **Bottom line, the GDPs and the government revenues as a share of GDPs are too low to accommodate sufficient pooled, pre-paid and compulsory funds for provision of a basic health service package** (estimated cost at 86 US\$ p.c.). Let's take Rwanda, the poster child of Africa in terms of progress towards UHC, as one example. At 720 GNI p.c., Rwanda is currently allocating 6 percent of its government revenues to health. Even if it met the 15 percent target, its estimated GGHE p.c. PPP would be around 78 US\$. The same calculations for Guinea would only amount to 50 US\$ p.c. PPP. **Therefore, a 15 percent GGHE does not necessary ensure sufficient absolute per capita funds for providing basic health services.**

However, **data clearly show that some countries are performing better despite comparable expenditures.** For example, Rwanda and Guinea-Bissau spend 31 US\$ p.c. PPP on health from government revenues, and yet Rwanda has achieved a 53 on the UHC service coverage index value whereas Guinea-Bissau is at 39. **The stark difference can be partly explained by Rwanda having the highest overall CPIA (institutional capacity) rating in Africa and is among the best performing in term of governance indicators.** Guinea-Bissau is among the lowest ranked countries in both sets of indicators.

The difference can also be due to how countries are allocating their limited resources and how much health they are getting from their inputs (i.e. allocative and technical efficiencies). In Africa, public resources are disproportionately spent (more than 60 percent) on high-cost hospitals and tertiary care services (which are also pro-rich) rather than on much more cost-effective primary care interventions. Additionally, in the 2010 World Health Report, WHO estimated that countries are wasting up to 40 percent of their health resources driven by "poorly executed procurement, irrational medicine use, misallocated and mismanaged human and technical resources or fragmented financing and administration." (4)

Regarding the latter (fragmented financing and administration), and the overall financial management systems, **unused budgetary room ranges from 10 to 100 million US\$ or 1 to 3.5 US\$ per capita across African countries.** According to the Public Financing for Health in Africa report, "Proportion of unspent health budget ranges from 10 to 30 percent of authorized allocations... with some outliers (e.g. DRC) getting close to 60 percent unspent." (10)

Undoubtedly, even with limited resources, African governments can still achieve more by **enhancing their economic efficiencies, financial management systems, and tax revenues**. However, even if tomorrow all the African countries allocate 15 percent of governments' revenues to health, as given by above hypothetical examples of Rwanda and Guinea, **still many African nations' incomes will not be sufficient to accommodate the 86 US\$ p.c. PPP benchmark for provision of basic health services**.

Therefore, assuming that the domestic options, including innovative financing such as a 'sin' tax and others, have been exhausted, **external resources or DAH are inevitable in bridging the financial gap**. Currently, 20 countries rely on greater than 25 percent DAH for their total health spending, with Mozambique topping the list with 85 percent of it's THE deriving from external resources. The negative implications of DAH reliance, including fungibility, unpredictability and vertical programming or fragmentation, cannot be discounted. **Yet, without the infusion of donor assistance, many countries in Africa simply cannot meet the minimum input requirements towards achieving UHC**.

There were several notable limitations, including availability of timely and high-quality data. As alluded above, I had anticipated that a UHC composite index which incorporates both the service coverage and financial protection dimensions exists. However, the global community is still working on devising such measure so instead there are currently a composite index for service coverage and two separate indicators for financial protection (based on the 10 and 25 percent thresholds). Although the service coverage index is available for all African countries, it is incomplete as data are not available for each of the 16 individual service indicators. Moreover, the financial protection indicators are both incomplete and unavailable for all African countries and therefore do not allow for a thorough analysis. **As such I was limited to using only the UHC service coverage index (SDG 3.8.1) as my dependent variable which is not a complete reflection of progress towards UHC**.

Another limitation was around the definition and composition of indicators particularly related to health financing. For example, most sources combine the DAH or external resources with government health expenditure, hence inflating the domestic financial commitment to health. In recent years, WHO has shifted from this practice by separating and reporting the public resources into GGHE and DAH. WHO is also separating and reporting the total health expenditure into current expenditures (CHE) and capital investments neutralizing sudden fluctuations, as well as accounting for health systems resilience and strengthening. In this

paper, I analyzed CHE (rather than THE) and GGHE excluding DAH; hence the figures are not always comparable with previous studies.

Furthermore, the benchmark of 86 US\$ for providing basic service package should be considered with caution when applying it to high and upper-middle income countries. This estimate was calculated based on assumptions in low and low-middle income settings. In this regard, I did a simple sensitivity analysis by removing the nine high and upper-middle income countries from the analysis when regressing GGHE p.c. PPP against UHC. The result shows a nearly 20 percent drop in R^2 , indicating that GGHE p.c. PPP among the nine high and upper-middle income countries strongly explains the changes and improvements in the UHC coverage service index. This relation is probably not surprising when noting that all nine countries have a GGHE p.c. PPP of well above 86 US\$ (ranging from 186 to 841 US\$) and an above average UHC service coverage index (ranging from values of 45 to 68). However, in the overall analysis, I decided to include all the countries since I used PPP in my analysis rather than constant or current p.c. estimates.

Finally, a major challenge, though not necessarily a limitation, was the unit of analysis which in this case was the initial signatories of the Abuja Declaration in 2001. At the time, the African Union organization was technically the Organization of African Unity. It was disbanded and replaced with the African Union in July 2002. The membership has evolved over the years, and in a few instances, countries (e.g. Morocco) have left and rejoined the organization. For this paper, I focused the analysis on the African continent as it stands in 2018 (which reflects closely with the African Union membership), rather than the original signatories of the Abuja Declaration. However, I used the WHO Regions as units of analysis for most of the health status and disease burden indicators because of data availability and ease of reference. As such, the comparisons may be a bit overstated since the WHO Africa Region does not include majority of the better performing north African countries.

Future research should further examine the relations between the Abuja Declaration GGHE target, GGHE p.c., DAH and other relevant explanatory variables and UHC using multiple regression, longitudinal and time-series methods. Such models, including probabilistic sensitivity analyses, would be more robust in explaining the African countries' progress towards UHC in their unique socioeconomic and epidemiological context, and perhaps reach a conclusion in terms of identifying a 'magic number' or benchmark. Having said that, as health is a social phenomenon, and it can be produced through multiple inputs and policies,

future research should further examine the relevance of the Abuja Declaration target. For example, it is possible that decision-makers can prioritize non-health (e.g. labor market, housing, social protection) factors, fall short of the 15 percent GGHE/GGE target, and still produce better marginal health benefits and overall health outcomes. Moreover, future studies should design and use a composite UHC index, inclusive of financial protection indicators, to ensure a comprehensive, relevant and accurate analysis in both developing and developed settings.

In conclusion, both GGHE as a share of government revenues and absolute health expenditures per person are significant predictors for African countries' progress towards UHC. However, GGHE p.c. PPP has a stronger explanation for improvements in UHC service coverage index compared to the GGHE as a proportion of GGE. The strength of this relation can be due to minimum input requirements per person for providing a basic health service package. In moving forward, African leaders should anchor their commitments to attaining UHC through legislations and prioritize health by increasing their share of government health spending according to the Abuja Declaration but in parallel ensure sufficient per capita funding for providing basic health services. At the same time, they should address economic efficiencies and strengthen financial management systems. Finally, the international and donor community should invest in UHC and health systems strengthening and fill the expected financial shortfalls in low-income countries. Collective action is required in ensuring that the most 'powerful concept' offered by public health is fulfilled.

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Endnotes

¹ United States of America, Germany, United Kingdom, France, Canada, Italy as per WHO Global Health Expenditures Database 2017

² GDP is the total sum of consumption, investments, government expenditures and net exports

³ The definition and parameters of 'what constitutes quality' are beyond the scope of this paper.

⁴ Measured in 2011 PPPs; using the threshold of US\$ 1.90 per person per day (referred to as extreme poverty line)

⁵ The following description is directly from the Chatham report: "Countries should strive over time to achieve government health spending levels of at least 5% of GDP, supplemented by a minimum target of US\$ 86 per capita government and donor funding in low-income countries in order to ensure basic PHC services in cases where meeting the 5% target alone would be insufficient."

⁶ GGE is a consolidated direct and indirect outlay, including subsidies, transfers, capital and extra-budgetary funds.

⁷ In this study, the pooled resources included DAH.

⁸ Briefly mentioned the insurance market failures as one category of reasons. The discussion around public and private approaches, organization of healthcare services and the tradeoff in efficiency and equity are salient to this topic, however, beyond the scope of this paper.

⁹ At the time, the organization was technically the Organization of African Unity (OAU) which was established in 1963. It was disbanded and replaced with the African Union in July 2002.

¹⁰ The data refer to the WHO AFRO region which does not include seven north African countries in the WHO Eastern Mediterranean Region.

¹¹ The following comparison table of GDP, GNI, and GNP and description of the formula are directly from the website:

<https://www.thebalance.com/gross-national-income-4020738>:

Income Earned by:	GDP	GNI	GNP
Residents in Country	C+I+G+X	C+I+G+X	C+I+G+X
Foreigners in Country	Includes	Includes If Spent in Country	Excludes All
Residents Out of Country	Excludes	Includes If Remitted Back	Includes All
Foreigners Out of Country	Excludes	Excludes	Excludes

"Formulas

The components of GDP are personal consumption (C) + business investment (I) + government spending (G) + [exports - imports (X)]:

$GDP = C + I + G - X$.

GNI is calculated from GDP: $GNI = GDP + [(income\ from\ citizens\ and\ businesses\ earned\ abroad) - (income\ remitted\ by\ foreigners\ living\ in\ the\ country\ back\ to\ their\ home\ countries)]$.

GNP is calculated from GDP: $GNP = GDP + [(income\ earned\ on\ all\ foreign\ assets - income\ earned\ by\ foreigners\ in\ the\ country)]$.

GNI is calculated from GNP: $GNI = GNP + [(income\ spent\ by\ foreigners\ within\ the\ country) - (foreign\ income\ not\ remitted\ by\ citizens)]$."

¹² This number or value does not have a unit.

¹³ The following description is directly from the World Bank website (<https://data.worldbank.org/indicator/NY.GNP.ATLS.CD>): "GNI per capita (formerly GNP per capita) is the gross national income, converted to U.S. dollars using the World Bank Atlas method, divided by the midyear population. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. GNI, calculated in national currency, is usually converted to U.S. dollars at official exchange rates for comparisons across economies, although an alternative rate is used when the official exchange rate is judged to diverge by an exceptionally large margin from the rate actually applied in international transactions. To smooth fluctuations in prices and exchange rates, a special Atlas method of conversion is used by the World Bank. This applies a conversion factor that averages the exchange rate for a given year and the two preceding years, adjusted for differences in rates of inflation between the country, and through 2000, the G-5 countries (France, Germany, Japan, the United Kingdom, and the United States). From 2001, these countries include the Euro area, Japan, the United Kingdom, and the United States. The income groupings use GNI per capita (in U.S. dollars, converted from local currency using the *Atlas* method) since they follow the same methodology used by the World Bank when determining its operational lending policy. While it is understood that GNI per capita does not completely summarize a country's level of development or measure welfare, it has proved to be a useful and easily available indicator that is closely correlated with other, nonmonetary measures of the quality of life, such as life expectancy at birth, mortality rates of children, and enrollment rates in school. There are some limitations associated with the use of GNI that users should be aware of. For instance, GNI may be underestimated in lower-income economies that have more informal, subsistence activities. Nor does GNI reflect inequalities in income distribution. Users should also note that the *Atlas* method used to convert local currencies into a common U.S. dollar is based on official exchange rates, which do not account for differences in domestic price levels. The *Atlas* method, with three-year average exchange rates adjusted for inflation, lessens the effect of exchange rate fluctuations and abrupt changes, but an alternative method would be to use the purchasing power parity (PPP) conversion factors of the International Comparison Program. To date, however, issues concerning methodology, geographic coverage, timeliness, quality and extrapolation techniques have precluded the use of PPP conversion factors for this purpose."

¹⁴ The following description is directly from the World Bank website (<https://data.worldbank.org/indicator/NY.GNP.ATLS.CD>): "For the current 2019 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$995 or less in 2017; lower middle-income economies are those with a GNI per capita between \$996 and \$3,895; upper middle-income economies are those with a GNI per capita between \$3,896 and \$12,055; high-income economies are those with a GNI per capita of \$12,056 or more."

¹⁵ The following descriptions are directly from the World Bank website (<http://info.worldbank.org/governance/wgi/index.aspx#home>): "The Worldwide Governance Indicators (WGI) project constructs aggregate indicators of six broad dimensions of governance: Voice and Accountability; Political Stability and Absence of Violence/Terrorism; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption. The six aggregate indicators are based on over 30 underlying data sources reporting the perceptions of governance of a large number of survey respondents and expert assessments worldwide. Estimate of governance score ranges from approximately -2.5 (weak) to 2.5 (strong).

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- ¹⁶ Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
- ¹⁷ Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
- ¹⁸ Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.
- ¹⁹ Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
- ²⁰ Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
- ²¹ Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests."
- ²² The following descriptions (10 thru 15) are directly from the World Bank website and CPIA database (<http://www.worldbank.org/ida> and <http://databank.worldbank.org/data/source/country-policy-and-institutional-assessment#>):
- ²³ "The economic management cluster includes macroeconomic management, fiscal policy, and debt policy.
- ²⁴ The structural policies cluster includes trade, financial sector, and business regulatory environment.
- ²⁵ The policies for social inclusion and equity cluster includes gender equality, equity of public resource use, building human resources, social protection and labor, and policies and institutions for environmental sustainability.
- ²⁶ The publicsector management and institutions cluster includes property rights and rule-based governance, quality of budgetary and financial management, efficiency of revenue mobilization, quality of public administration, and transparency, accountability, and corruption in the public sector.
- ²⁷ Overall CPIA Score for a Country. The 16 items to be assessed are grouped into four clusters. Each of the four clusters has a 25 percent weight in the overall rating. Within each cluster, all criteria receive equal weight, although components within a criterion may be weighted differently."
- ²⁸ The following description is directly from the UNDP website (<http://hdr.undp.org/en/2016-report>): "The Human Development Index (HDI) is a composite statistic (composite index) of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development. HDI classifications are based on HDI fixed cutoff points, which are derived from the quartiles of distributions of the component indicators. The cutoff points are HDI of less than 0.550 for low human development, 0.550–0.699 for medium human development, 0.700–0.799 for high human development and 0.800 or greater for very high human development."
- ²⁹ The following description is directly from the Democracy Ranking Association website (<http://democracyranking.org/wordpress/welcome/about-us/>): "The Democracy Ranking is an annual ranking of all democracies (country-based democracies) in the world by focusing on the Quality of Democracy in an international perspective. The Democracy Ranking publishes the ranking scores and displays ranking score increases or decreases over time. The ranking designs a multidimensional conceptual approach, integrating the political and non-political dimensions of society, and is furthermore carried by a broader theoretical understanding of democracy. The Democracy Ranking applies the following conceptual formula: Quality of Democracy = (freedom and other characteristics of the political system) and (performance of the non-political dimensions). The non-political dimensions are: gender, economy, knowledge, health, and the environment."
- ³⁰ The data were accessed in August 2018 from: http://www.who.int/gho/publications/world_health_statistics/2018/en/.
- ³¹ The data were accessed in August 2018 from: http://www.who.int/gho/publications/world_health_statistics/2018/en/.
- ³² The data were accessed in August 2018 from: http://www.who.int/gho/publications/world_health_statistics/2018/en/.
- ³³ The data were accessed in August 2018 from: http://www.who.int/gho/publications/world_health_statistics/2018/en/.
- ³⁴ The data were accessed in August 2018 from: <http://ghdx.healthdata.org/gbd-results-tool>
- ³⁵ The data were accessed in August 2018 from: <https://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS?view=map>
- ³⁶ The data were accessed in August 2018 from: <http://apps.who.int/nha/database/Select/Indicators/en>.
- ³⁷ The data were accessed in August 2018 from: <http://ghdx.healthdata.org/gbd-results-tool>
- ³⁸ The data were accessed in August 2018 from: <http://apps.who.int/gho/data/view.main.H503v>
- ³⁹ The following descriptions are directly from Wikipedia (https://en.wikipedia.org/wiki/List_of_countries_with_universal_health_care#cite_note-6):
- "Algeria operates a public healthcare system. It is a universal healthcare system as well. A network of hospitals, clinics, and dispensaries provide treatment to the population, with the Social Security system funding health services, although many people must still cover part of their costs due to the rates paid by the Social Security system unchanged since 1987. The poor are generally entitled to health services free of charge, while the wealthy pay for treatment according to a sliding scale."
- "Botswana operates a system of public medical centers, with 98% of health facilities in the country run by the government. All citizens are entitled to be treated in public facilities free of charge, though a nominal fee of ~70 BWP (~\$6.60 USD) is typically charged for public health services except for sexual reproductive health services and antiretroviral therapy services, which are free."
- "Tunisia operates a public healthcare system under the National Health Insurance Fund (*Caisse Nationale d'Assurance Maladie*). All Tunisian citizens and residents can receive treatment in state-run hospitals and clinics free of charge."