



Health Care 2.0 in Africa

This article profiles three companies that are driving innovation in health care in Africa, where national spending on physical and mental health ranks remains stubbornly low.

Access to quality health care is one of the most important humanitarian and developmental issues across sub-Saharan Africa. A recent McKinsey & Company report asserts that Africa faces a twin health crisis that will be exacerbated by COVID-19: a high existing disease burden and fragile health systems. Despite the compounding effects of the pandemic and extensive underinvestment in health care systems across the continent, entrepreneurs across the continent are leveraging local innovative solutions to upend this trend. Zipline, a drone medicine delivery company, is reducing the costs and time of logistics in underserved rural Africa. MANI, a mental health awareness company, is harnessing technology to help local communities address mental health problems. 54 gene, an enterprise cataloguing the African genome, aims to facilitate medical research tailored to the African people. These companies are at the forefront of innovation, laying the foundations for health care 2.0 in Africa through data and community infrastructure. In this article, we explore their stories.

Background and Context

Africa is currently the home of approximately 1.3 billion people. With a population growth rate of approximately 2.6% — the highest of any continent — it is projected to reach 2.5 billion by 2050, according to United Nations estimates. Africa is experiencing an unprecedented population boom. Currently, 60% of its population is under the age of 25, making Africa the youngest continent in the world. Over the past 20 years, this trend has been accompanied by rising economic growth exemplified by a threefold increase in the average GDP per capita, according to the World Bank.

A *Stanford Business Review* report states that fewer than 50% of Africans have access to modern health facilities. In addition, many African countries spend less than 10% of their GDP on health care despite the dearth of services. Life expectancy in the region has grown steadily since the turn of the century; the average life expectancy grew by 10 years in only the past two decades. A study by the World Health Organization found that the average life expectancy at birth in Africa (60 years) is the lowest in the

world compared to the Americas (76.9), Europe (76.8), and South-East Asia (69). Neonatal mortality, malaria, diarrhea, and lower respiratory diseases and infections still represent a vast percentage of total deaths, in comparison to other parts of the world.

In an attempt to defy these infrastructural challenges, young people across Africa, making up the *youth bond* — a term coined by economists to describe the availability of young workers as a share of total population — are creatively building the foundations of a modern health care system and driving innovative African solutions to strengthen African health care systems.

Flying Medicine

Leveraging the latest robotics technology, the drone-logistics company Zipline has enabled Rwanda to turn its health care supply distribution and cold chain storage challenges into a 21st century on-demand model for shipments of life saving supplies. Using autonomous fixed wing aircraft drones, which can carry cargo of five pounds as far as 100 miles, Zipline has partnered with the Rwandan government to leapfrog newer and better equipped health logistics in Western countries in terms of cost, delivery efficiency, and geographic reach. Since launching its health logistics services in Rwanda in 2016, it has made over 190,000 deliveries of vital medical supplies, ranging from blood used for lifesaving transfusions during childbirth to vaccines, insulin, and personal protective equipment.

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According to the World Bank, 83% of Rwanda’s population lives in rural areas and relies on over 500 small community clinics, rather than hospitals located in urban areas, for access to health care. Through its on-demand drone delivery system, Zipline significantly enhances the reach and timely delivery of vaccines and blood from its 22 distribution centers located near the country’s limited number of cold chain storage facilities. Given the challenge of predicting the need for supplies across the country,

particularly during community vaccine campaigns and crises, health care officials were often forced to make trade-offs between expanding access or limiting waste. Today, doctors are able to place blood delivery and vaccine orders in real time and receive the products within 15-30 minutes across all corners of the country, significantly reducing delays due to traditional health logistics infrastructure challenges and almost eliminating the wastage of medical supplies, which according to *Forbes* magazine has not been achieved by any health care system globally. In a recent TED Talk, the company’s founder and CEO, Keller Rinaundo, stated that Africa is on the cusp of a major paradigm shift in that it “can be the disruptor. Small, agile economies can out-innovate large richer ones. They can leapfrog over the absence of outdated legacy infrastructure to go straight to newer and better systems.”

Building off of its successes in Rwanda, Zipline recently expanded to serve 12 million people in Ghana and over 10 million across Tanzania. The company’s successes in Africa have not only improved health outcomes, particularly in rural areas, but have led to replication in the United States. Noviant Health in North Carolina launched America’s first emergency drone operation to deliver personal protective equipment and medical supplies to health facilities to combat COVID-19. Learning from Zipline’s growth in Africa, Walmart established a similar partnership focused on consumer health products with the ultimate aim of offering an on-demand service for delivering lifesaving prescriptions directly to patients’ homes.

Building Communities to Address Mental Health

Across Africa, the need for mental health care services cannot be overstated. The COVID-19 pandemic has exacerbated the problem and highlighted the persistent mental health infrastructure gap across the African continent. According to the WHO, 15 African countries are among the top 30 globally for suicide per 100,000 people. While there are nine mental health workers per 100,000 people globally, that number falls to 0.9 in Africa. In addition, the median mental health hospital beds per 100,000 was 1.6 in Africa, compared with 11.14 in the U.S. These figures indicate a severe shortage of psychiatrists and psychologists.

In September 2015, the United Nations General Assembly recognized mental health and substance abuse as key priorities of the Sustainable Development Goals (SDGs), urging countries to propose mental health solutions in their national budgets. Yet, according to the World Economic Forum, most African governments devote less than 1% of their national health spending to mental health services.

In Nigeria, Mentally Aware Nigeria Initiative (MANI) is working innovatively to close the mental health gap using technology-driven, community-based solutions. According to its website, MANI, founded by Victor Ugo in 2016, is West Africa's biggest youth-run nonprofit. Using digital and social media campaigns to drive mental health promotion and prevention, it democratizes access to mental health professionals and advocates for better mental health policies across Africa.

In an interview with WHO, Ugo described how his experience seeking mental health care in Nigeria led him to create the community-led organization:

“My passion for mental health has always been there from my time in medical school, but what amplified that passion was my personal experience and my diagnosis of major depressive disorder in my final year in medical school, which opened my eyes to the shocking inadequacy of mental health care in Nigeria. I was lucky and privileged to have friends who were doctors and some also had mental health issues themselves...but I am aware how different the reality is for millions of other young persons in Nigeria who go through these issues without support. That formed the foundation of what MANI is today — a community of young persons who will be there to support each other, build knowledge about mental health basics and fight for better mental health in the country.”

To address the issue of limited resources and infrastructure for mental health care, Ugo and his team leveraged the power and popularity of digital and social media among Nigerian youth to provide access to mental health services to a large share of the Nigerian population that would otherwise have been underserved. In a Guardian interview, Ugo described leveraging social media's cool factor. They launched online campaigns in which youth spoke candidly about their experiences dealing with mental health issues. They also shared catchy educational content about mental

health issues such as depression and anxiety and practical ways to cope. Noticing the level of interest among Nigerian youth, in 2017, MANI launched a 24-hour mental health support/suicide hotline led by professionally trained volunteers. Using this service, any Nigerian can reach out using Twitter or Whatsapp for advice and counselling. One year after its launch, MANI had trained over 1,500 volunteers and was providing mental health care to Nigerians in 13 of the country's 36 states.

To supplement its digital community, MANI also hosts in-person events to further create connections among Nigerian youth and provide a platform for people to share their mental health experiences more openly. MANI is an example of innovative models that leverage communal involvement to solve mental health through networks of support, leapfrogging challenges in Africa's health sector. During the COVID-19 pandemic, MANI provided specific mental health services through its project-COVID website and partnered with companies such as Twitter to amplify its reach. MANI is currently expanding its community and platforms in its mission to provide mental health support to every Nigerian that needs it.

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Deciphering the African Gene

Are traditional medicines, vaccines, and studies suitable for every race? Are they built for all in an equal manner? Genetic bank data and clinical trials representation prove otherwise.

Due to historic and socioeconomic reasons, Africa has long been excluded from the global health care industry. Despite representing approximately 15% of the total world population, only 3% of current gene data is from African people or people of African descent. Following this trend, Africa as a whole has conducted 12 times fewer studies than have been conducted in the United States, according to BioMedical Central. Historically, Africans have composed less than 5% of the total sampling size for

clinical trials, especially in cancer research. The problem has been exacerbated by the fact that Africa has one of the most genetically diverse populations in the world. Thus, it should be receiving both a larger percentage of gene pooling and a larger representation in clinical trials, not dismally less.

These two factors clearly establish that medicine is not being researched for nor by Africans. Consequently, Africans and people of African descent are more likely to suffer unpredictable outcomes from newly launched medicines and may not be receiving the most efficient treatment suited to their genetic composition. The lack of African participation in medicine discovery can be directly attributed to a lack of research network effects, knowledge spilling, poor infrastructure, and minimal funding. 54gene is a company trying to solve this.

The company is building a robust data set of African genomic samples, which it aims to share with drug manufacturers to incentivize its use for drug development. Beyond collecting and processing the data, the company also strives to enhance African representation in the drug discovery process. The intention is to help facilitate the expansion of African owned and published research around genomics.

To collect samples, the company is administering non-invasive, ethically run diagnostic tests for patients currently in the hospital. When patients visit the hospital for a diagnosis, they're given the option to share their sample with 54gene. Without the need for additional sampling, the test results are highly cost effective. Once a patient gives authorization, the company proceeds to sequence genetic data using the first privately owned NovaSeq 6000 on the continent, and subsequently stores the patient's sample in a centralized biobank.

To date, 54gene has successfully collected over 100,000 samples. The company plans to expand its database and share the captured biobank sequencing and genotyping samples with pharmaceutical companies. The resulting

partnership will enable the development of drugs tailored to African populations and facilitate the identification of pathogenic variations or vulnerabilities in the African races.

The work of 54gene and similar companies present unique challenges in terms of data privacy. Nikki Tiffin, a computational biologist from the University of Cape Town in South Africa, said that issues of data privacy are paramount when dealing with people's genomic data. Despite the risk, she said she is in favor of projects such as 54gene, according to an article on genomeweb. To this point, 54gene has stated that they only accept and biobank specimens for which they have explicit consent. In addition, the samples are devoid of information that link them back to the original donor. A final measure of protection is in the form of choice offered to donors. Donors have the option to request that their samples be withdrawn from the gene bank and destroyed.

Closing Thoughts

There is still plenty of ground to cover over the next few decades to address the complexity of health care challenges across Africa. African youth and innovative companies are forging the future health care landscape by harnessing the power of the most modern technologies and a bold approach to problem solving.

Flying drones, massive volunteering communities, and gene decoding represent cutting-edge solutions developed and deployed across the continent and which are enabling cost-effective mechanisms to meet the challenges posed by Africa's health care crisis. Zipline, MANI and 54Gene epitomize the thesis that locally launched solutions can overcome legacy infrastructure, as well as deeply entrenched political and demographic challenges.

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