HSPI The Open Access Publisher

JCMHS ISSN 2833-5333 JOURNAL OF COMMUNITY MEDICINE AND HEALTH SOLUTIONS

Research Article

Assessing the Impact of Framework Agreements on the Availability of Essential Medicines: A Case Study of 65 Essential Medicines at the Upper East Regional Medical Stores, Ghana

Abdalla Salia[1,2]*, Baba Seidu Issifu[2] and Kwaku Gyamfi Oppong[1]

[1]Department of Pharmacy Practice, Faculty of Pharmacy and Pharmaceutical Sciences, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

[2]Upper East Regional Health Directorate, Ghana Health Service, Bolgatanga, Ghana

More Information

***Corresponding author:** Abdalla Salia, Department of Pharmacy Practice, Faculty of Pharmacy and Pharmaceutical Sciences, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana, Email: abdalla.salia@yahoo.com

Submitted: February 16, 2026
Accepted: February 23, 2026
Published: February 24, 2026

Citation: Salia A, Issifu BC, Oppong KG. Assessing the Impact of Framework Agreements on the Availability of Essential Medicines: A Case Study of 65 Essential Medicines at the Upper East Regional Medical Stores, Ghana. J Community Med Health Solut. 2026; 7(1): 015-021. Available from: https://dx.doi.org/10.29328/journal.jcmhs.1001067

Keywords: Essential medicines; Framework agreement; Procurement; Medicine availability; Supply chain management; Ghana

Check for updates

OPEN ACCESS

Abstract

Background: Access to Essential Medicines stands as a vital foundation to public health service delivery in any well-performing health system. In 2017, Ghana's Ministry of Health established the Framework Agreement system, which selects prequalified suppliers to deliver 54 Essential Medicines (now 65 Essential Medicines) to Regional Medical Stores and Teaching Hospitals to address supply chain inefficiencies and maintain continuous availability.

Objectives: The study assessed the impact of these Framework Agreements on medicine availability at the Upper East Regional Medical Stores (UERMS), focusing on effectiveness, implementation challenges, and stakeholder perceptions.

Methods: A mixed-methods cross-sectional study design was employed. Quantitative data were collected through retrospective analysis of stock records from 2015 to 2024, comparing availability and lead times before and after implementation, while qualitative data were gathered through semi-structured interviews with key stakeholders.

Results: Quantitative data showed that before implementation, stock availability of these 65 Essential Medicines was 100%, with average lead times of 21–22 days. However, after implementation (2017–2024), medicine availability declined, and lead times increased by more than 40%, undermining the system's objective of efficiency. Inconsistencies in supply were observed. Qualitative data showed that supplier performance faced system-level obstacles, including restricted emergency procurement flexibility, communication breakdowns between procurement entities and suppliers, and delayed payments, leading suppliers to lose commitment.

Conclusion: Framework Agreements demonstrate potential for better procurement transparency and cost-effectiveness, yet their existing implementation model negatively impacts medicine availability in the Upper East Region. The study recommends revision to allow emergency procurement, strengthen supplier performance monitoring, decentralise some procurement responsibilities, improve communication, and ensure timely payments.

Introduction

Access to Essential Medicines is a major factor influencing health outcomes and a fundamental component of healthcare delivery [1]. The WHO defines Essential Medicines as those satisfying the priority healthcare needs of a population, selected based on disease frequency, efficacy, safety, and cost-effectiveness [2]. These medicines form the backbone of healthcare, particularly in public health facilities, making their supply a top priority for the Ministry of Health (MOH) and Ghana Health Service (GHS) [3-5]. Access to medicines is a fundamental human right and a key building block of effective health systems [6,7]. However, records indicate that supplies in Ghana's public health institutions are often below the WHO-recommended threshold of 80%, reflecting challenges in meeting patient needs [4].

Framework Agreements (FWAs) are long-term memoranda defining the terms for recurring smaller purchasing orders [8]. They aim to increase medicine availability, simplify procurement, and ensure cost-effectiveness [9]. Yet, their effectiveness at ensuring continuous supply at regional and institutional levels, particularly in the Upper East Regional Medical Stores (UERMS), remains uncertain, with stakeholders questioning whether FWAs truly improve pharmaceutical supply.

The FWA system relies on pre-negotiated contracts with selected suppliers to provide essential medicines over a defined period, mitigating procurement inefficiencies, ensuring quality, and stabilizing prices [10]. After the 2015 Central Medical Stores fire, Ghana developed a Supply Chain Master Plan implemented through collaboration between MOH and the Global Fund, including Framework Contracting/ Agreement (FWA), Last Mile Distribution (LMD), GhiLMIS, and Warehouse Optimisation. The FWA was designed to address stockouts, high acquisition costs, and supply chain inefficiencies [11]. Under the system, selected suppliers provide 65 Essential Medicines—including antibiotics, antihypertensives, antidiabetics, haematinics, antiulcers, antihistamines, vaccines, immunoglobulins, ophthalmics, and other essential drugs [12]. Nevertheless, studies indicate potential drawbacks, such as delayed supplier response, reduced procurement flexibility, and sporadic stockouts [12].

In the Upper East Region, geographical and infrastructural limitations make access to healthcare challenging, making a consistent Essential Medicines supply critical [13]. Irregular supply may increase morbidity and mortality, particularly among vulnerable populations dependent on public health facilities [1]. While centralised procurement through FWAs can be efficient, reliance on pre-selected suppliers can extend stockouts during manufacturing delays or logistical challenges [14]. Understanding these issues is essential for planning improvements in procurement and ensuring continuous medicine availability.

Achieving universal health coverage and improving patient outcomes depend on an uninterrupted Essential Medicines supply [1]. Preliminary data suggest that UERMS faces challenges in maintaining sufficient stocks of the 65 Essential Medicines, affecting local healthcare delivery [14]. FWAs, while providing long-term contracts, do not fully account for demand fluctuations from disease outbreaks or seasonal consumption variations [15]. Moreover, regional medical stores' limited ability to engage in contingency procurement outside FWAs may exacerbate supply disruptions [13]. Therefore, evaluating the efficiency of the FWA procurement method and its impact on healthcare delivery in the Upper East Region is critical.

Methods

Study design

This study employed a mixed-methods design integrating a retrospective before–and–after quantitative analysis with a cross-sectional qualitative component. The quantitative component involves a retrospective review of stock records to assess the availability of the 65 Essential Medicines and Lead Times, while the qualitative component explores perceptions and experiences of key stakeholders regarding the implementation and effectiveness of Framework Agreements. Medicine availability was defined as the proportion of the 65 tracer Essential Medicines recorded as in stock at the Upper East Regional Medical Stores at the time of routine monthly inventory assessment using Ghana Integrated Logistics Management Information System records. Lead time was defined as the number of calendar days between the official order placement date and the date of receipt and inventory entry at the store. Data sources included procurement orders, delivery documentation, and electronic inventory logs. Monthly values were aggregated into annual averages to enable period comparison.

Study area

The study was conducted in the Upper East Region of Ghana, focusing on the Upper East Regional Medical Stores (UERMS) located in Bolgatanga, and selected public health facilities (District Hospitals and the Regional Hospital) that are directly supplied by the Upper East Regional Medical Stores. The region is characterised by a mix of urban and rural populations and experiences unique challenges in health logistics due to its geographic location and infrastructural constraints.

Study site

The study was conducted in the Upper East Regional Medical Stores, a unit of the Upper East Regional Health Directorate located in Bolgatanga. The Upper East Regional Medical Stores (UERMS) operates as a vital supply chain element for health services in the Upper East Region, and it is under the Upper East Regional Health Directorate's governance. The UERMS

serves as the essential hub for health commodity storage, distribution, and management throughout the Upper East Region. The UERMS functions as a fundamental logistical hub that ensures and maintains proper pharmaceutical products, non-medical consumables, and medical equipment availability for all public health facilities and some private health facilities in the region. The core mandate of the Upper East Regional Medical Stores includes the receipt, safe storage, and timely distribution of medical commodities to health facilities. The facility manages essential medicines and vaccines alongside laboratory reagents and medical devices, together with non-medical consumables. The UERMS currently serves 15 District and Municipal Health Directorates, 1 Regional Hospital, 8 District Hospitals, 14 CHAG Health facilities, 12 Private Hospitals, 76 Health Centres, and 240 CHPS. It performs its operations based on national health policy directives and the Ministry of Health's guidance, and it maintains close partnerships with the Central Medical Stores as well as Non-Governmental Organisations and accredited private sector suppliers. The UERMS maintains operational efficiency through its implementation of diverse supply chain management and logistics practices. The facility maintains inventory control systems through the Ghana Integrated Logistics Management Information System (GhiLMIS) and conducts regular stock audits while preserving temperature-sensitive products through cold chain systems and follows Good Storage Practices (GSP) standards. The facility operates with separate units dedicated to warehousing, storage, inventory control, quality assurance, and dispatch operations. The UERMS again supports vertical public health programs such as Expanded Program on Immunisation (EPI), Tuberculosis, Malaria, HIV/AIDS, and Family Planning through commodity management and distribution services. Through its activities, the UERMS supports the Ghana Health Service's objectives to enhance healthcare delivery while promoting universal health coverage and equity in the region. The Upper East Regional Medical Stores maintains its strategic position as the central healthcare delivery point to evaluate the effects of Framework Agreements on essential medicine availability.

Study population

The target population consists of three main groups: Supply Chain Officers at the UERMS who manage and supervise the receipt, storage, and distribution of Essential Medicines, Pharmacists at the Regional and District Hospitals within the Upper East Region who receive supplies from the UERMS, and Representatives of selected pharmaceutical suppliers who have been awarded Framework Agreements to supply the 65 Essential Medicines.

Inclusion and exclusion criteria

Inclusion criteria include Pharmacists with at least one year of experience at their current facility, Supply Chain Practitioners who are directly involved in procurement, ordering, or inventory management, Pharmaceutical Suppliers who have active contracts under the Framework Agreement system, and Pharmaceutical Suppliers who have stopped supplying the UERMS under the Framework Agreement system. Exclusion criteria include interns or temporary staff without adequate knowledge of procurement processes, and Pharmaceutical Suppliers not included in the Framework Agreement for the selected medicines.

Sample size and sampling techniques

A purposive sampling technique was used to select participants based on their relevance to the study. The proposed sample size includes 1 Regional Medical Store (UERMS) staff, 8 District Hospital Pharmacists, 1 Regional Hospital Pharmacist, and 10 Representatives of Pharmaceutical Suppliers with active Framework Agreements, as well as Suppliers who have stopped supplying the UERMS under the Framework Agreement. This yields an estimated sample size of 20 participants, which is sufficient for achieving data saturation in qualitative studies and allows a meaningful quantitative summary of availability levels.

Data collection methods

Quantitative data: A retrospective review of stock records was conducted from 01/04/2025 to 30/04/2025, to assess the availability of the 65 Essential Medicines over 10 years (2015–2024), covering 2 years before and 8 years after the implementation of the Framework Agreement. Data was extracted using a structured template and analysed to identify trends and patterns in medicine availability before and after the framework agreement policy implementation.

Qualitative data: Semi-structured interviews were conducted with the selected pharmacists, UERMS staff, and supplier representatives from 01/05/2025 to 31/05/2025. The interview guide explored perceptions of framework agreement implementation, perceived impact on availability and delivery timelines, challenges experienced, and recommendations for improvement.

Data analysis

Quantitative data analysis: Quantitative data was entered into Microsoft Excel and analysed using SPSS. Descriptive statistics were generated to show availability trends.

Qualitative data analysis: Thematic content analysis was used to examine open-ended responses. Responses were transcribed, and then initial codes were assigned to meaningful phrases and statements. Then these codes were grouped into broader themes corresponding to the study objectives, including availability of Essential Medicines, Framework Agreement challenges, supply delays, and procurement flexibility. This approach allows for a comprehensive understanding of the experiences of stakeholders about the

Framework Agreement's influence on the availability of the 65 Essential Medicines at the hospitals and Upper East Regional Medical Stores.

Ethical considerations

Ethical clearance was obtained from the Committee on Human Research Publication and Ethics (CHRPE), KNUST, with reference number CHRPE/AP/437/25. Participation in the study was voluntary. All participants provided written informed consent before data collection. Data confidentiality and anonymity were strictly maintained.

Results

Quantitative findings

From 2015–2016 (pre-Framework Agreement), stock availability for the 65 essential medicines at the Upper East Regional Medical Stores (UERMS) was consistently 100%, with mean lead times of 21–22 days. Post-implementation (2017–2024), availability dropped, with frequent stock-outs, and mean lead times increased by more than 40%, as shown in Table 1.

Year-by-year data indicated that the steepest decline in availability occurred in 2017–2019, and Lead times showed the greatest increase during 2021 to 2024, as shown in Figure 1.

Qualitative findings (Table 2)

Table 1: Stock availability and lead times before and after Framework Agreement implementation.

Year	Percentage Stock Availability (%)	Average Lead Time (Days)	Framework Agreement Status
2015	100	20	INACTIVE
2016	100	21	INACTIVE
2017	82	23	ACTIVE
2018	71	24	ACTIVE
2019	55	26	ACTIVE
2020	75	27	ACTIVE
2021	83	28	ACTIVE
2022	58	29	ACTIVE
2023	69	28	ACTIVE
2024	52	29	ACTIVE

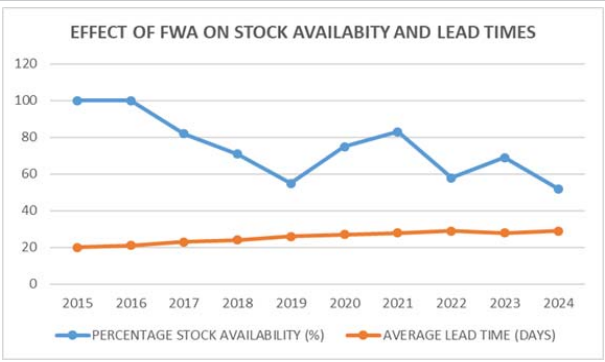

Figure 1: Effect of Framework Agreements on Stock Availability and Lead Times.

Table 2: Demographic profile of respondents.

Index	Category	Number	Percentages
Gender	Male	19	95
	Female	1	5
Total		20	100
Age	30-39	3	15
	40-49	15	75
	50-59	2	10
Total		20	100
Working Experience	≥ 10 years	20	100
	< 10 years	0	0
Total		20	100
Professional Category	Pharmacists	9	45
	Supply Chain Staff	1	5
	Representatives of Suppliers	10	50
Total		20	100

Stakeholders take on the framework agreement policy

Policy content: Out of the 20 respondents from the 3 main groups of population, 2 respondents, constituting 10%, were aware of the policy but had no idea about its content, whereas 18 respondents, constituting 90%, were both aware of and had knowledge of the content of the policy, as indicated in Table 3. Though some were aware of the policy, they were unable to articulate its parts, goals, and objectives.

Policy context: According to the study's findings, a number of issues made the rollout and execution of the Framework Agreement Policy necessary. Among these are a reduction in administrative bottlenecks and an enhancement of equity, effectiveness, and quality of care. Other technical issues included reducing procurement corruption, cutting down the prices of the medicines procured under this policy, addressing the issues of low staff capacity, particularly at the regional level, and a lack of funding at the lower levels to engage in large volumes of procurement to enjoy economies of scale. The research on policy analysis supports these contextual factors by identifying sector reforms, administrative and technical bottlenecks, economic factors, traditional and sociocultural factors, environmental factors, and demographic shifts as key policy determinants [16].

Policy implementation and challenges

The implementation of the Framework Agreement (FWA) policy in the Upper East Region has encountered notable challenges. While the policy seeks to improve efficiency and transparency in public sector medicine procurement, its rollout has been marked by inconsistencies. A Supply Chain Manager at the Regional Medical Stores reported

Table 3: Respondents' awareness of the Framework Agreement Policy.

Indicators	Number	Percentage
Not aware of the policy	0	0
Aware of the policy but do not know its content	2	10
Aware of the policy and know its content	18	90
Total	20	100

delays in supplier deliveries and difficulty in navigating the new centralised system, leading to inconsistent availability of Essential Medicines. A principal pharmacist at a district hospital stated, *"The idea is good, but the way it is being rolled out makes it difficult for us to maintain consistent availability of essential medicines."*

Suppliers under the framework agreement also highlighted bottlenecks, citing poor coordination and a lack of engagement with the Ghana Health Service after contracts were awarded. Some expressed concerns about delayed payments for medicines already supplied. A supplier representative noted, *"We stopped supplying the various Regional Medical Stores across the country under the Framework Agreement because of payment delays."*

A Supply Manager explained that inadequate financial resources make it difficult to pay suppliers on time, largely due to erratic and delayed NHIS reimbursements, which in turn affect facilities' ability to settle debts. The rigid nature of the policy also limits flexibility during emergencies or stockouts. A Senior Pharmacist asserted, *"In cases where the contracted suppliers fail to supply the Upper East Regional Medical Stores, which has been our primary source of procurement, we are not allowed to procure from other sources even in urgent situations because the Regional Medical Stores would not issue a certificate of non-availability to us."*

Another issue raised by the Supply Manager was the absence of robust monitoring and evaluation systems. Without a standardised reporting mechanism for delays or defaulting suppliers, facilities were often forced to wait longer or resort to informal channels, undermining the purpose of the framework agreement.

Discussion

From the quantitative findings, the implementation of the Framework Agreement (FWA) policy in 2017 led to a substantial reduction in stock availability. Stock availability reached 100% from the year 2015 to 2016 before the policy took effect. The Framework Agreement activation in 2017 resulted in stock availability decreasing to 82% and subsequently to 52% by 2024. The Framework Agreement's current structure demonstrates an unsuccessful achievement of its purpose to sustain or enhance essential medicine supply levels. The supply chain efficiency decreased when lead times rose from 20–21 days in the 2015–2016 period (Pre-FWA period) to 29 days in 2024. The main reason for adopting FWAs was to enhance efficiency and decrease procurement delays, yet the data shows the opposite effect. The data shows that the FWA implementation created new procurement inefficiencies because of bureaucratic rigidity, supplier non-compliance, and centralization challenges. The policy aimed to create standard procurement procedures while shortening delivery times through prequalified pharmaceutical suppliers. The opposite outcome has occurred instead of the expected results. The lead times have grown longer throughout the years until they reached their highest point at 29 days during the years 2022 and 2024. The Framework Agreement has made stock availability more unpredictable, which directly affects medicine security and public health outcomes. The pre-FWA years maintained 100% stock availability, but the FWA years showed a significant decline, which suggests suppliers cannot meet demand or the system lacks proper enforcement for timely delivery. The study therefore shows that Framework Agreements have a significant impact on the availability of the 65 Essential Medicines at the Upper East Regional Medical Stores, and this impact, specifically, appears to be negative.

From the qualitative findings, the study discovered multiple obstacles that impede the Framework Agreement implementation in the Upper East Region. The main obstacle is the lack of coordination between the Ghana Health Service and contracted suppliers. Suppliers identified inadequate engagement, together with delayed payments and restricted Ghana Health Service responsiveness, as essential barriers to their work. This aligns with procurement literature, which emphasizes that successful supplier partnerships require ongoing communication, timely payments, and mutual accountability [17]. A supplier representative explained that they left the Framework Agreement because of ongoing payment delays. Health facility managers expressed their agreement with the problem of recurrent medicine stockouts and non-issuance of Certificates of Non-Availability, which would have allowed them to purchase medicines outside the agreement. The Framework Agreement lacks sufficient adaptability according to regional health officials. Healthcare facilities must either follow official procedures or use unofficial procurement methods when facing emergencies or supplier defaults. The system's inflexibility runs counter to the basic healthcare requirement of immediate access to necessary medications. The lack of an effective monitoring and evaluation (M&E) system creates additional problems for these issues. There exists no standardised reporting system to track non-compliance or delivery delays, and suppliers lack consistent accountability measures. The policy's goals remain unattainable because of administrative weaknesses that prevent decision-makers from making timely adjustments to procurement strategies. The observed decline in availability should be interpreted within broader health system constraints, including delayed National Health Insurance Scheme reimbursements, supplier liquidity challenges, centralized procurement procedures, and geographic distribution barriers within northern Ghana. These structural conditions may influence procurement performance independent of policy design. The qualitative findings reinforce this interpretation by demonstrating that payment delays, limited engagement between procurement authorities and suppliers, and the absence of robust monitoring mechanisms

undermine supplier responsiveness and system efficiency. These findings suggest that policy effectiveness is strongly mediated by implementation environment and institutional capacity.

From the qualitative findings, stakeholders showed their understanding of the policy alongside their varied opinions about its execution. The survey results showed that 90% of participants both understood the Framework Agreement and its established provisions. The positive results demonstrate effective policy dissemination together with successful stakeholder education efforts. The majority of pharmacists, together with supply chain personnel, expressed negative opinions about the policy's effects. The majority of pharmacists and supply chain personnel described the implementation process as poorly coordinated and top-down, while being detached from actual on-the-ground realities. A senior pharmacist expressed concern that the inability to procure outside the Framework Agreement during urgent or emergencies endangers patients while overburdening health facility operations. Healthcare professionals provided important information that demonstrates a major implementation gap. The policy's goal to achieve value-for-money procurement and fight corruption remains excellent, but frontline staff experience frustration because of execution challenges. Stakeholders reported that the policy focused on fighting procurement corruption while enhancing supply equity, lowering administrative workloads, and achieving cost savings through economies of scale. These policy drivers align with global procurement reform initiatives that promote both pooled procurement and long-term contracting approaches for public health sectors. The practical execution of Framework Agreements in the region has not met the expected standards despite their good intentions. The system continues to perform poorly because of multiple systemic issues which include delayed NHIS reimbursements, limited financial independence at lower levels and weak regulatory enforcement. The policy remains ineffective because it failed to adjust to the existing financial problems and emergency stock requirements and regional supply chain limitations. The Framework Agreement system proves useless during crisis situations because regional stores cannot obtain alternative supplies when they run out of stock according to one respondent.

Conclusion

The study assessed the impact of Framework Agreements on the availability of 65 Essential Medicines at the Upper East Regional Medical Stores. The analysis of both quantitative and qualitative data shows that the Framework Agreement system had good intentions but its implementation in the Upper East Region has resulted in reduced stock availability and longer lead times. The shows that Framework Agreements have negatively affected the availability of essential medicines in the Upper East Region. The FWA policy itself does not contain any fundamental errors but the implementation process has neglected essential operational requirements.

The system's inflexibility combined with delayed payments and insufficient supplier interaction and non-existent real-time monitoring systems represent major weaknesses that require immediate attention. A procurement system which fails to adapt to health emergencies or local conditions endangers patient outcomes.

Recommendations

The Ministry of Health and Ghana Health Service should introduce flexibility in procurement rules to permit emergency procurement when contracted suppliers fail or Regional Medical Stores run out of stock. Supplier engagement and coordination should be strengthened through quarterly review meetings and performance dashboards. Payment timeliness should be improved by resolving NHIS payment delays. Monitoring and Evaluation systems should be built with digital real-time tracking and sanctions for defaulters. Certain procurement functions should be decentralised to improve responsiveness. Lastly, there should be regular policy review and stakeholder consultation with inputs from hospitals, regional stores and pharmaceutical suppliers.

Acknowledgment

The author expresses sincere gratitude to Dr. Kwaku Gyamfi Oppong for his valuable supervision, guidance and feedback throughout the research process. Appreciation is extended to the staff of the Department of Pharmacy Practice, Kwame Nkrumah University of Science and Technology, for their academic and administrative support. The author also thanks the pharmacists, supply chain officers, and supplier representatives who participated in the study for their time, insights and cooperation.

References

1. World Health Organization. Ensuring essential medicine availability: global strategies and regional perspectives. Geneva: WHO Publications; 2023.
2. World Health Organization. WHO model list of essential medicines – 22nd list, 2021 [Internet]. Geneva: WHO; 2021 [cited 2026 Feb 23]. Available from: https://www.who.int/publications/i/item/WHO-MHP-HPS-EML-2021.02
3. Ghana Health Service. GHS annual holistic report [Internet]. Accra: Ghana Health Service; 2019 [cited 2026 Feb 23]. Available from: https://www.afro.who.int/sites/default/files/2020-10/Ghana%20Annual%20report%202019.pdf
4. Ghana Health Service. Holistic assessment report [Internet]. Accra: Ghana Health Service; 2020 [cited 2026 Feb 23]. Available from: https://www.moh.gov.gh/wp-content/uploads/2022/09/2020-Holistic-Assessment-Report_v8.3docx.pdf
5. Osei-Assibey A, Akweongo P. Assessment of availability of essential medicines in Sekondi-Takoradi Metropolis. J Biomed Pharm Res. 2017;6:100-111. Available from: https://www.semanticscholar.org/paper/Assessment-of-Availability-of-Essential-Medicines-Osei-Assibey-Akweongo/40a399b9ebc790328d2db7a3ed5d7c4796a5f070
6. Hogerzeil HV. Selection of essential drugs: standardised supply of

essential drugs in Ghana—1. Trop Doct. 1986;16:113-116. Available from: https://doi.org/10.1177/004947558601600306

7. Hogerzeil HV. Essential medicines and human rights: what can they learn from each other? Bull World Health Organ. 2006;84:371-375. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC2627335/

8. Arney L, Yadav P, Miller R, Wilkerson T. Strategic contracting practices to improve procurement of health commodities. Glob Health Sci Pract. 2014;2:295-306. Available from: https://doi.org/10.9745/ghsp-d-14-00068

9. United Nations Office for Project Services. Framework agreements for health procurement: lessons from Africa [Internet]. Copenhagen: UNOPS; 2021 [cited 2026 Feb 23]. Available from: https://content.unops.org/publications/ASR/2021-ASR.pdf

10. European Medicines Agency. Framework agreements in pharmaceutical procurement: a strategic approach [Internet]. London: EMA Publications; 2020 [cited 2026 Feb 23]. Available from: https://www.ema.europa.eu/en/documents/other/eu-medicines-agencies-network-strategy-2020-working-together-improve-health_en.pdf

11. Ghana Ministry of Health. National pharmaceutical procurement guidelines. Accra: MoH Publications; 2022.

12. Bosu W, Aikins M, Sackey S. Challenges in pharmaceutical procurement in Ghana: a regional perspective. Ghana Med J. 2021;55(3):67-79.

13. Mensah K, Oppong R, Adjei F. Pharmaceutical supply chain bottlenecks in rural Ghana: the case of the Upper East Region. J Public Health Pharm. 2022;10(1):88-102.

14. Asante K, Osei D, Mensah J. Assessing the impact of procurement policies on medicine availability in Ghana. J Health Policy Syst Res. 2021;18(2):120-134.

15. Ghana Health Service. Annual report on essential medicines supply and distribution in Ghana [Internet]. Accra: GHS Publications; 2023 [cited 2026 Feb 23]. Available from: https://www.afro.who.int/sites/default/files/2024-06/WHO%20Ghana%202023%20Annual%20Report.pdf

16. Grindle MS. Policy content and context in implementation. In: Grindle MS, editor. Politics and policy implementation in the Third World. Princeton: Princeton University Press; 2017. p. 3-34. Available from: https://www.scirp.org/reference/referencespapers?reference id=3557776

17. OECD. Health at a glance 2019: OECD indicators [Internet]. Paris: OECD Publishing; 2019 [cited 2026 Feb 23]. Available from: https://www.oecd.org/en/publications/health-at-a-glance-2019_4dd50c09-en.html