# *Report on Vaccine Equity and Distribution Research in Ghana*

budgIT | CTAP

## Disclaimer

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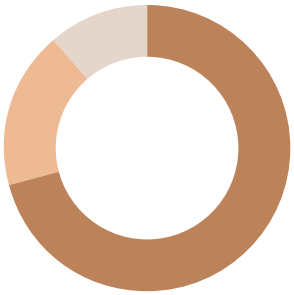
# Key Findings

*Ghana*
Capital: Accra

POPULATION
31.07M
People in the 2020

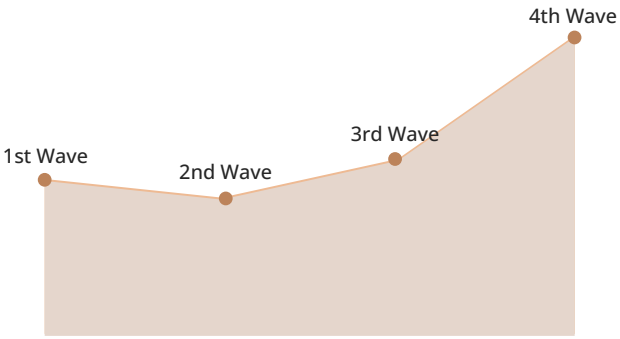
GROSS DOMESTIC PRODUCT
USD 66.98B
in 2019, which translates into a per capita GDP of USD 2,202.1 in 2018

1 Executive President
16 Different Regions
260 Administrative Subdivisions.
16,000 Different Unit Committees.
5,292 Health Facilities

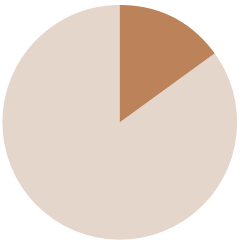


**30,378,478 doses** of COVID-19 vaccines was administered as at 20th of April. 2022 which was significantly higher than the 17,459,408 doses was planned for. The source of vaccines were:

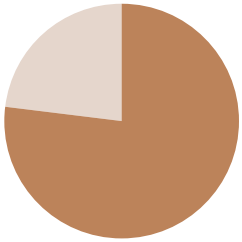
- **70.9% COVAX (21,547,530)**
- **17.9% AVATT/AU (5,424,450)**
- **11.2% WB's Bilateral Relations (3,406,498)**




The **4th distinct wave** of the pandemic was said to be the most devastating by the 16 administrative region.



**15.2%**
**Of People in Low-income Nations**
had received at least one dose of the 11.5 billion doses provided globally



**77%**
**Of total Vaccine Eligible Populations**
in the UK and the US received at least one dose.

**22.6%**
**Of Total Vaccine were Administered in Accra**

Accra is said to have administered the most vaccination doses totaling 2,012,892 and accounting for 22.6 percent of total administered doses

# Part 1

# Executive Summary

# Executive Summary

Less than a year after the first wave of COVID-19 was reported in Wuhan, China, the international scientific community launched its first preventive SARS-Cov-2 (COVID-19) vaccines. In December 2020, the United Kingdom began administering index doses of this vaccine, followed by the worldwide approval and implementation of several other candidate vaccines.

There have been growing concerns about the potential for an unequal distribution of vaccines around the world, which could have a negative impact on global health security and health outcomes, as a result of this innovation. Phase 2 of CTAP's COVID-19 Vaccine Evolution and Hesitancy Study sought to outline Ghana's COVID-19 vaccine evolution, hesitancy, current vaccination levels and distribution, adequacy and related emerging issues in order to inform civil society advocacy for vaccine equity in Ghana.

**The study found that:**

a **An all-government approach was taken by the Ghanaian government in order to deal with the pandemic. The Interministerial National Coordinating Committee (NCC) was put in charge of planning and coordination for COVID-19 preparedness and response, the National Technical Coordinating Committee (NTCC) was put in charge of monitoring implementation, and the National Public Health Emergency Council (NPHEC) was put in charge of coordinating the response.** In spite of the country's frantic preparations and commendation for its proactive and timely measures to set up an emergency response team, the country reported its index cases of the disease on March 12, 2020. This marked a cataclysmic change in the trajectory of the pandemic in April 2020 when it was confirmed that the disease had spread throughout the community. Over the course of the pandemic's four distinct waves, each of the 16 administrative regions eventually registered confirmed cases, with the pandemic's fourth wave being the most devastating of them all.

b Ghana was historically the first country in the world to receive COVID-19 vaccines as part of the COVID-19 Vaccines Global Access (COVAX) facility after the introduction of vaccines in the country. Ghana developed a National COVID-19 Vaccine Deployment Plan in order to guide the delivery of COVID-19 vaccines, initially targeting some 17,459,408 people through a phased approach and multiple vaccine delivery strategies, and ultimately becoming the first country in the world to receive COVID-19 vaccine

c Its vaccine receipts increased significantly to approximately 30,378,478 doses as of 20th April 2022. COVAX was the predominant source of vaccines, accounting for approximately 70.9 percent (21,547,530) of its total receipts, while AVATT/AU/and WB's Bilateral Relations represented 17.9 percent (5,424,450) and 11.2 percent (3,406,498) respectively.

d Vaccine hesitancy was becoming a source of concern for health authorities and civil societies. This was due to a number of factors, including the lack of access and availability of the COVID-19 vaccines, the aetiology of the disease interlacing with the population dynamics of the country to mitigate against the significant uptake of the vaccines, the inverse relationship between vaccine stocks and disease incidence, and the religiosity of vaccination.

# Executive Summary

*Although access and vaccine availability were no longer drivers of hesitancy, it was proposed that COVID-19 vaccinations be incorporated into routine vaccine programs and that the institution of a national COVID-19 vaccination day campaign be strengthened in order to promote vaccine equity and counter hesitancy in Ghana.*

f Despite the data, it was necessary to reaffirm the fact that a growing proportion of the population was still becoming infected, with some people dying and others suffering from post-recovery syndrome or long-term complications, decreasing their quality of life.

In the end, a vaccine advocate could address the issue of religiosity by citing key decisions such as the 15th annual conference of the International Fiqh Council, which held the view that vaccination was acceptable in Islam and became obligatory once the risk of disease was high and the benefits of the vaccine outweighed its risks, and by underscoring the scientific evidence behind vaccine efficacy and buttressing this position by prominent religious figures.

# Part 2 Background

# Background

More than a year after the first outbreak of SARS-Cov-2 (COVID-19) in Wuhan, China, the global scientific community launched its first preventive vaccinations for COVID-19. In December 2020, the United Kingdom began administering index doses of this vaccine, followed by the worldwide approval and implementation of many more candidate vaccines.

There have been growing concerns about the potential for an unequal distribution of vaccines around the world, which could have a negative influence on global health security and health outcomes, as a result of this innovation. Caseloads and deaths continue to rise in low and middle-income countries as the pandemic appears to be diminishing in many high-income countries.

Only 15.2% of people in low-income nations had received at least one dose of the 11.5 billion doses provided globally as of mid-April 2022[1], compared to an average of 77 percent of total vaccine eligible populations in the UK and the US, respectively. These disparities are considerably more pronounced in places like Africa, where the regional average of people receiving at least one dose of COVID-19 vaccine, i.e., 21%, compared significantly to the European Union's 73% and Asia's 68%[1]. The differences amongst African countries are as great as they are across the rest of the continent. Morocco, Tunisia, and Egypt have a 51% average percentage of their people with a complete initial protocol, but nations in West and Central Africa, such as Ghana, Nigeria, the Democratic Republic of the Congo (DRC), Liberia (LRA), and Kenya, have under 15% of their populations fully vaccinated[2,3].

During prior pandemics, the same sequence of events was observed in these large differences. H1N1 vaccinations were first acquired and stored in large quantities by wealthy countries during the 2009 epidemic. Aid to LMICs was generally limited, even when the WHO and UN intervened to attempt and supply vaccines for developing countries.

Inequities in vaccine coverage affect reference countries and the global health community in general, both directly and indirectly. To put it another way, a lack of capacity to care for other health disorders is put at risk by continuing exposure to vaccine preventable diseases[4]. Since COVID-19 has spread so widely, it has created the ideal conditions for new virus variants to emerge, some of which may have a selective advantage over others in immune evasion or avoidance, as we've seen in recent months.

Those who haven't been vaccinated or who haven't produced a strong enough immune response to immunization may be at risk from these viral variations. Furthermore, overworked health systems are less likely to recognize emerging and endemic infectious disease threats. Reprioritizing important resources for COVID-19 response deprives economies and health systems of much needed funding for other essential fundamental necessities, which has a direct impact on health. 95 million people have been forced into extreme poverty, and another 200 million are expected to be at danger between 2020 and 2030 when the global economy begins to recover[5,6].

Following CTAP's phase 1 study, this current investigation aims to detail Ghana's COVID-19 vaccine evolution, hesitation, current vaccination levels and distribution, sufficiency, and related emergent challenges in order to help civil society advocate for vaccine fairness in the country.

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# Part 3

# Methodology And Approach

**The method was divided into four steps:**

***A*** preparing the COVID-19 related nation reports,

***B*** extracting data from the prepared country reports,

***C*** analyzing the extracted data from the country reports, and

***D*** distilling findings from the analyzed data.

# Methodology And Approach

## 3.1 Paradigm of the Study

Only research that can be influenced by third parties (ontological idealism) or has a defined scope in terms of "the nature of reality" (ontology) or the perceived nature (ontological materialism) exists independently of human observations can be considered valid[7,8]. These viewpoints have an impact on the researcher's epistemology, methodology, and data collection/analysis procedures, as well as the type of knowledge the researcher contributes to society[9].

Researchers in Ghana used a deductive approach to uncovering what is already there using both quantitative and qualitative methodologies in their study of vaccine equality and distribution[7,10,11]. Pragmatism was therefore used in the study to allow for quick and easy adaptation to the demands of the research, its techniques, concept selection and a mix of induction and deduction to be used in the process of investigation[12,13,14].

As a result of this pragmatic view of language and concepts as instruments for solving problems, the perception that the results are more important than the method is underpinned, and thus the end justifies the means. Research methods and concepts should be chosen based on the needs of the project, according to the authors[13], who believe that researchers should have the freedom to do so. Research practicalities should not be led solely by theory or facts, but by the process of abduction that allows the forward and backward movement between induction and deduction through a process of inquiry. This approach recognizes this[14,15]. As the third methodological trend, pragmatism emerged, particularly in the field of health research, in part as a reaction to the limitations that were shown by the alternative use of quantitative or qualitative approaches. The use of this paradigm, as established by several authors, has been underscored by the motivation to ensure "completeness, address a wider range of questions than either method alone would allow"[16]. Additionally, the use of this paradigm has been underscored by the motivation to prevent the otherwise binary production of evidence that is devoid of the context that is associated with the characteristic of the positivist approach[17]. This approach provides "hard data" for the decision makers whose responsibility it is to formulate health care policy, responds to the pressures for outcomes in healthcare while taking into consideration the context of those outcomes, and offers greater possibilities in[18]. It makes a commitment to the end-causes and outcomes of practice, analyzes findings by tracing their respective practical effects, and gets to the conclusion that the absence of differences in research outcomes results in fruitless metaphysical discussion[19].

In addition, the paradigm gives a practical starting point for pluralist approach and adequate technique to solve the complex difficulties inherent in healthcare and health service disciplines[20,21].

## 3.2 Study Design

An explanatory sequential mixed methods approach was used for design because it partially fit with the study objectives[15,22]; the paradigm shift in research approaches within the field of health research and the benefits of using mixed methods, such as triangulation, completeness, offsetting weaknesses, and providing stronger inferences, amongst others[10,23]. The design used

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23. Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. Handbook of mixed methods in social and behavioral research, 209(240), 209-240.

# Methodology And Approach

a two-phase approach, with the quantitative and qualitative findings triangulated into a third phase, allowing the quantitative findings to provide observed patterns and width and the qualitative findings to contextualize and enrich the findings, strengthen interpretational validity, and generate new knowledge[24,25,26,27]. Given that the synthesis was a secondary research endeavor, the findings/analysis of the quantitative and qualitative stages were given equal weighting.

### 3.3 Approach to the Study – The READ Approach

The research was divided into two stages. The READ approach to document analysis was used in the first phase of the synthesis[28]. The READ approach to document analysis comprises a systematic examination of documents to offer context, raise questions, and quantify changes over transformational epochs.

The study's application of this strategy resulted in the methodical acquisition of crucial information from the respective COVID-19 relevant nation reports, as well as the easy synthesis of the compiled indices.

The method was divided into four steps:

**(a) preparing the COVID-19-related nation reports,**
**(b) extracting data from the prepared country reports,**
**(c) analyzing the extracted data from the country reports, and**
**(d) distilling findings from the analyzed data.**

Narrative Synthesis was then employed to take a textual approach to 'telling the tale' of the included report's results[29]. As the study's main goal was to identify patterns and common indicators, as well as document success factors, challenges causing vaccine inequity, and hesitancy, the synthesis sought to answer the question: how effective has Ghana's COVID-19 vaccination drive been in addressing inequitable access to COVID-19? To ensure proper formulation of the study objectives, efforts were made to address the three main components - the participants (healthcare providers and recipients), the intervention of COVID-19 vaccination (before and after), and the outcomes (of the vaccination) in preventing COVID-19 on the health outcomes in Ghana. All relevant COVID-19 vaccination records were included for review, and the study objectives guided the selection of which datasets to extract. Given that the import of the synthesis was centered on the influence of the drivers and hurdles to equity in the country's distribution of COVID-19 vaccinations, data on the specific type of barriers, problems, and success stories were extracted. Following that, the reports' validity was assessed in order to limit the impact of the reports' methodological quality on the study report.

**The second phase of the synthesis entailed conducting key informant interviews with relevant country COVID-19 policy actors to document the pathways of vaccine access in the country, interrogate the phenomenon of vaccine equity (priorities, measurement, enablers, and other elements, taking gender equity and PLWDs into account), and the challenges of vaccine hesitancy via an analysis of country context and drivers.**

During this part of the project, a semistructured interview guide (Appendix 1) produced by the consultant under the supervision of the BudgIT Ghana team was employed as the data gathering method. The tool was divided into three sections: 1) responder demographics, 2) difficulties regarding the procurement, production, availability, and distribution of COVID-19 vaccines, and 3) advocacy proposals to reduce COVID-19 vaccine reluctance.

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# Part 4 Findings

# Findings

## 4.1 Economic, Social and Demographic Context of Ghana

Ghana is a country that is situated between the Gulf of Guinea and the Atlantic Ocean. The name Ghana comes from the Soninke language and literally translates to "warrior king" (Jackson, 2015). It is bounded to the west by the Republic of Ivory Coast, to the north by the Republic of Burkina Faso, and to the east by the Republic of Togo, and it encompasses a total land area of 238,535 square kilometers.

Administratively, the Republic of Ghana is led by an executive President and is broken up into sixteen different regions: Ashanti, Greater Accra, Central, Eastern, Northern, Brong Ahafo, Western, Upper West, Upper East, and Volta, Ahafo, Bono East, North East, Savannah, Oti, and Western North regions. The President of the Republic of Ghana is elected every four years. Each of these sixteen administrative regions is further subdivided into town or area councils, zonal councils, and area councils. Depending on the size of the population, these districts, municipalities, and metropolises are referred to as either Districts, Municipalities, or Metropolises. There are a total of 260 of these administrative subdivisions. At the most basic level of the local administrative structure, there are more than 16,000 different unit committees. In order to ensure that every voice is heard in the nation's capital, the voting population is partitioned into 275 separate electoral districts.

In 1957, Ghana became the first country in sub-Saharan Africa to declare its independence from colonial authority. This claim is often made. Since then, it has been consistently working to increase the size of its economy, which has helped it become a regional force in West Africa[30]. Its economic freedom score increased by around 1.9 point to close at 59.4, earning it the position of the 104th freest economy in the world according to the 2020 economic freedom index. This is an inter-jurisdictional assessment of trade freedom, tax burden, and judicial performance. Given an anticipated Gross Domestic Product (GDP) of US$66.98 billion (in 2019), which translates into a per capita GDP of US$2,202.1 in 2018, Ghana is categorized as a lower-middle-income country by the World Bank[31]. Even though roughly 23.4 percent of the population is considered to be poor, significant progress has been made in reducing the prevalence of poverty by about 0.8 percentage points between 2012/13 and 2016/17. These advances have been made despite the fact that poverty continues to be a majormobstacle[32].

Despite the fact that the country's key macroeconomic indicators improved steadily in 2019 (economic growth of about 7.6 percent, non-oil growth of 6 percent, and stable inflation within the Central Bank's target range of a single digit), the World Bank believes that "maintaining a fiscal consolidation stance and remaining on a sustainable path through the 2020 election cycle will be a challenge over the next two years." Ghana's population is expected to be around 30.8 million by 2021, with an inter-censal population growth rate of 2.1 percent between 2010 and 2021 - the lowest since the country's independence[33]. The share of its urban population is continuously expanding, rising from around 50.9 percent in 2010 to 56.7 percent in 2021, with substantial variances within administrative Regions. Similarly, the country experienced growth in its national population density (by 26 people per square kilometer between 2010 and 2021) and share of age structure (shifting from a child-dominated to a youthful population - 38.2 percent).Ghana's population is expected to be around 30.8 million by 2021, with an inter-censal population growth rate of 2.1 percent between 2010 and 2021 - the lowest since the country's independence (GSS, 2021).

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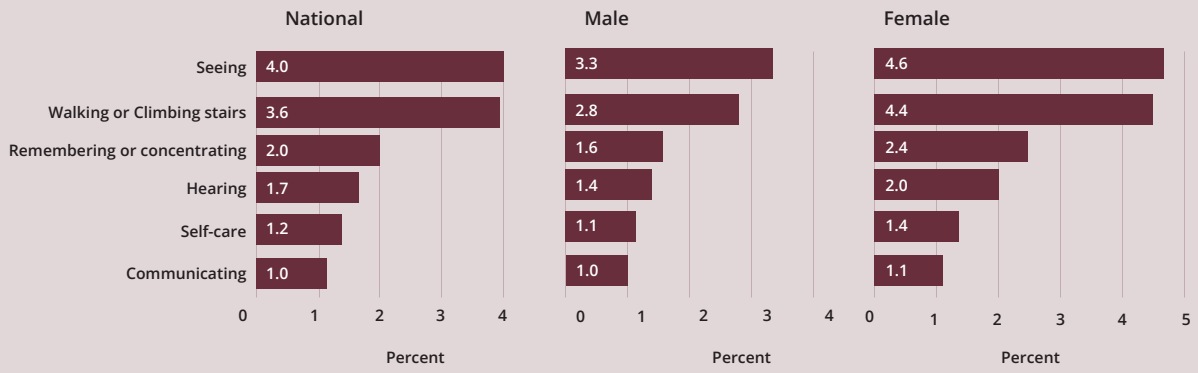
# Findings

share of age structure (shifting from a childdominated to a youthful population - 38.2 percent).

Disturbingly, the 2021 Population and Housing Census indicates that as many as 2.1 million people (8 percent of the entire population) had varied degrees of difficulty performing activities (PWDs), with females (8.8 percent) outnumbering males (6.7 percent ). As seen in Figure, difficulty seeing (4.0 percent) had the highest incidence of all six domains, while communicating had the lowest (1.0 percent).

***Figure 1:Percent of Population 5 Years and Older Who Cannot Perform an Activity at All By Type of Difficulty And Sex***

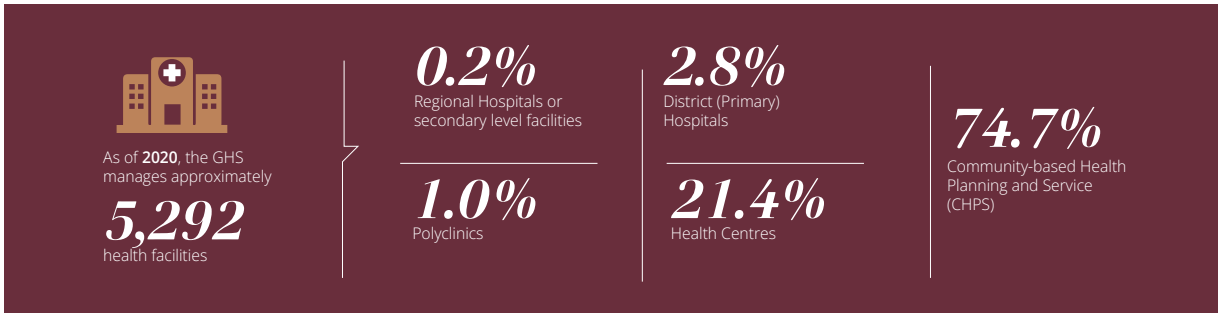



Source: Ghana Statistical Service

## 4.2 Health Context

Ghana's health sector is one of the few in the sub-region that has a decoupled structure, with the policymaking arm separated from the service delivery and regulatory arms. With the passage of the Ghana Health Service (GHS) and Teaching Hospitals Act, 1996, Act 525, the GHS gained the mission to offer primary and secondary health care services to Ghanaians, while the Teaching Hospitals gained the duty to provide tertiary health care services (THs). As a result, policy formulation and resource mobilization fall to the Ministry of Health (MOH).

Teaching Hospitals (THs), which are semi-autonomous national referral hospitals with a mandate of addressing complicated health problems, research, and staff training, are at the top of the health service delivery hierarchy in descending order of complexity. To improve its functions, each TH is linked to a university. The GHS, the MOH's main health service delivery organization, offers around 60% of outpatient and inpatient services, as well as nearly all preventative public health care services. As of 2020, the GHS manages approximately 5,292 health facilities, of which 0.2 percent are Regional Hospitals or secondary level facilities, 1% are Polyclinics, 2.8 percent are District (Primary) Hospitals, 21.4 percent are Health Centres, and 74.7 percent are Community-based Health Planning and Service (CHPS). The number of health facilities controlled by GHS is shown in table 1.



# Findings

*Table 1: Health Facilities Managed by GHS, 2020*

| Type of Health Facility | Number | Percentage (%) |
|---|---|---|
| CHPS | 3951 | 74.7% |
| Health Centre | 1132 | 21.4% |
| Polyclinic | 51 | 1.0% |
| District (Primary) Hospital | 148 | 2.8% |
| Regional Hospital | 10 | 0.2% |
| **Grand Total** | **5292** | |

Source: Human Resource Information and Monitoring System (HRIMS)

Regional Hospitals (RHs) are located in regional capitals and provide secondary level specialized health care as well as serving as referral centers for all District Hospitals in each region. District Hospitals (DHs), on the other hand, provide basic and emergency healthcare and have catchment regions that are coterminous with electoral districts or have a population of 100,000-200,000 people. Health Centres (HCs) support sub-districts by providing basic curative and preventive treatments. These are designed to serve a population of around 20,000 people. However, in metropolitan locations, their capacity can be expanded to form polyclinics that serve populations larger than 20,000. At the community level, the primary service delivery facilities for preventive care and minor diseases are CHPS, which may or may not have physical structure(s) (compound). These are primarily coterminous with electoral zones and are intended to service populations of 5000 to 750 homes.

There are currently five public (government-owned) teaching hospitals in Ghana: Korle Bu Teaching Hospital (KBTH), Komfo Anokye Teaching Hospital (KATH), Tamale Teaching Hospital (TTH), Cape Coast Teaching Hospital (CCTH), and the recently upgraded Ho Teaching Hospital (HTH), as well as one quasi-government teaching hospital, the University of Ghana Medical Centre (UGMC).

The country's health indices have been on a good trajectory over the previous decade, thanks to huge investments in health infrastructure and health workforce. Ghanaians' average life expectancy at birth increased from 61.03 years (60.10 years for males and 61.97 years for females) in 2010 to 63.78 years (62.72 years for males and 64.85 years for females) in 2018; infant mortality rate fell to 34 per 1,000 live births in 2019 (down from 47 per 1,000 live births in 2010) and under-five mortality rate fell to 46 per 1,000 live births in 2019, similarly declining by about 23 percent from 69 per 1,000 live births in 2010.

Despite the foregoing, the country has substantial health issues, with the total universal health coverage index peaking at 47 percent in 2017 and the human capital index at 0.44 in 2018[34]. It also faces an increasing complicated illness load. The trend of TB case notification per 100,000 people has continued to fall, from 60.0 in 2013 to 48.8 in 2019, as has the goal of matching the global average of 8-10 percent for notification of children TB.

Similarly, malaria is the biggest cause of morbidity and mortality in the country, with nearly 12 million suspected cases, accounting for 42.8 percent of out-patient cases and contributing for 22.2 percent and 1.1 percent of total admission and total fatalities in 2019 respectively. Over the same time period, noncommunicable diseases such as hypertension, heart disease, and cerebrovascular disease accounted for 17.6 percent of institutional deaths[35].

Maldistribution of the health workforce, as well as verticalization of in-service training programs, continue to be major concerns for

34. WB. (2020b). UHC Service Coverage Index - Ghana. Retrieved from https://data.worldbank.org/indicator/SH.UHC.SRVS.CV.XD

# Findings

health workforce policymakers. In terms of Health Workforce (HWF) regional distribution, the current trend of the southern regions having the highest HWF densities maintained, albeit with small gains in the poorer regions. The Greater Accra Region regained its lead as the region with the highest proportion of health-care workers (22,415 - 19.4 percent), surpassing the Ashanti Region (21,533 - 18.6 percent). Meanwhile, the Upper West Region continued to have the fewest HWF, followed by the Upper East Region.

Nationally, the doctor-to-population ratio (a measure of how many people one doctor may potentially see) had been continuously falling from 10,430 in 2014 to 7,192 in 2018, a 12 percentage point improvement over 2017. (8,026). The ratio fell from 54,072 individuals to one doctor in 2014 to 13,080 persons to one doctor in 2018. Nonetheless, Greater Accra Region maintained the best doctor-to-population ratio (1:3,216). Overall, Ghana's critical health staff density at the end of 2018 was 2.56 per 1,000 population, indicating 57 percent of the WHO's criterion of 4.45 required to achieve the median ranked value of the SDG 3 tracer indicators.
Despite these hurdles, the industry appears to be on a steady course toward further penetration.

### 4.3 Governance Structure of Ghana's Response to the COVID-19 Pandemic

In response to the pandemic, the Ghanaian government took an all-government approach.

The Inter-Ministerial National Coordinating Committee (NCC) was in charge of planning and coordination for COVID-19 preparedness and response under this method. The NCC, in collaboration with the National Technical Coordinating Committee (NTCC), served as a technical expert committee in monitoring implementation, while the National Public Health Emergency Operations Centre (PHEOC) served as the mechanism for preparedness and coordinating response activities if an outbreak was declared. When a pandemic was declared a disaster, all planning and coordination activities took place under the auspices of the National Disaster Management Organization (NADMO), which is charged with the multi-sectoral management of all disaster responses; while the NCC performed resource mobilization functions on the advice of the NTCC.

The NTCC, chaired by the Minister of Health, included major technical ministries and their related agencies, as well as foreign partners such as FAO, WHO, CDC, and USAID, among others. The Ghana Health Service Director-General oversaw the technical direction of the response and reported to the Minister of Health, whereas the Director of Public Health coordinated the various technical thematic areas on behalf of the Director-General and was in charge of the day-to-day management of the technical response. Bi-weekly NTCC meetings were conducted to discuss response updates from health and other stakeholders. Similarly, the technical EOC met at least once a week to discuss updates on response actions by the various thematic groups and to ensure that scheduled activities were carried out effectively. These arrangements were reproduced at the sub-national levels in the regions and districts, where representations were comprehensive and expertise was the primary determinant of membership/representation.

The bodies made choices that affected both genders and age groups, such as the mandatory wearing of a facemask in public[36], movement restrictions in the Greater Accra and Greater Kumasi Metropolitan regions, the use of alcohol-based sanitisers, and social distancing.

*35. GHS. (2018). 2018 Annual GHS Report. GHS.*
*36. MOH. (2020). Ministerial Directive on Wearing Mask In Public Places to Prevent Transmission of COVID-19. Accra: MOH Retrieved from https://www.moh.gov.gh/wp-content/uploads/2020/04/04-26-2020-08.11.511-1.pdf*

# Findings

## 4.4 Epidemiology of the COVID-19 Pandemic

Prior to the country's first instances of the disease, Ghanaian health officials took WHO Regional Director for Africa Dr Matshidiso Moeti's recommendation to "act and influence the path of the pandemic through a scaling up of the country's emergency preparedness or reaction" seriously[37]. Local authorities, concerned that there was no one-size-fits-all approach to emergency preparedness and/or response, adapted the WHO Guidelines to their needs, focusing on the establishment of isolation/treatment and/or quarantine centers, the procurement and distribution of personal protective equipment (PPEs), discouraging nonessential travel into Ghana, temporarily suspending all foreign travel for public officials, and setting aside $US100 million to improve emergency preparedness and response[38,39,40,41].

Despite these frenzied preparations and the country's acclaim for its proactive and early steps to establish an emergency response team, the disease's index cases were registered on March 12, 2020. Following test results from the Noguchi Memorial Institute of Medical Research (NMIMR), these cases, officially announced in an emergency press briefing by the Minister of Health, Hon. Kwaku Agyemang-Manu, set in motion contact tracing processes, leading to the detection of four more cases within the next 72 hours[42].

As of March 12 to 19, 2020, the country had 19 instances and had recorded its first death from the sickness, setting the stage for an expected upward trend in the number of cases. In order to maintain staffing levels, the Director-General of the Ghana Health Service called back all personnel on approved study leave as of March 26th, 2020, when the number of confirmed cases reached 132[43].

Since 4 out of 9 new cases in April 2020 have had neither contact with confirmed cases nor travel history, the pandemic's trajectory has moved to community spread[44]. Confirmed COVID-19 cases rose from 5,638 to 18,134 between April and May; the number of cases recovered rose from 494 to 594 and 28 people died. Proportionately, positive and recovery/discharge rates increased by 8.2% and 95%, respectively, with these large increases in the number of confirmed cases. According to confirmed instances, the death rate remained low, making it one of the lowest in the world.

As of the end of June 2020, all 16 administrative areas had verified COVID-19 cases, with a gender distribution of 41 percent female and 59 percent male, with the majority of cases in the Greater Accra Region (10,087) and Ashanti Region (3,676) correspondingly. More instances have been found, in large part because of "quick and increased contact tracing, general surveillance and testing techniques" that have been implemented in the country[45,46]. Using the pooled testing system, the country expanded its laboratory testing capacity from the lone NMIMR center to ten testing labs, deployed its medical drones for sample collection, launched the COVID-19 Tracker App, and designated over 7,000 health facilities as treatment centers while also incentivizing its health workforce[47,48]. In addition, despite the widespread use of face masks, public transportation remained a high-risk environment because of the prevalence of passengers without them[49].

As a result of these actions, the country's case load increased to 51,667 out of a total of 592,285 tested (positivity rate =8.7 percent) as of November 27th, 2020. The national recovery rate was 97.8 percent, ranging from 90.0 percent in the North East region to 99.4 percent in the Bono region; the total number of active cases was 797, with twelve (12) cases classified as severe

37. WHO-AFRO. (2020). More than 15 Countries in Africa Report COVID-19 Cases. Retrieved from https://www.afro.who.int/news/more-15-countries-africa-report-covid-19-cases
38. Ansah, M. (2020). Coronavirus: We've discouraged non-essential travels to Ghana – Nana
39. Asante, L. A., & Mills, R. O. (2020). Exploring the Socio-Economic Impact of COVID-19 Pandemic in Marketplaces in Urban Ghana. Africa Spectrum, 55(2), 170-181.
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44. GHS. (2021). SITUATION UPDATE: COVID-19 OUTBREAK IN GHANA AS AT 8 August 2021. Situation Updates. Retrieved from https://www.ghanahealthservice.org/covid19/latest.php#
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46. Jiaqi Zhang, J. N., Wenhui Mao. (2020). How well is Ghana—with one of the best testing capacities in Africa—responding to COVID-19? Retrieved from https://www.brookings.edu/blog/future-development/2020/07/28/how-well-is-ghanawith-one-of-the-best-testing-capacities-in-africa-responding-to-cov id-19/
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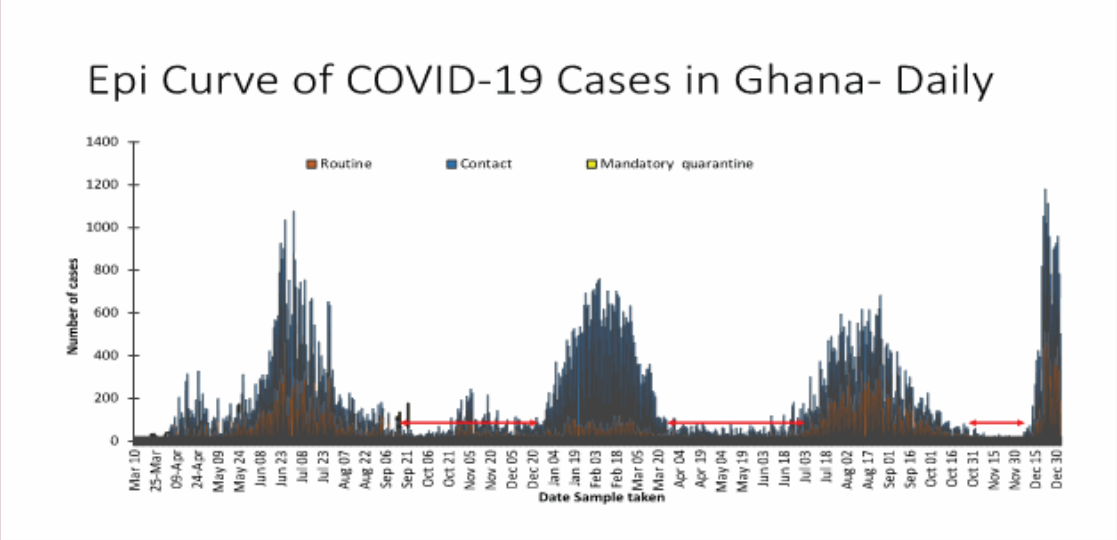
48. Wikipedia. (2020). Timeline of the COVID-19 pandemic in Ghana. Retrieved from https://en.wikipedia.org/wiki/Timeline_of_the_COVID19_pandemic_in_Ghana#cite_note-8
49. Dzisi, E. K. J., & Dei, O. A. (2020). Adherence to social distancing and wearing of masks within public transportation during the COVID-19 pandemic. Transportation Research Interdisciplinary Perspectives, 7, 100191

# Findings

***Figure 2: Epi Curve of COVID-19 Cases in Ghana – March 2021 to December 2021***

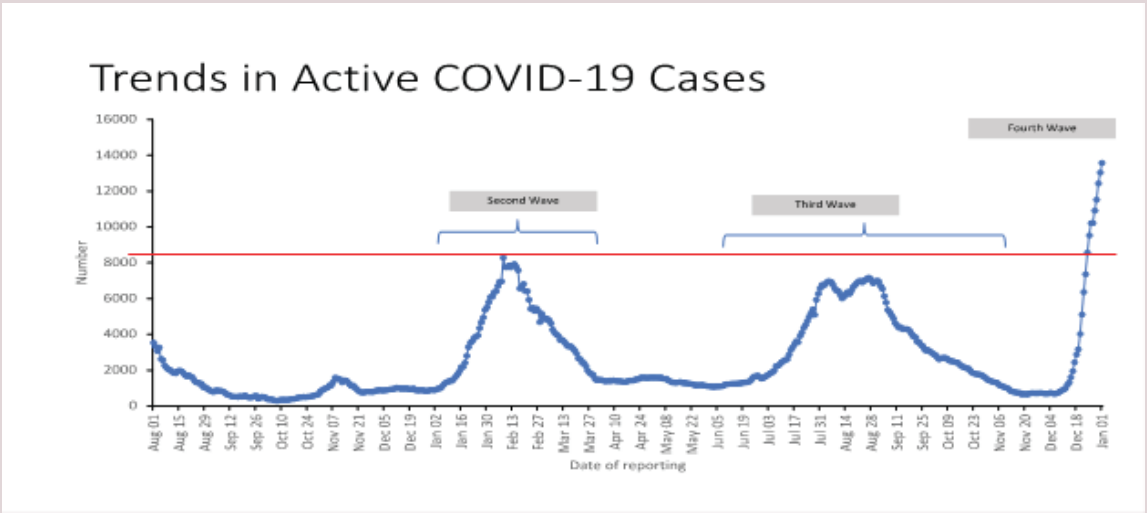



Source: Ghana Health Service

and four (4) as critical, with two (2) of the critical patients on ventilator support, and 323 deaths with a Case Fatality Rate of 0.63 percent. The Upper West, Savannah, and Oti areas were all free of active cases, bringing the country's total national incidence risk to 167/100,000 population.

In the interim, the country had four distinct pandemic waves, the fourth of which was the most severe. During the month of November 2021, Ghana began recording rapid increases in COVID-19 cases, with a significant increase in cases among international arrivals, sporadic spread of cases in all regions, and an average of 1,000 new cases per day. The fourth wave had the most active patients (almost 10,000) and the lowest number of severe and critical illnesses.

***Figure 3: Trend of Cases - August 2021 to January 2022***




Source: Ghana Health Service

# Findings

As at 19th April, the country's caseload skyrocketed to some 161,133 with a 99% recovery rate and about a 0.9% case fatality rate[50]. These caseloads resulted from a case positivity rate of 6.6% following the testing of some 2,433,757 people. Regionally, the Greater Accra Region, the major hotspot of the country, bore the brunt of about 56% (90,771) of the total confirmed cases, followed by the Ashanti, Western, and Eastern Regions with percentage shares of active cases of 13.8%, 5.2%, and 4.4%, respectively, as shown in Table 2 below:

***Table 2: Regional Distribution of Confirmed Cases - April 2022***

| Region | Cases | Recovered/ Discharged | % Share of Total Cases |
|---|---|---|---|
| Ahafo | 1,136 | 1,102 | 0.7% |
| Ashanti | 22,298 | 21,909 | 13.8% |
| Bono | 2,332 | 2,236 | 1.4% |
| Bono East | 2,972 | 2,896 | 1.8% |
| Central | 5,402 | 5,353 | 3.4% |
| Eastern | 7,039 | 6,890 | 4.4% |
| Greater Accra | 90,771 | 90,431 | 56.3% |
| North East | 384 | 373 | 0.2% |
| Northern | 1,863 | 1,831 | 1.2% |
| Oti | 930 | 921 | 0.6% |
| Savannah | 291 | 287 | 0.2% |
| Upper East | 1,736 | 1,674 | 1.1% |
| Upper West | 895 | 852 | 0.6% |
| Volta | 6,020 | 5,927 | 3.7% |
| Western | 8,328 | 8,252 | 5.2% |
| Western North | 1,112 | 1,099 | 0.7% |
| International travelers (KIA) | 7,624 | 7,623 | 4.7% |
| **TOTAL** | **161,133** | **159,656** | **100%** |

50. GHS. (2022). Situation Update on COVID-19 Outbreak in Ghana As At 19th April 2022; 23:00hrs. Accra: GHS

# Findings

To counteract this rising trend, Ghana's risk communication was tailored along the lines of maintaining social distance, frequent and regular hand washing with soap under running water or use of alcohol-based hand rub, avoiding touching one's mouth, nose, and eyes with unclean hands, wearing a face mask, and notifying health authorities as soon as one felt ill. Ghanaians were also advised to adopt good diets and exercise regularly in order to maintain their health and immune systems.To counteract this rising trend, Ghana's risk communication was tailored along the lines of maintaining social distance, frequent and regular hand washing with soap under running water or use of alcohol-based hand rub, avoiding touching one's mouth, nose, and eyes with unclean hands, wearing a face mask, and notifying health authorities as soon as one felt ill. Ghanaians were also advised to adopt good diets and exercise regularly in order to maintain their health and immune systems.

Meanwhile, Ghana's method for managing confirmed cases changed in tandem with the disease's shifting characteristics. Its case definition was changed from "a person presenting with Fever (>38°C) or a history of fever and symptoms of respiratory tract illness e.g. cough, difficulty in breathing AND a history of travel to or residence in a location reporting person to person transmission of COVID-19 during the last 14 days prior to symptom onset" to "a patient with acute respiratory illness (fever and at least one sign/symptoms".

Similarly, as part of the response strategy, health facilities were prepared to establish pre-triage systems and areas for early detection of patients with acute respiratory infection (ARI) to prevent pathogen transmission to health care workers through timely and effective triage and infection control, admitting patients to a dedicated area, utilizing specific case and clinical management protocol, and safe transport of cases and discharge home.

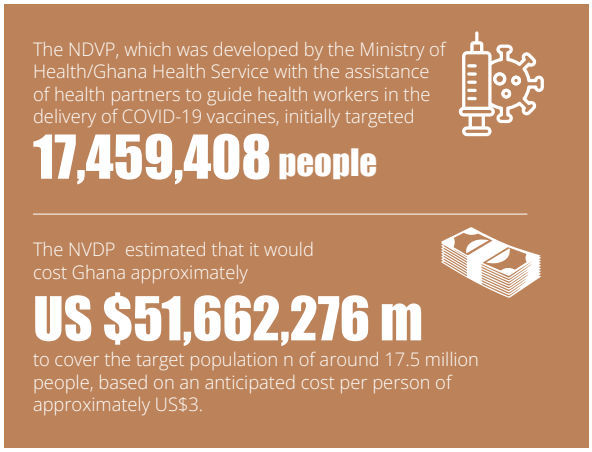
These preparedness and response strategies earned Ghana international recognition, including the use of the pooling system for laboratory investigations, strategic risk communication (as demonstrated by the President's sessional updates to the nation), a slowing in spread and case fatality rates, being the first country in the world to receive COVID-19 vaccines through the COVAX facility, and the introduction of vaccination into its pandemic arsenal.

### 4.5 COVID-19 Vaccine Deployment and Vaccination Plan

**Less than a year after the first wave of COVID-19 was detected in Wuhan, China, the global scientific community launched its first preventative SARS-Cov-2 (COVID-19) vaccinations, prompting Ghana to design a proactive national COVID-19 vaccine deployment and vaccination plan (NVDP). The NDVP, which was developed by the Ministry of Health/Ghana Health Service with the assistance of health partners to guide health workers in the delivery of COVID19 vaccines, initially targeted 17,459,408 people and proposed a phased approach as well as multiple vaccine delivery strategies, such as static, mobile, campout, or a combination of these vaccination campaign strategies.**

It also projected the deployment of 12,471 vaccinators, 37,413 volunteers, and 2,079 team supervisors for two rounds of vaccination campaigns, as well as some minor expansion of existing cold chain infrastructure to be able to deploy and store vaccines at +2 - +8 OC, and the establishment of an active surveillance system for adverse events following immunization (AEFI) and adverse events of special interest (AESI).

The NVDP estimated that it would cost Ghana approximately US$51,662,276.00m to cover the target population of around 17.5 million people, based on an anticipated cost per person of approximately US$3.



# Findings

## 4.6 Pathways of Access to Vaccines

Ghana was the first country in the world to get COVID-19 vaccines through the COVID-19 Vaccines Global Access (COVAX) facility[51]. The delivery of 600,000 COVAX vaccinations was part of an initial tranche of AstraZeneca / Oxford vaccine deliveries to poor and middle-income countries. However, the country's vaccine stock landscape improved dramatically between February and December 2021, with nearly 12 million additional doses of COVID-19 vaccines received within the last three weeks of December 2021, bringing total COVID-19 vaccine receipts to 24,702, 290 as of January 1st, 2022.

In terms of vaccination brand, AstraZeneca continued to be the top brand, accounting for around 43 percent of all vaccines, followed by COVID-19 Vaccine Jansen (32.5 percent), PfizerBioNTech (19.4 percent), and Moderna (19.4 percent) (5 percent ). Only 21,000 doses of the Sputnik V vaccination were delivered to the country, accounting for the remaining 0.1 percent. The COVAX facility remained the country's major source of vaccine supply, accounting for 67.3 percent of total vaccine receipts, followed by the African Union Vaccine Acquisition Trust (AVATT)/World Bank with 22 percent and the remaining 10.7 percent via bilateral connections. COVAX's share of total vaccine receipts increased by nearly four percentage points to 70.9 percent (21,547,530), while AVATT/AU/and WB's Bilateral Relations shrank to 17.9 percent (5,424,450) and 11.2 percent (3,406,498), respectively, with total vaccine receipts of 30,378,478 as of April 20th, 2022.

## 4.7 Vaccine Distribution dynamics and Level of vaccination

Total vaccine receipts were found to be favorably linked with vaccine distribution dynamics and vaccination level. As the number of vaccines received grew, so did the distribution and degree of immunizations.

However, the overall dynamics of vaccination level changed midway due to an increase of the target group to include people aged 15 and up, as well as pregnant women. As a result, the vaccine-eligible population was revised upward to 20.2 million.

As of January 5, 2022, distributed vaccines as a percentage of total vaccine receipts ranged from 100 percent for the Sputnik V and Moderna brands to 15 percent and 17 percent for the Pfizer-BioNTech and COVID-19 Vaccine Jansen brands, respectively, with the AstraZeneca brands averaging around 70 percent. This distribution pattern was influenced by the shelf-life of the individual vaccine brands; hence, the shorter a vaccine's shelf-life, the faster it is transported to service points for use. Across all vaccine brands, the level of distribution as a percentage of total vaccine receipts remained below fifty percentage points, peaking at around 43.9 percent of total accessible vaccine stock on January 5th, 2022. However, when compared among brands, AstraZeneca received 68.9 percent, COVID-19 Vaccine Jansen received 12.9 percent, Moderna received 11.3 percent, Pfizer-BioNTech received 6.7 percent, and Sputnik V received 0.2 percent.

Significant improvements in the pattern were found between February and April 2022, with an across-vaccine-brand distribution as a share of total vaccine payments of 78.2 percent as of April 20th, 2022. This was due to increased distribution efficiency and the purchase of ten more ultra-low cold chain vaccine delivery trucks[52].

**Ghana was the 1st country**

in the world to get COVID-19 vaccines through the COVID-19 Vaccines Global Access (COVAX) facility (Unicef, 2021).

... the country's vaccine stock landscape improved dramatically between February and December 2021, with nearly

**12m additional doses of COVID-19 vaccines**

received within the last three weeks of December 2021, bringing total COVID-19 vaccine receipts to 24,702, 290 as of January 1st,

51. Unicef. (2021). Ghana becomes recipient of historic first shipment of COVAX vaccine. Retrieved from https://www.unicef.org/press-releases/ghana-becomes-recipienthistoric-first-shipment-covax-vaccine
52. Graphic, D. (2021). Ministry presents vaccine cold transportation vehicles to GHS. Retrieved from https://www.graphic.com.gh/news/health/ministry-presents-vaccine-coldtransportation-vehicles-to-ghs.html

# Findings

***Table 3: Summary of Vaccio Distribution as at April 2022***

| Summary of COVID-19 vaccines received in Ghana @ 20.04.2022 | | | | |
|---|---|---|---|---|
| Vaccine Brand Name_1 | SUM of Quantity | Prop (%) | Doses Distributed | Doses available |
| AstraZeneca | 12,971,470 | 42.7% | 12,971,470 | 0 |
| COVID-19 Vaccine Janssen | 8,788,850 | 28.9% | 4,152,050 | 4,636,800 |
| Moderna COVID-19 vaccine | 1,229,620 | 4.0% | 1,229,620 | 0 |
| Pfizer-BioNTech | 7,367,538 | 24.3% | 5,367,960 | 1,999,578 |
| Sputnik-V | 21,000 | 0.1% | 21,000 | 0 |
| Grand Total | 30,378,478 | 100.0% | 23,742,100 | 6,636,378 |

| Source of Vaccine | Quantity received | Prop (%) |
|---|---|---|
| COVAX | 21,547,530 | 70.9% |
| AVATT/AU/WB | 5,424,450 | 17.9% |
| Bilateral | 3,406,498 | 11.2% |
| **Grand Total** | **30,378,478** | **100.0%** |

*Source: Ghana Health Service*

As previously stated, vaccination rates varied in parallel with vaccine supply and distribution levels: as the latter improved, so did the former. When total vaccine receipts were 24,702, 290 in January 2022, total doses provided over the same reference period were 8,893,267, with about 33.1 percent (6,615,247) of the total eligible population receiving at least a single dose and 14.2 percent being fully vaccinated. Greater Accra administered the most vaccination doses, totaling 2,012,892 and accounting for approximately 22.6 percent of total administered doses, compared to 1.3 percent (116,335) in the Oti Region.

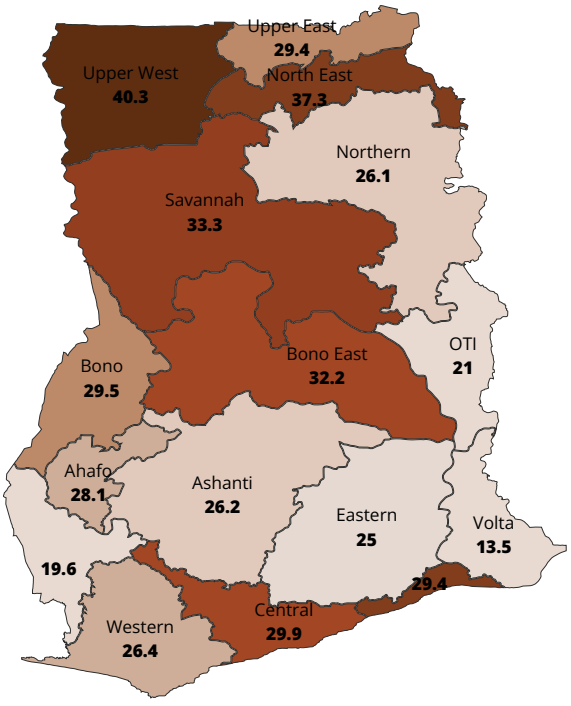
A preliminary examination of total doses provided as a percentage of total vaccinations dispensed found some efficiency increases, with the ratio pegged at 82.1 percent after adjusting for vaccine wastages owing to cold chain and other operational problems. When compared to overall vaccination receipts for the reference period - 24,702,290 - end point use, i.e., vaccines in the hands of the population, was a meagre 36%.

# Findings

*For the seeming slow pace of vaccine delivery, the Ghana Health Service cited obstacles such as insufficient cold chain space in relation to vaccine arrival intervals, periodic issues with District Health Information System (DHIS) 2 and budget constraints. It emphasized the urgent need to pursue more vaccines and scale up vaccination efforts—doubling teams, 'recruiting' additional teams, using different venues, and improving social mobilization and communication.*

These strategies, combined with the launch of the National COVID-19 Vaccination Day Campaign, paid rewards, increasing the total number of administered doses from 8.9 million to 13.8 million by 20th April 2022 - a 55.7 percentage point gain. Similarly, the percentage of those who had received at least one dosage climbed by 2.7 million doses, while the number of people who were fully vaccinated doubled. During this time, 251,174 booster doses were also delivered.

***Figure 4: Proportion (%) of persons FULLY vaccinated by region***




*Source: Ghana Health Service COVID-19 Vaccination Dashboard*

The gender (54.2 percent Females:45.8 percent Males) and geographical distribution (62.3 percent Urban:37.7 percent Rural) of those vaccinated mirrored the pandemic epidemiology, with more females sick than males and more people living in cities than in rural areas. Persons with underlying medical issues, on the other hand, made up a pitiful proportion of those vaccinated, with the general population accounting for 92 percent. Health care workers made up 4% of the workforce, while frontline security personnel made up 3%.

**In accordance with vaccine numbers, Ghana's**

# Findings

**deployment plan was originally segmented and staged, focusing on frontline health professionals, members of the executive, judicial, and legislative branches of government, people with chronic medical issues, and people aged 60 and up. The WHO/SAGE Prioritization Roadmap led this prioritization process, which was informed by the risk of exposure, disease severity, business continuity, and national security.**

However, when the vaccine landscape improved, the objective was broadened to cover all eligible people aged 15 and up, including pregnant women. The inclusion criteria were expanded in response to new evidence of vaccine safety and efficacy in this group.

With people aged 15 to 17 accounting for 5% of the overall population and pregnant women accounting for 4%, the total eligible population climbed from 20 million to 22.8 million, updating the target population to 72 percent of the total population to allow for herd immunity.

## 4.8 Country Context and Drivers of Vaccine Hesitancy

Vaccine hesitancy was named one of the top ten dangers to global health and security by the World Health Organization (WHO) in 2019. Vaccine hesitation is defined as "the unwillingness or refusal to vaccinate despite the availability of vaccinations"[53]. There are numerous and complex reasons for vaccine hesitancy, including behavioral, societal, and political variables[54]. Several studies in both low and high-income countries have since narrowed the drivers of vaccine hesitancy to the 5C model, which names confidence, complacency, convenience (or constraints), risk calculation, and collective responsibility as the five main individual person-level determinants of vaccine hesitancy[55,53,3]. These five major individual level determinants are informed by the individual's knowledge and information about the vaccine, previous experiences (with vaccination), if any, perceived importance of the vaccine, risk-benefit ratio of receiving the vaccine, and subjective norms such as religious and moral convictions.

**Preliminary observation suggests that vaccine reluctance was initially caused by a lack of access to and availability of COVID-19 vaccines in Ghana. As previously stated, during the second wave of the pandemic, when morbidities and mortalities associated with the disease were high, vaccine stock levels were insufficient and frequently lacking, resulting in long delays in the administration of second doses and the resulting dwindling of vaccine appetite.** Furthermore, while the vaccination landscape has improved significantly over time, the aetiology of the disease, combined with the country's demographic dynamics, has tempered major vaccine uptake. Given that the pandemic primarily affected people aged 50 and up, and that the same age group accounted for nearly 75 percent of fatalities, **the young Ghanaian population exuded overconfidence in their ability to avoid the disease in the first place and/or survive it once contracted, and thus avoided taking the vaccines[56,57].** This youthful enthusiasm for reluctantly receiving the vaccine was bolstered further by the scientific reality that even completely immunized individuals may get the disease. In addition, the inverse link between vaccine stocks and disease incidence was discovered to be another source of skepticism in the country. As vaccine stock levels increased, the COVID-19 incidence rate decreased, weakening motivation for vaccination use and calling the risk-benefit ratio of the COVID-19 vaccine into question.

Finally, in Ghana, religion was discovered to be a contextual cause of reluctance. Certain religious beliefs placed spirituality above medicine, leading to vaccine apprehension among its adherents. For example, while some religions, such as the Catholic, are opposed to vaccinations in general, other religious adherents, such as Muslims, are also opposed to vaccines containing pig components[58]. This outcome is consistent with other research conducted around the world[59,60].

53. Machingaidze, S., & Wiysonge, C. S. (2021). Understanding COVID-19 vaccine hesitancy. Nature Medicine, 27(8), 1338-1339.
54. Rodrigues, F., Block, S., & Sood, S. (2022). What Determines Vaccine Hesitancy: Recommendations from Childhood Vaccine Hesitancy to Address COVID-19 Vaccine Hesitancy. Vaccines, 10(1), 80.
55. Dubé, E., Laberge, C., Guay, M., Bramadat, P., Roy, R., & Bettinger, J. A. (2013). Vaccine hesitancy: an overview. Human vaccines & immunotherapeutics, 9(8), 1763-1773.
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60. Lucia, V. C., Kelekar, A., & Afonso, N. M. (2021). COVID-19 vaccine hesitancy among medical students. Journal of Public Health, 43(3), 445-449

# Part 5

# Advocacy Points And Recommendations For Equity And Counter-hesitancy

# *Advocacy Points And Recommendations For Equity And Counter-hesitancy*

To combat vaccine hesitancy and promote vaccine uptake, researchers must first understand people's motivation to be vaccinated, as well as their willingness or unwillingness to do so, as well as their subjective norms such as religious and moral convictions[61,62,57]. As a result of the findings in section 4.8, the following advocacy points are proposed as recommendations to promote vaccine fairness and reduce hesitation in Ghana:

| S/N | Country Context Driver of Hesitancy | Advocacy Point |
|---|---|---|
| 1 | **Lack of access and unavailability of COVID-19 Vaccine** | Though access and vaccine availability are no longer hesitancy drivers, the drive for advocacy should aim at bringing the vaccines to the doorstep of the Ghanaian citizenry through:<br><br>a. Incorporating COVID-19 vaccinations into routine vaccine programmes<br>b. Deepening the institution of national COVID-19 vaccination day campaigns |
| 2 | **Aetiology of the disease interlaced with the country's population dynamics mitigating against the significant uptake of the vaccines** | Reiterate the fact that although young people are mostly able to fight off the disease and survive if infected, evidence still points to the increasing share of the youthful populations getting infected, some succumbing and others suffering post recovery syndrome or long COVID; thereby reducing their quality of life.<br><br>Again, underscore the fact that although fully vaccinated persons can still contract the disease, their disease severity level is often mild and not requiring hospitalisation, as opposed to unvaccinated persons. |

61. Lucia, V. C., Kelekar, A., & Afonso, N. M. (2021). COVID-19 vaccine hesitancy among medical students. Journal of Public Health, 43(3), 445-449
62. Matos, C. C. d. S. A., Gonçalves, B. A., & Couto, M. T. (2021). Vaccine hesitancy in the global south: Towards a critical perspective on global health. Global Public Health, 1-12.

| S/N | Country Context Driver of Hesitancy | Advocacy Point |
|---|---|---|
| 3 | **Inverse relationship between vaccine stocks and disease incidence** | Albeit, the regional burden of the disease is on the decreasing trend, its incidence is still high in Asia, Europe and the Americas, and that the best time to get vaccinated against the pandemic is when its incidence rate is low. Vaccinating against the disease at this time will ensure the health system does not get overstretched during peak periods. |
| 4 | **Religiosity of Vaccination** | For Muslims, the 15th annual conference of the International Fiqh Council held the view that vaccination was acceptable in Islam and became obligatory once the risk of disease was high and the benefits of the vaccine outweighed its risks. Underscore the scientific evidence behind the efficacy of the vaccine, and buttress same with the stance of prominent religious leaders. |

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