Review



# Advancing Adherence and Compliance to Personal Protective Equipment Policies among Health Care Workers – Insights from a Groundbreaking Case Study in Cameroon

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# Advancing Adherence and Compliance to Personal Protective Equipment Policies among Health Care Workers - Insights from a Groundbreaking Case Study in Cameroon

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**Abstract:** Personal protective equipment (P PE) rules must be respected and followed to the letter of healthcare professionals in Cameroon to avoid the transmission of infectious diseases. This research proposes solutions to the problems of non-adherence and non-compliance among healthcare workers in Cameroon towards PPE rules. Inadequate access to suitable PPE, discomfort when wearing PPE during poor quality, and a lack of training on correct PPE use are just a few of these obstacles amongst HCWs in Cameroon. Hospitals and healthcare facilities should prioritize offering thorough instruction on PPE use and pinpoint the need to adhere consistently to PPE rules to remove these obstacles. They should also ensure that all healthcare personnel have access to and a sufficient supply of the proper PPE. Through the organization of impromptu visits by surveillance teams to identify areas of support and training, there is a need for assistance from government bodies and public health groups in creating awareness of the security value of PPE use among healthcare professionals. There is a lack of PPE in health care settings in rural areas in Cameroon, thus a need for an adequate supply. Then can we put appropriate PPE policies and practices for HCWs in Cameroon, as they will keep to it. Healthcare professionals in Cameroon must comprehend that following PPE standards protects not just their selves from diseases but also their patients, coworkers, and communities. We are accountable for ensuring everyone's safety and well-being, and adhering to PPE regulations is an essential first step.

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## Introduction

Personal protective equipment commonly called «PPE» is any equipment worn to minimize exposure to hazards that could cause serious injuries or illnesses (varying from chemical, radiological, physical, electrical, mechanical, or other workplace hazards). These protective measures help minimize the spread of diseases in health and social care settings among Health Care Workers (HCWs). Some of these include personal protection equipment (gloves, face mask, etc.), proper hand cleanliness, and physical separation are a few of these. The Covid-19 pandemic has affected several countries and has shown the relevance and importance of PPE in healthcare settings by pinpointing the weaknesses of health systems in Africa and Cameroon. The primary cause of nosocomial infection transmission in Cameroon's healthcare settings is poor adherence and compliance of healthcare workers to the proper usage of personal protective equipment (PPE) [1]. PPE items include gloves,

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safety glasses and shoes, earplugs or muffs, hard hats, respirators, coveralls, vests, and full-body suits.

Over 28 million people call Cameroon home, and the low stagnant per capita income of citizens, relatively inequitable distribution of income amongst the population, unceasing corruption, and a generally unfavorable health system and climate. Its borders are shared with the Central African Republic, Chad, Equatorial Guinea, Gabon, and Nigeria [2]. However, for many low- and middle-income countries to achieve particular SDG 3 (MDGs), they must address the shortages of a trained, motivated, and supported health workforce which is the capital problem in Cameroon. It is necessary in Sub-Saharan Africa (SSA), where there is a low ratio of health workers to the population (per 1,000 people) which makes it harder for the area to manage given the rise in health crises and disease load [3]. Personal protective equipment must be well designed, built safely, and kept in appropriate hygiene conditions. It should be snug enough to encourage worker usage. Employers should provide PPE to employees and ensure there is a surveillance system to monitor its usage. Especially in areas where their usage is indispensable [4]. Alongside this, employers must provide training to all employees who use PPE so that they are aware of the following: when it's required, which sort is needed, how to put it on, adjust, wear it, take it off properly, what restrictions the equipment has, how to take care of it, how long it will last, and how to get rid of it. These aspects are mostly neglected and mismanaged and could cost the life of the HCWs due to a lack of information on the consequences of the negligence and non-respect of these PPE policies. Numerous individual, environmental, and organizational factors are related to this recurrent attitude of poor use of PPE [5]. To better understand these factors impacting PPE use and compliance among healthcare professionals in Cameroon and propose strict healthcare policies to stop this attitude, we engaged in this research study.

**Epidemiology of Diseases (Nosocomial Infections)**

The most frequent adverse event in healthcare that compromises the safety of both patients and healthcare professionals is Healthcare-associated infections or nosocomial infections (HAI) [6]. Healthcare-associated infections are infections we acquire while receiving treatment. The first appear 48 hours or more after hospital admission or 30 days after treatment [7]. In a day, about one in 31 hospital patients has at least one healthcare-associated infection [8], and amongst HCWs, healthcare-associated infections (HAIs) are threats in healthcare settings contributing to increased morbidity, mortality, and antimicrobial resistance worldwide in patients and HCWs. For example, hand hygiene (HH) is the simplest and most important single intervention to reduce HAIs, but due to the recurrent non-adherence and non-compliance to handwashing, it is seemingly impossible to embed such attitudes in HCWs [9]. The frequency of HAIs is due to the negligence of HCWs in adherence and compliance with PPE practices which places a heavy financial burden on patients, families, healthcare professionals, and healthcare systems that could bring about severe morbidity and death on patients [10]. The treatment or management of HAI is based; on the source of infection, the type of infection, and the responsible pathogen, which may be bacterial, viral, or fungal. Due to a lack of HAI and PPE surveillance methods, the burden of HAIs related to HCWs in Africa is still very unclear [11]. However, infection prevention and control programs have made a significant effort to create surveillance systems and infection control techniques [12]. The effective use of PPE against several nosocomial infections is an indispensable tool for preventing HAIs in many healthcare systems, and the most assured defense mechanism to implement against disease transmission among healthcare professionals during a disease epidemic/pandemic is to strengthen HCW on disease spread and control procedures. These precautions put in place to combat HAIs are known as "transmission-based precautions" and include environmental cleaning, improved education, and antimicrobial stewardship initiatives [13].

Intending to break down barriers to compliance by HCWs to PPE, Africa CDC provided guidelines on the types of PPE to be used by different HCWs for clinical settings and activities. It enables HCWs to distinguish PPE concerning the situation [14]. Similarly, several African nations have placed regulations on the usage of PPE, but no surveillance systems are functional to verify if

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these policies are respected. Therefore, it's crucial to comprehend the risk and consequences of non-adherence and non-compliance behavior toward PPE amongst these HCWs in Cameroon. During the COVID-19 pandemic, poor adherence to personal protective behaviors, inappropriate PPE usage, and PPE reuse were linked to an increased risk of infection among frontline HCWs( during the COVID-19 pandemic, poor adherence to personal protective behaviors, inappropriate PPE usage, and PPE reuse were linked to an increased risk of infection among frontline HCWs [15]. Healthcare workers may come into contact with germs and ensuing illnesses while they work, but if they have their PPE on, this prevents them from being contaminated and infected. Pathogens like the SARS-COV-2 that spread rapidly amongst HCWs were mainly a result of non-adherence and non-compliance to health care measures which principally was that of PPE policies. Most occupationally acquired infections in healthcare settings are also due to these attitudes. Other exposures may also come from interactions with employees, clients, guests, ambient surfaces, medical equipment (such as a needle stick injury), or other healthcare providers [16]. Moreover, very little data exist on the reasons for non-adherence or non-compliance of HCW to PPE policies in Cameroon. But some adherence observations among health care workers (HCWs) in the health care system are elaborated, and the recommended personal protective equipment (PPE).

**Reasons for the Non-Adherence and Non-Compliance**

The respect for PPE policies in healthcare systems in Africa and Cameroon is poor. That is the supply of PPE, its management, and its usage by HCWs. The most common reason in Cameroon is the risk of shortages or scarcity of these PPE materials. In some rural and urban healthcare centers in Cameroon, a glove is used on 3-4 patients till they are said to have a stain before being discarded. It's because of the limited supply by health and hospital administrators who neglect occupational health and safety policies for HCWs. In reality, HCWs shouldn't be blamed for this attitude, as the inadequate supply of PPE is due to corruption and embezzlement of state funds allocated to the protection of healthcare workers by administrators. As a result of these shortages or insufficiency of PPE HCWs fears being exposed to injuries from sharp objects or even contaminated, so they apply these measures of repetition of PPE. Some even go the extra mile of recycling facial masks and gloves by washing them off with decontaminating solutions and reusing them the next day. These happen at both the district and regional healthcare levels in Cameroon. These practices are to be seriously discouraged. There is a need for a surveillance system for monitoring and evaluating the adherence and compliance of HCWs to PPE policies and ensuring a constant and adequate supply of PPE to HCWs. Also, training and recycling on the danger of misuse of PPE as some HCWs in Cameroon believe that as long as a glove doesn't get stained, it's not contaminated. But with the coming of the Covid-19 pandemic, many healthcare systems in Africa and Cameroon precisely discovered their loopholes as they went short of PPE at a certain point due to increased demand [17,18]. An urgent need for African industrialization arising as the US is the top importer of face masks, eye shields, and medical gloves in the world, according to an analysis of trade statistics, leaving it very susceptible to delays in the export of medical equipment and healthcare personnel are more prone to get sick if they lack PPE [19]. In the situation of lack or shortage of PPE, workers' sickness will reduce the supply of healthcare, and the demand for treatment rises, the healthcare infrastructure becomes unstable, lowering the quality and amount of care services offered. Due to this endogeneity, the lack of PPE affects everyone's health. PPE for healthcare personnel should be essential in infection prevention and control programs; protecting HCWs results in more effective containment for everyone. Thus we should ensure that the surveillance systems in hospitals should avoid encouraging to save expenses to the detriment of having insufficient supplies of PPE due to a dysfunctional budgeting mechanism in their operational system.

Also, the lack of knowledge and training on the use and management with respect to PPE is frequent, and the risk due to non-compliance and non-adherence to PPE policies is gaining way. Our HCWs' readiness in terms of PPE usage training is a crucial tool for maintaining infection prevention and control while also highlighting the need to adhere to the suggested PPE usage recommendations by WHO [20]. PPE misuse poses a danger of self-contamination if not utilized appropriately.

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Many health administrators in Cameroon aren't global health or public health professionals; neither are they political administrators or academia oriented. As such, no prior knowledge of the risk-to-benefit assessment of protecting HCWs by providing an adequate supply of PPE. The aspect of being profit-motivated, seeing PPE as a capital expense, and seeking to lavage budget into short-term cost expenditures (most especially in Cameroon) given the increase in demand for proper healthcare, has handicapped the growth of the healthcare system in Cameroon as little or no concern to the health and security of HCWs.

An increase in the experience of HCWs in their healthcare systems in Cameroon could be seen as an increase in non-adherence and non-compliance to PPE too. Many HCWs believe an accumulated year of experience gives them a mastery of PPE, where many start being non-adherent to the policies. The commonest slang gotten from these HCWs in Cameroon is I know what I am doing, or I have been into it for a long. This attitude is very recurrent among the veterans of healthcare systems who neglect the use of PPE while carrying out health practices frequently for blood collection at the laboratory. Such attitudes and perceptions need strict policies to sanction.

Covid-19 in Cameroon was a devastating period for some and an enrichment moment for others. The mismanagement of Covid-19 funds was at the top of all misconduct [21]. Many ideas and thoughts about corruption in Cameroon make us believe it is a pathology with a yet-to-be-discovered treatment. Corruption is maybe the main reason for the weak healthcare system in Cameroon. The lack of appropriate PPE in terms of quality is another factor hindering the non-adherence and non-compliance of HCWs to using PPE. The risk of exposure to diseases due to poor quality PPE tops the list in Cameroon. Some consequences observed as a result of poor quality PPE are: restricted vision or mobility, affecting how well they do their job due to overheating, and also if the PPE is stopping their sweat from evaporating, or some may develop an allergic reaction to the materials in the PPE [22].

**Specific Types of PPE Used, Their Effectiveness, and Any Challenges Associated with Their Availability or Quality in Cameroon's Healthcare**

The efficiency of the various forms of PPE employed in the healthcare system in Cameroon depends on their caliber and accessibility. Disposable gowns, masks, gloves, face shields, and shoe coverings are the most frequently utilized PPE items. PPE devices are a defense barrier against potentially infectious substances like blood or body fluids. These products' efficacy may be affected by incorrect usage or insufficient supplies. Additionally, there have been complaints of PPE that have failed to meet safety regulations due to subpar manufacturing processes or inadequate testing methods. As a result, the danger for healthcare personnel who depend on them for infection prevention may grow. Government organizations must collaborate with manufacturers and suppliers to create rules surrounding manufacturing standards and distribution channels to maintain appropriate supply and quality control procedures for PPE in Cameroon's healthcare system. Additionally, with the world being digital medical professionals must be trained on how to use the upcoming technology at their disposal to safeguard themselves while properly delivering patient care like AR Glasses, exosuits, etc.

**A Curative Measure to Non-Adherence and Non-Compliance to PPE.**

With a knowledge of the consequences of non-adherence and non-compliance of HCWs to PPE, that is: antimicrobial resistance (AMR), increase in mortality amongst HCWs, increase in the trends of occupational diseases, and a decrease in healthcare supply proven by a rising death rate, etc. Thus urgent actions and measures are necessary to counteract this situation because PPE is an indispensable tool in fighting against disease spread in the healthcare milieu. We have highlighted some ways to eradicate these poor attitudes:

There is a need for an effective surveillance system to ensure the adhesion of HCWs to PPE policies is effective, as this would lead to a decrease in the ill health of HCWs as a result of nosocomial infections as it could also affect patients (as HCWs contribute to the majority of nosocomial infections), and a decrease in death rate. The disrespect of the surveillance system should be

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sanctioned according to rules set by the surveillance committee. It could range from the suspension of HCWs to the disaccreditation of laboratories which do not obey PPE policies.

There should be an obligatory and free vaccination program for HCWs for all common infectious diseases to ensure their immunity and safe working space while at work. If this measure is applied, efforts towards achieving a resilient and sustainable healthcare system in Cameroon by placing the safety of HCWs prior.

Creating awareness among healthcare workers on the dangers of neglecting PPE policies is another strategy to ensure compliance. Across training, they would be able to; identify a good PPE material, use a PPE material properly (gloves, facial masks, glasses, et.c.), how to take off PPE, and how to dispose of PPE materials. This training will go a long way to create a space of confidence and proper respect for healthcare.

Moreover, there should be impromptu surveillance of PPE adherence and compliance alongside quality control measures to eradicate the attitude of negligence within healthcare systems. And in case of disrespects score cards points should be affected. There would be a behavioral change as many laboratory values the accreditation process because it increases the patient's trust in healthcare services.

Hospitals should set aside an appropriate and suitable PPE budgeting model annually. The hospital budgeting model in Cameroon is a structural flaw in the healthcare system, which is the primary contributing element to low adherence and compliance of HCWs. Employers are obliged by the Occupational Safety and Health Administration (OSHA) to offer free PPE to healthcare employees. From an employer's standpoint, PPE expenditures need to be refunded by employees and patients. They don't understand that PPE is different from other medical supplies needed to treat patients (such as catheters, bed pans, and drugs), which work on a cost-passing basis and are on the bills of the patient/insurer. Although some hospitals are tax-exempt, hospitals in Cameroon operate like other companies in that they strive for efficiency and cost reduction. The budgeting model becomes problematic when demand increases sharply, such as during the Covid-19 pandemic and the Cholera epidemic in 2020 in Cameroon. Although hospitals may be encouraged to prevent shortages by charging patients and insurers for PPE, similar to other healthcare supplies, this strategy of limited PPE for HCWs is a common practice in Cameroon.

The employer, not the patient, should be compelled to supply PPE to healthcare personnel at no expense to the worker to avoid adding tension to a relationship based on care and trust, but here the reverse takes place. The objective of patients' well-being is a mutual task between the practitioners and the patients themselves. Some labor economists have realized and stated that employers may (or already do) compensate healthcare staff for working in hazardous situations by paying compensatory salary differentials. There should be policies that compel firms to pay benefits to employees who work in harmful and dangerous situations compared to those who have less risky jobs [24].

And lastly, the Africa CDC, in the vision of a new Public Health Order, which includes the initiative of vaccine production in Africa by 2040, should be envisaged adding to it industrialization towards PPE production centers in African countries [25]. These measures have begun in some African countries where workshops, seminars, and conferences concerning this initiative. We hope Cameroon Ministry adopts these measures to reduce the cost of exportation and minimize expenditures to invest in the safety of HCW [26].

PPE training is crucial for maintaining the health and safety of employees in any business. It includes educating staff members on how to use, maintain and care for personal protective equipment (PPE). PPE training should be customized to match the unique requirements of each workplace, taking into account the frequency, substance, and form of delivery. PPE training materials should cover topics like how to choose the right kinds of PPE, how to inspect it before use, how to wear it properly, when and why it needs to be replaced or repaired, and what to do if a worker is exposed to hazardous materials while wearing PPE. Depending on the sort of job done, different frequency requirements apply, but generally speaking, recycling training should take place at least every two years. Also, if new dangers emerge or modifications to current procedures that could potentially alter employee exposure levels, employers might need to offer extra training. Finally,

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there are several ways that businesses may provide their PPE training programs, including in-person lectures and conversations, online video tutorials, and webinars. Employers should select the strategy that best fits the preferences of their individual workforce's learning style to guarantee that everyone involved understands the material.

## Conclusions

There is an urgent need for a continuous focus on adherence and compliance in the use of PPE among healthcare workers in Cameroon. Non-compliance and non-adherence to PPE guidelines is a universal problem that needs urgent action, and the creation of standardized measures for an effective and efficient surveillance system in Cameroon would ensure monitoring and evaluation. Theoretical models from the behavioral sciences should be used internationally and should be adapted to the Cameroon context to bring a rapid change in such behaviors. We realized that factors associated with non-adherence and non-compliance are individual, environmental, and organizational factors. However, in observations made in Cameroon they most common reason is negligence due to a lack of knowledge of the risk of non-compliance during an absence of a disease spread

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## References

1. Luma, H. N., Doualla, M. S., Ebongue, C. O., Temfack, E., Wouafo, M., & Belley-Priso, E. (2012, January 1). Bacterial Reservoirs in A Health Care Environment: Case of the Douala General Hospital, Cameroon | Health Sciences and Disease. Bacterial Reservoirs in a Health Care Environment: Case of the Douala General Hospital, Cameroon | Health Sciences and Disease. https://www.hsd-fmsb.org/index.php/hsd/article/view/69
2. Overview. (n.d.). World Bank. https://www.worldbank.org/en/country/cameroon/overview
3. Tandi, T. E., Cho, Y., Akam, A. J. C., Afoh, C. O., Ryu, S. H., Choi, M. S., Kim, K., & Choi, J. W. (2015, May 12). Cameroon public health sector: shortage and inequalities in geographic distribution of health personnel. PubMed Central (PMC). https://doi.org/10.1186/s12939-015-0172-0\
4. Personal Protective Equipment - Overview | Occupational Safety and Health Administration. (n.d.). Personal Protective Equipment - Overview | Occupational Safety and Health Administration. https://www.osha.gov/personal-protective-equipment
5. Factors Influencing Compliance With Personal Protective Equipment (PPE) Use Among Healthcare Workers - PubMed. (2023, February 21). PubMed. https://doi.org/10.7759/cureus.35269
6. Haque, M., Sartelli, M., McKimm, J., & Bakar, M. A. (2018, November 15). Health care-associated infections – an overview. PubMed Central (PMC). https://doi.org/10.2147/IDR.S177247
7. Revelas, A. (n.d.). Healthcare – associated infections: A public health problem. PubMed Central (PMC). https://doi.org/10.4103/0300-1652.103543
8. HAI Data | CDC. (2018, October 5). HAI Data | CDC. https://www.cdc.gov/hai/data/index.html
9. Agbor, M., & Azodo, C. (2010, January 1). Handwashing and barrier practices among Cameroonian dental professionals | Tanzania Dental Journal. Handwashing and Barrier Practices Among Cameroonian Dental Professionals | Tanzania Dental Journal. https://doi.org/10.4314/tdj.v16i2.69866
10. Gidey, K., Gidey, M. T., Hailu, B. Y., Gebreamlak, Z. B., & Niriayo, Y. L. (2023, February 23). Clinical and economic burden of healthcare-associated infections: A prospective cohort study. PubMed Central (PMC). https://doi.org/10.1371/journal.pone.0282141
11. Nejad, S. B., Allegranzi, B., Syed, S. B., Ellis, B., & Pittet, D. (2011, July 20). Health-care-associated infection in Africa: a systematic review. PubMed Central (PMC). https://doi.org/10.2471/BLT.11.088179

 doi:10.20944/preprints202403.1810.v1




12. Maki, G., & Zervos, M. (2021, August 4). Health Care–Acquired Infections in Low- and Middle-Income Countries and the Role of Infection Prevention and Control. PubMed Central (PMC). https://doi.org/10.1016/j.idc.2021.04.014
13. Taplitz, R. A., Ritter, M. L., & Torriani, F. J. (2016, August 12). Infection Prevention and Control, and Antimicrobial Stewardship. PubMed Central (PMC). https://doi.org/10.1016/B978-0-7020-6285-8.00006-X
14. Personal Protective Equipment for Different Clinical Settings and Activities – Africa CDC. (n.d.). Africa CDC. https://africacdc.org/download/personal-protective-equipment-for-different-clinical-settings-and-activities/
15. Gaikwad, U. N., Bose, O., Padhi, A., Jindal, A., Nagpure, K., Bhargava, A., & Das, P. (2022, May 17). A retrospective observational insight into COVID-19 exposures resulting from personal protective equipment (PPE) breaches. A Retrospective Observational Insight Into COVID-19 Exposures Resulting From Personal Protective Equipment (PPE) Breaches | PLOS ONE. https://doi.org/10.1371/journal.pone.0268582
16. Management of Exposures | HCP | Infection Control Guidelines Library | CDC. (2019, October 4). Management of Exposures | HCP | Infection Control Guidelines Library | CDC. https://www.cdc.gov/infectioncontrol/guidelines/healthcare-personnel/exposures.html
17. 10,000 health workers in Africa infected with Covid-19 amid lack of PPE. (2020, July 24). South China Morning Post. https://www.scmp.com/news/china/diplomacy/article/3094578/over-10000-health-workers-africa-infected-covid-19-amid-lack
18. Tessema, G. A., Kinfu, Y., Dachew, B. A., Tesema, A. G., Assefa, Y., Alene, K. A., Aregay, A. F., Ayalew, M. B., Bezabhe, W. M., Bali, A. G., Dadi, A. F., Duko, B., Erku, D., Gebrekidan, K., Gebremariam, K. T., Gebremichael, L. G., Gebreyohannes, E. A., Gelaw, Y. A., Gesesew, H. A., . . . Tesfay, F. H. (2021, December 1). The COVID-19 pandemic and healthcare systems in Africa: a scoping review of preparedness, impact and response. PubMed Central (PMC). https://doi.org/10.1136/bmjgh-2021-007179
19. Matters, D. (2020, May 18). Driving Africa's industrialisation on the back of COVID-19 - Development Matters. Driving Africa's Industrialisation on the Back of COVID-19 - Development Matters. https://oecd-development-matters.org/2020/05/18/driving-africas-industrialisation-on-the-back-of-covid-19/
20. Personal protective equipment (PPE). (2021, April 7). Health Products Policy and Standards. https://www.who.int/teams/health-product-policy-and-standards/assistive-and-medical-technology/medical-devices/ppe
21. Cameroon: Ensure Credible Inquiry on Covid-19 Funds. (2021, April 23). Cameroon: Ensure Credible Inquiry on Covid-19 Funds | Human Rights Watch. https://www.hrw.org/news/2021/04/23/cameroon-ensure-credible-inquiry-covid-19-funds
22. Agarwal, A., Agarwal, S., & Motiani, P. (2020, November 23). Difficulties Encountered While Using PPE Kits and How to Overcome Them: An Indian Perspective. PubMed Central (PMC). https://doi.org/10.7759/cureus.11652
23. Risk without reward: The myth of wage compensation for hazardous work. (n.d.). Economic Policy Institute. https://www.epi.org/unequalpower/publications/risk-without-reward-the-myth-of-wage-compensation-for-hazardous-work/
24. The signing of a New Agreement to Drive Vaccine Impact in Africa – Africa CDC. (n.d.). Africa CDC. https://africacdc.org/news-item/the-signing-of-a-new-agreement-to-drive-vaccine-impact-in-africa/
25. Banda, G., Mugwagwa, J., Wanjala, C., Mackintosh, M., & Kale, D. (2021, June 24). Local manufacturing, local supply chains and health security in Africa: lessons from COVID-19. PubMed Central (PMC). https://doi.org/10.1136/bmjgh-2021-006362