

# The Journey of the Pill



Findings of the NCD  
Commodity Supply Chain  
Assessment in Ghana



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# Contents

<b>FOREWORD .....</b>	<b>4</b>
<b>ACKNOWLEDGEMENTS.....</b>	<b>5</b>
<b>ABBREVIATIONS .....</b>	<b>6</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>8</b>
<b>1.0 INTRODUCTION TO NONCOMMUNICABLE DISEASES .....</b>	<b>11</b>
<b>2. ASSESSMENT METHODOLOGY .....</b>	<b>13</b>
<b>2.3 Limitations .....</b>	<b>15</b>
<b>3. FINDINGS .....</b>	<b>16</b>
<b>3.1 NCD service delivery in Ghana’s public health care system .....</b>	<b>16</b>
<b>3.2 Overview of the NCD supply chain in Ghana .....</b>	<b>16</b>
3.2.1 Public sector supply chain .....	16
3.2.1.1. Framework contracts.....	17
3.2.1.2. Ghana Integrated Logistics Management Information System .....	18
3.2.1.3. Last Mile Delivery Programme .....	18
3.2.2. Faith-based organization sector supply chain .....	18
3.2.3. Private sector supply chain .....	19
<b>3.3 The journey of the pill.....</b>	<b>19</b>
3.3.1. Inventory management .....	19
3.3.2. Order preparation.....	21
3.3.3. Order processing.....	23
3.3.4. Order fulfillment.....	24
3.3.5. Alternative procurement.....	25
3.3.6. Private suppliers.....	26
3.3.7. National NCD commodity needs forecasting and procurement.....	26
3.3.8. Manufacturing .....	27

<b>3.4 Supply chain human resources.....</b>	<b>28</b>
<b>3.5 Availability of NCD tracer commodities.....</b>	<b>29</b>
<b>3.6 Supply chain for insulin .....</b>	<b>31</b>
3.6.1 Cold chain for insulin .....	33
<b>3.7 Source of medicines .....</b>	<b>34</b>
<b>3.8. Stockouts of medicines.....</b>	<b>35</b>
<b>3.9 Financing and pricing.....</b>	<b>36</b>
3.9.1. Price of medicines.....	38
<b>3.10. Availability of diagnostic equipment and supplies .....</b>	<b>43</b>
<b>4.0 CONCLUSION .....</b>	<b>44</b>
<b>5.0 RECOMMENDATIONS.....</b>	<b>45</b>
5.1 Strengthen leadership, governance, and financing of the NCD supply chain at the central, regional, and district levels.....	45
5.2 Expand reach of supply chain to increase access .....	45
5.3 Strengthen supply chain workforce capacity .....	46
5.4 Develop a business case for investing in NCD commodity security for Ghana .....	46
5.5 Digitalize supply chain functions .....	47
5.6 Improve forecasting and procurement .....	47
5.7 Meet the unique needs of the insulin supply chain .....	48
5.8 Develop a costed NCD Supply Chain Strategy .....	49
<b>APPENDICES .....</b>	<b>50</b>

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## Foreword



Noncommunicable diseases are a major global health issue, accounting for more than 15 million premature deaths annually. And despite years of progress, patients still struggle to manage their diseases. An important factor in care for NCDs is access to medicines and health products. PATH believes ensuring this access is key to helping people across the world manage their diseases and prevent unnecessary deaths. The COVID-19 pandemic has made the gaps in NCD care more apparent. We believe our work in strengthening the supply chain in Ghana plays a vital role in the country's ongoing efforts to build a resilient health care system in the face of future crises.

PATH works in over 70 countries globally to develop and scale solutions—including vaccines, drugs, devices, diagnostics, and innovative approaches to strengthening health systems worldwide. We have been a trusted partner of the Government of Ghana since 2013 and have supported the introduction of several vaccines in the country. PATH began working on NCDs in 1996, focusing on women's cancers. In 2012, the program expanded to begin addressing the expanding global burden of diabetes and cardiovascular disease.

Ghana began its journey of testing innovations to support the realization of universal health coverage for its citizens in 2004 with the implementation of the National Health Insurance Scheme. This assessment is part of a comprehensive set of programming designed to contribute to Ghana's aspirations by strengthening primary health care NCD services, building a culture of quality data use for NCD planning and care, and improving access to NCD commodities. Most recently, with the support of Access Accelerated, we have launched the NCD Navigator, a dynamic tool that provides Ghana's Ministry of Health and the Ghana Health Service with data to direct strategy execution and resource allocation. This is an important component of this program of work. I thank both the Ministry of Health directorate, Supplies, Stores and Drug Management (SSDM) and Public Health Divisions of the Ghana Health Service for their help in completing this NCD commodity supply chain assessment. We look forward to working with them to implement the recommendations found in the report as an important contribution towards achieving universal health coverage in Ghana. We are grateful to Access Accelerated for their visionary approach to bringing industry together to collaborate with partners and support ground-breaking work that achieves system change to improve the lives of people living with NCDs.

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PATH is grateful to the NCD Program Management, Regional Health Directors, and their Management Teams in the six assessment regions: Greater Accra, Ashanti, Volta, Bono, Northern, and Upper West. In addition, the collaboration of management and health workers from selected faith-based and private health facilities, private sector pharmacies, international and local pharmaceutical manufacturers, importers, and suppliers was invaluable.

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Finally, the PATH Ghana team would like to also express our appreciation to the PATH Global NCD Leadership for their vision and to all others who contributed to the implementation of this work at various stages in a variety of ways.

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## Abbreviations

CARISCA	Center for Applied Research and Innovation in Supply Chain – Africa
CHAG	Christian Health Association of Ghana
CHPS	Community-based Health Planning and Services
DHA	District Health Administration
DHD	District health directorates
EPI	Expanded Programme on Immunisation
EVM	Effective vaccine management
FBO	Faith-based organization
FBO H	Faith-based organization Hospital
FDA	Ghana Food and Drug Authority
FWC	Framework Contract
GhILMIS	Ghana Integrated Logistics Management Information System
GHS	Ghana Health Service
GHSC-PSM	Global Health Supply Chain Program- Procurement and Supplies Management
HC	Health Center
HF	Health facility
LMD	Last mile distribution
NCD	Noncommunicable diseases
NCDCP	Non-Communicable Disease Control Programme
NHIA	National Health Insurance Authority
NHIS	National Health Insurance Scheme
PH	Private Hospital
PHC	Primary health care
PLWNCD	Person living with noncommunicable disease
PPP	Pooled procurement programme
PST	Pre-service training
Q-GH	Quasi-government hospital
RH	Regional hospital
RHA	Regional health administration
RHD	Regional Health Directorate
RMS	Regional medical store
SCMP	Supply Chain Master Plan
SOP	Standard operating procedure

SSDM	Stores and Drugs Management Division
SSNIT	Security and the National Insurance Trust
UHC	Universal health coverage
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization



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## Executive summary

Noncommunicable diseases (NCDs) kill 41 million people each year, representing 71% of all deaths globally.<sup>1</sup> Over three-quarters of all NCD deaths occur in low- and middle-income countries, many from cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes.<sup>1</sup> The United Nation's 2030 Agenda set the goal of reducing premature deaths from NCDs by one third by 2030 through prevention and treatment as expressed in Sustainable Development Goals target 3.4.<sup>2</sup> Furthermore, the World Health Organization (WHO) identified the management of cardiovascular disease, diabetes, and cancer as cost-effective and feasible “best buys,” which are among interventions that show the best evidence of generating impact and value – for health, the economy and other areas of national development. The WHO estimates that a US\$1 investment in preventing ischemic heart disease and stroke by 2030 in low- and lower-middle-income countries will yield a US\$3.29 return.<sup>3</sup>

The Global NCD Action Plan sets a goal of “80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major noncommunicable diseases in both public and private facilities by 2025.”<sup>4</sup> However, many people living with NCDs (PLWNCDs), especially those living in low- and middle-income countries, can't easily access the medical products they need to manage their conditions. In Ghana, Access Accelerated and PATH collaborated with the Ministry of Health and Ghana Health Service (GHS) to analyze supply chain channels for NCD-related (diabetes, hypertension, and breast cancer) medicines and diagnostics, identify bottlenecks, and recommend interventions to strengthen NCD supply security.

This NCD supply chain assessment tracked the journey of six tracer NCD medicines from importation or (local) manufacturing point to the client at service delivery points at primary and secondary health facilities. The tracer products for the assessment were selected in consultation with the Ghana Health Service (GHS) NCD program and guided by standard treatment protocols for hypertension, diabetes, and breast cancer. We also assessed the availability of the tracer medicines and eight NCD diagnostic instruments and consumables at health facilities. Quantitative and qualitative data were collected through 84 site visits and interviews at public and private health facilities, retail pharmacies, and wholesalers in six regions.

The assessment findings are documented in seven distinct process maps that outline the steps of different actors in the Ghana health commodity supply chain: inventory management, routine ordering, order processing, order fulfillment/distribution, alternative procurement (the faith-based organization supply chain), and public facility orders from the private sector. Ghana's health supply chain manages all health commodities in an integrated way, using the same standard operating procedures (SOPs), tools, and processes for all commodities. It makes the distinction between regular and “full supply” commodities; the latter benefit from policy commitment and dedicated resources to supply the maximum stock levels.

Despite having a comprehensive set of SOPs documented in *Logistics Management of Public Sector Health Commodities in Ghana, Standard Operating Procedures, June 2010*, numerous factors have led to a deinstitutionalization of the procedures. Human resource capacity has weakened facility performance management. Limited availability of SOPs at health facilities has resulted in unstandardized processes and ordering methodology, contributing to poor supply chain data. The implementation of the Ghana Integrated Logistics Management Information System (GhILMIS), while

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<sup>1</sup> [https://www.who.int/health-topics/noncommunicable-diseases#tab=tab\\_1](https://www.who.int/health-topics/noncommunicable-diseases#tab=tab_1) (Accessed April 6, 2020)

<sup>2</sup> <https://indicators.report/targets/> (Accessed September 8, 2020)

<sup>3</sup> Saving lives, spending less: a strategic response to noncommunicable diseases. Geneva, Switzerland. World Health Organization. 2018

<sup>4</sup> <https://www.who.int/beat-ncds/take-action/policy-brief-improve-medicine-access.pdf> (Accessed April 6, 2020)

providing an electronic platform with the potential of end-to-end data visibility, is still rolling out and building facility staff capacity to use the system. The financing of NCD commodities, price markups along the supply chain, and availability of NCD products at the regional medical store (RMS) often result in out-of-pocket cost to PLWNCDs accessing supplies from public and private channels, despite the tracer drugs being included in the National Health Insurance Scheme (NHIS) for reimbursement up to a certain price.

The availability of medicines at the RMS has a direct impact on the functioning of the Ghana health supply chain. RMS availability on the day of visit (Figure 4) varied from Ashanti having stocks of all nine variations of the six tracer drugs assessed, to Greater Accra having only insulin vials available. Inconsistent availability of priority NCD products at the RMS hinders access for the health facilities that are RMS's customer base and drives health facilities and PLWNCDs to the private sector. In the public sector, health centers had the weakest percent availability of tracer drugs with less than 80% availability for all. District hospitals fared better with 100% availability of Amlodipine but below 80% availability for other tracer products. Regional hospitals had 100% availability for all tracer drugs, except for metformin. Despite availability of Metformin 500mg at the of the RMSs, this low-cost, locally manufactured drug for diabetes was unavailable at 65% of health facilities and 45% of district hospitals.

Availability of tracer drugs was better at faith-based organization (FBO) hospitals than at private hospitals (Figure 2). The availability of functional equipment for diagnosis of NCDs was available at most health facilities visited, with the main challenge being the availability of glucose monitoring strips for glucometers.

Price markups for tracer drugs were different across all levels of the supply chain and products. The markup percentages at the three RMS that shared data exceeded 290% for Amlodipine (Figure 8). RMS prices for some drugs were at or above NHIS prices (Figure 9). While some health facilities sold tracer drugs to uninsured PLWNCDs at prices that were at or less than NHIS prices, there were many sites where tracer drug costs for uninsured who pay out of pocket exceeded NHIS prices. Data for diabetes medicines show the highest percent markups for metformin at health centers and regional hospitals, which sold at higher than NHIS prices at 15 public facilities. For hypertension, regional hospitals had the highest markups of Amlodipine, with health centers and regional hospitals having similarly high ranges in the markups of Bendroflumethiazide. Twenty facilities sold Amlodipine at above NHIS prices, and 13 for Bendroflumethiazide. Private pharmacy prices for tracer drugs (Figure 13) are consistently above NHIS prices with the exception of some retail pharmacies that sell insulin at or below NHIS reimbursement price, with metformin representing the highest range of price markups (Figure 14).

The following recommendations are made to strengthen the NCD supply chain in Ghana:

1. **Strengthen leadership, governance, and financing of the NCD supply chain at the central, regional, and district levels**, formally adopting the Global NCD Action Plan goal of 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major NCDs in both public and private facilities by 2025 to meet UHC goals. Establish a multi-stakeholder NCD commodity security technical working group (TWG) to ensure data-driven decisions on forecasting, financing, procurement, and delivery of NCD commodities aimed at closing the availability gap.
2. **Expand the reach of the supply chain to establish greater access to quality NCD medicines and products in primary health care (PHC) facilities** as an essential part of universal health coverage (UHC). Monitor and maintain consistent supply of quality NCD medicines and products in PHC facilities and through the supply chain. Extend the reach of Last Mile Distribution Programme (LMD) to all PHC facilities and accelerate the deployment of GhILMIS down to the PHC level health facilities. Determine reasonable pricing for NCD

commodities for uninsured Ghanaians that ensures equitable access without risk of catastrophic spending. Enroll a larger proportion of the population in national health insurance.

3. **Expand and strengthen the capacity of the supply chain workforce** to use updated tools and follow best practices for managing health commodities with a focus on improving NCD supply chain management as a matter of priority. Leverage data from GhILMIS at all levels to track supply chain key performance indicators and prioritize supervision to resolve supply chain issues affecting availability.
4. **Develop a business case for Ghana to invest in achieving NCD commodity security** and gain the support of policy makers in the Ministry of Finance and the National Health Insurance Authority (NHIA) to close the financing gap that currently constrains availability of NCDs ensure harmonized coverage by NHIA and reasonable cost to consumers.
5. **Digitalize supply chain functionalities with a focus on linking dispensing, ordering, and stock management systems at all levels** of the supply chain and **expand GhILMIS functionality to include a prescription and dispensing application** that integrates with the existing GhILMIS functionality and supports forecasting of NCD commodities.
6. **Improve forecasting and procurement** by testing a demand forecasting methodology tailored for NCD medicines in collaboration with the Coalition for Access to NCD Medicines and Products and **monitor performance of new framework contract implementation** against a set of key performance indicators and service level agreements to reduce the risk of manufacturer or supplier performance negatively impacting the public health supply chain.
7. **Meet the unique needs of the insulin supply chain** by exploring options for financing “bundling” of insulin with syringes and glucose strips, investing in an integrated cold chain solution for insulin, and adding insulin to other cold chain medicines and vaccines to be included in the Supply Chain Master Plan that is under development.
8. **Develop a costed strategy and detailed roadmap for NCD supply security** under the leadership and coordination of a supply chain technical working group.

Strengthening supply chains is a long-term effort, and Ghana has been working towards the goal of an effective, efficient, and reliable integrated health commodities supply chain for over a decade. The timing of this assessment’s findings and recommendations presents an opportunity to reflect on how to improve the system to better manage NCD commodities given the importance of the goals of the Ghana NCD program, and the role of the supply chain and NHIS in supporting the goals of NCD care and treatment within UHC.

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## 1.0 Introduction to noncommunicable diseases

Noncommunicable diseases kill 41 million people each year, representing 71% of all deaths globally.<sup>5</sup> Over three-quarters of all NCD deaths occur in low- and middle-income countries, many from cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes.<sup>1</sup> The Global NCD Action Plan sets a goal of “80% availability of the affordable basic technologies and essential medicines, including generics” by 2025<sup>6</sup> to treat NCDs. However, many PLWNCDs, especially those living in low- and middle-income countries, face barriers to access to the medical products they need to manage their conditions.

The United Nation’s 2030 Agenda set the goal of reducing premature deaths from NCDs by one third by 2030 through prevention and treatment as expressed in Sustainable Development Goals target 3.4.<sup>7</sup> Furthermore, among WHO-identified cost-effective and feasible “best buys” are the management of cardiovascular disease, diabetes, and cancer, which are among interventions that show the best evidence of generating impact and value – for health, the economy, and other areas of national development. They estimate that a US\$1 investment in preventing ischemic heart disease and stroke by 2030 in low- and lower-middle-income countries will yield a US\$3.29 return.<sup>8</sup>

Ghana, like many low- and middle-income countries, is undergoing an epidemiological transition marked by a decline in morbidity and mortality due to communicable conditions and an increase in the burden of NCDs. NCDs are estimated to account for 43% of all deaths in the country; the probability of dying in Ghana between the ages of 30 and 70 years from cardiovascular disease, chronic respiratory disease, cancer, or diabetes is 21%.<sup>9</sup> A review of data collected by PATH for a Ghana NCD landscape assessment (Figure 1) revealed ranges for the most prevalent NCDs. Between 30-40% of adult Ghanaians live with hypertension while between 8-12% live with diabetes. The economic burden of managing these chronic conditions is only partly borne by health systems in developing countries, often forcing families into catastrophic spending.

Because these diseases are chronic, they require continuous and consistent availability of treatments. Therefore, it is imperative to identify supply chain-related issues and propose solutions to improve availability of medicines, products, and diagnostics for hypertension, diabetes, asthma, and breast and cervical cancers in Ghana.

In Ghana, Access Accelerated and PATH collaborated with the Ministry of Health and GHS to analyze supply chain channels for NCD-related (diabetes, hypertension, and breast cancer) medicines and diagnostics, identify bottlenecks, and recommend interventions to strengthen NCD supply security. Upon request of the Non-Communicable Disease Control Programme (NCDCP), Salbutamol was added to include medicine for asthma to the tracer items.

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<sup>5</sup> [https://www.who.int/health-topics/noncommunicable-diseases#tab=tab\\_1](https://www.who.int/health-topics/noncommunicable-diseases#tab=tab_1) (Accessed April 6, 2020)

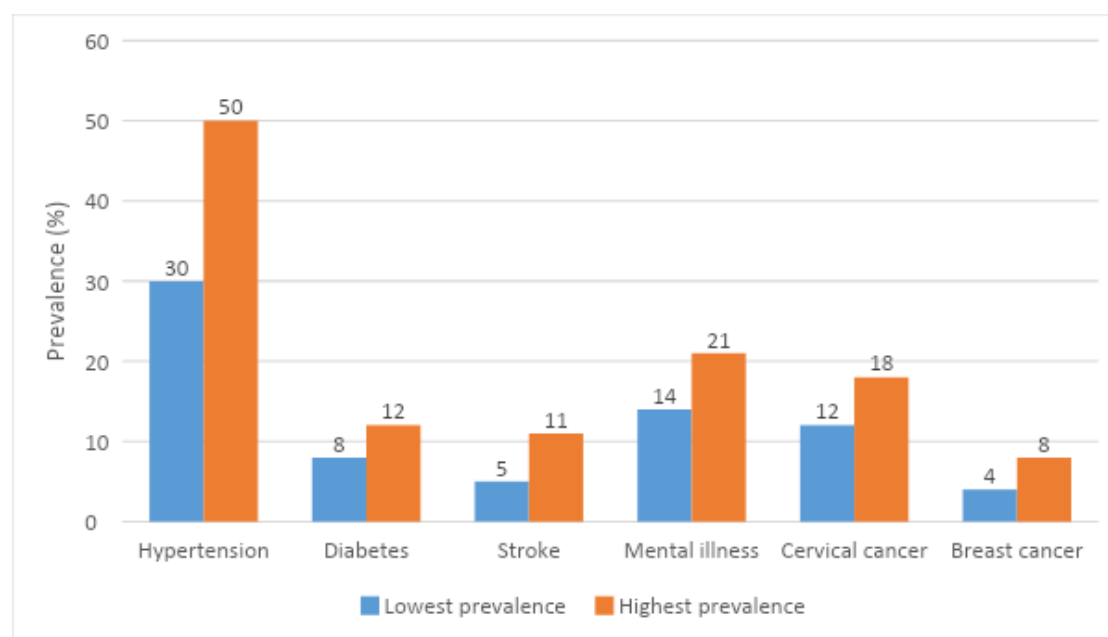
<sup>6</sup> <https://www.who.int/beat-ncds/take-action/policy-brief-improve-medicine-access.pdf> (Accessed April 6, 2020)

<sup>7</sup> <https://indicators.report/targets/> (Accessed September 8, 2020)

<sup>8</sup> Saving lives, spending less: a strategic response to noncommunicable diseases. Geneva, Switzerland. World Health Organization. 2018

<sup>9</sup> World Health Organization (WHO). WHO country profile 2016. [https://www.who.int/nmh/countries/gha\\_en.pdf?ua=1](https://www.who.int/nmh/countries/gha_en.pdf?ua=1)

**Figure 1. Highest and lowest national prevalence rates in Ghana of selected NCDs<sup>10</sup>**



This assessment identified supply chain inefficiencies that hinder access to affordable NCD medicines and technologies. The assessment took place between December 2019 and June 2020, with data collection in January-February 2020 in six regions: Greater Accra, Ashanti, Volta, Bono, Northern, and Upper West Regions. The assessment found critical bottlenecks across supply chain functions, financing, and policies.

Given Ghana's commitment to implementing UHC, which by Ghana's definition implies all people living in Ghana should have timely access to high-quality health services irrespective of ability to pay at the point of use<sup>11</sup>, this assessment was timely. At the drafting of this report, evidence from the global COVID-19 pandemic identifies people living with noncommunicable diseases (NCDs), such as hypertension and cardiovascular disease, diabetes, respiratory diseases, cancer, as well as neurological health conditions and those with compromised immune systems, are at higher risk of severe complications or dying from COVID-19. The COVID-19 crisis has thrust NCDs into the spotlight and underscores the need for public health supply chains to become more responsive to the needs of PLWNCDs.

These findings inform recommended interventions to make the NCD supply chain more responsive, efficient, and effective, thereby improving supply security for PLWNCDs in normal and exceptional times.

<sup>10</sup> PATH. Ghana NCD Landscape Assessment. Seattle: PATH; 2020.

<sup>11</sup> <https://www.moh.gov.gh/ghana-finalising-roadmap-towards-uhc/>

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## 2. Assessment methodology

The assessment goal was to identify the supply chain pathway for NCD-related (diabetes, hypertension, and breast cancer) medicines by completing an end-to-end NCD supply chain assessment to inform the Ministry of Health and GHS on future actions to strengthen supply security. Specific objectives included:

- Map the journey of the tracer medicines from time of manufacture, importation where applicable, and procurement to the time of dispensing to patients for consumption through batch tracking of specific consignments in the public, faith-based, and private sectors.
- Define timelines for the journey of the tracer medicines received from manufacture, importation, and procurement through the various processes and levels of health care up to the time of dispensing for patient consumption within the last 12 months.
- Document cost escalators including price markups as the tracer medicines move from regional to district, and sub-district levels.
- Assess availability and functionality at the service delivery points of select diagnostic equipment for NCDs and associated consumables. Functionality is defined as equipment turns on and has been used in the last week. If a consumable is required, it is available and not expired.<sup>12</sup>
- Identify any inefficiencies in the supply chain management systems at all levels in the last 12 months to determine barriers to access of the tracer medicines.

Using qualitative and quantitative data from 84 sites and 112 interviews with key informants the assessment team explored supply chain processes, challenges, bottlenecks, and gaps as well as best practices experienced at all the levels. Key informants included operations managers, procurement officers, storekeepers, pharmacists (public and private), matrons, and laboratory in-charges working within the supply chain process for the selected tracer items. At the national level, the interviews focused on areas of manufacture, importation, customs clearance, and regulatory requirements. At the regional level, interviews focused on the roles and responsibilities of the regional and district health team for order processing, supply management, and consumption reporting. At the service delivery points—hospitals, health centers, and retail pharmacies—the interviews focused on supply systems and processes, timeliness of deliveries, stockouts, and logistical aspects of medicine movement.

Quantitative availability and supply data were collected from physical or electronic stock-keeping records, dispensing records, requisition records, order processing records, and delivery notes to verify and reconcile distribution and receipt delivery documents cascading down the supply chain system at all levels. Stock on hand data for medicines were collected and verified at the health facility level to determine the stockout rate on the day of visit. Timelines and unit price data were collected at every level to analyze lead times<sup>13</sup> and markups along the supply chain.

Six regions were selected purposively in consultation with the GHS NCD Program based on prevalence data, distribution data, country representation, and accessibility. Within each region, between 12-15 sites were purposively selected and assessed or interviewed including the regional medical stores, public hospitals, private and faith-based hospitals, health centers, private sector pharmacy outlets, and private wholesalers/distributors. Key informants were also interviewed at the

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<sup>12</sup> Functionality is defined as equipment turns on and has been used in the last week. If a consumable is required, it is available and not expired.

<sup>13</sup> Lead time is the total time from when an order is placed to when the product is delivered and received.

GHS Supplies, Stores and Drugs Management Division (SSDM). Table 1 summarizes the distribution of facilities by type included in the assessment sample. The actual number of sites visited varied slightly, depending on willingness to meet with assessors and information learned during the assessment.

**Table 1: Assessment sites visits**

Sector	No.
National level	
GHS Supplies Stores & Drugs Management Division	1
Local wholesalers/manufacturers	2
Subnational level (in each of 6 regions selected)	
Regional Health Directorate	6
Regional medical stores	6
Regional hospitals	6
Public district hospitals	14
Quasi-government hospital	3
FBO/CHAG hospital	6
Private hospital	6
Public health centre	14
Private sector retail pharmacy	18
Local wholesalers	2
<b>Total assessment sites visited</b>	<b>84</b>

The tracer products for the assessment were selected in consultation with the GHS NCD program and guided by standard treatment protocols for common NCD conditions in Ghana. They include six medicines in different strengths and eight diagnostic products (equipment and consumables) as listed in Table 2. Because insulin, which requires cold chain between 2° – 8° C, was one of the medicines selected as a tracer product, cold chain equipment and temperature monitoring practices were also assessed.

**Table 2: NCD tracer products assessed**

Category	Class	Product name and strengths
Hypoglycemic	Biguanide	<b>Metformin tablets 500 mg, 850 mg &amp; 1,000 mg</b>
	Hormone	<b>Intermediate-acting Insulin 30/70 premixed solution</b>
Antihypertensive	Calcium Channel Blocker	<b>Amlodipine tablets 5 mg &amp; 10 mg</b>
	Diuretic	<b>Bendroflumethiazide tablets 2.5mg** &amp; 5mg</b>
Antiestrogen	Estrogen receptor antagonist	<b>Tamoxifen tablets 20mg</b>
Antiasthma	Bronchodilator	<b>Salbutamol Inhaler, 100 microgram/metered dose, 200 doses</b>
Diagnostic	Medical equipment	Glucometer
	Test strip	Glucometer strips
	Medical equipment	Blood pressure device
	Test strip	Urine strips
	Medical equipment	A1C analyzer
	Reagent	A1C analyzer reagents
	Medical equipment	Weight scale
	Medical equipment	Heightometer

\*Bolded medicine strengths are those that are included in the 2018 NHIS Medicines List

\*\* Bendroflumethiazide and Bendrofluazide are used interchangeably in this document

## 2.3 Limitations

During the assessment, the team encountered some challenges in collecting the data needed to meet all the assessment objectives.

- Insufficient 2019 data were available to present findings on frequency and duration of stockouts over the last 12 months due to poor data archiving at health facilities.
- Financial data were difficult to obtain, especially pricing data from the regional medical stores, private pharmacies, and private facilities. These data were more accessible at the public health facilities.
- Information on procurement and contracting processes was not available from the public sector because of the new framework contracts being implemented. The private sector was not willing to share these data either. The private sector wholesalers did not have such data available at the regions
- The private sector did not consent to respond to all questions posed by the interviewers.



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## 3. Findings

### 3.1 NCD service delivery in Ghana's public health care system

Ghana's health care system is made up of private, public, traditional, and alternative medicine practices. The Ministry of Health is responsible for policy formulation and provides direction and supervision to its agencies. Service delivery is a three-tier system, comprising district (primary), regional (secondary), and national (tertiary) levels. District health services are further organized into three levels: community-based health planning and services (CHPS) zones, sub-districts (health centers and health posts) and district (district hospital and district health directorate). The Non-Communicable Disease Program (NCDP) is in the Disease Control Department of the Directorate of Public Health within the Ghana Health Service. Service delivery for NCDs is guided by the different capacities at each service delivery level for dealing with different NCDs based on policies, level of care, and expertise available. There is a policy guiding referrals between the different levels, but it is not functioning well because all levels provide primary care for diabetes and hypertension. Cancers such as breast cancer can be suspected at any level but are referred to teaching hospitals for diagnosis and treatment.

### 3.2 Overview of the NCD supply chain in Ghana

There are multiple actors and influencers that impact the three distinct health supply chains that distribute NCD supplies in Ghana. The public, FBO, and private supply chains are described in the sections that follow.

#### 3.2.1 Public sector supply chain

Ghana's public health supply chain has the support of many partners, including Gavi, The Global Fund, the United Nations Population Fund, UNICEF, the United States Agency for International Development (USAID), and the World Bank, as well as technical assistance partners and projects. In the past decade, a series of important initiatives were implemented to strengthen an integrated system for managing essential medicines and diagnostics. Products are supplied to health facilities through a network of public regional medical stores supplied by a combination of local manufacturers and wholesale distributors of international manufacturers. Health facilities may procure directly from the private sector when the public supply chain cannot fill their order.

In 2010, the GHS published an updated SOPs Manual for the Logistics Management of Public Sector Health Commodities in Ghana<sup>14</sup>. It describes in comprehensive detail the organization, responsibilities, tools and procedures for the tasks and activities involving commodity resupply, inventory management, logistics information records and reporting, quality assurance and system monitoring, including key performance indicators.

In 2012, an ambitious Health Commodity Supply Chain Master Plan (SCMP) was formulated and finally launched by the MOH and GHS in 2015. The five-year plan aimed to address all health

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<sup>14</sup> John Snow, Inc/DELIVER. 2010. *Ghana: Logistics Management of Public Sector Health Commodities, Standard Operating Procedures*. Arlington, Va.: USAID | DELIVER PROJECT, Task Order 1 and Task Order 3.

commodities except immunization vaccines and supplies, and lays out a set of guiding policies, along with nearly 50 strategic interventions and associated implementation plans to address system weaknesses in the following areas:

1. Organization (institutional capacity and roles) and coordination; human resources and supervision
2. Financing, resource mobilization, and commodity pricing
3. Procurement
4. Policy, legal, and regulatory environment
5. Distribution - storage, inventory management, transport, and waste management
6. Information systems and processes
7. Quantification and product selection

In the ensuing years, some of the strategies have been achieved (e.g. the implementation of GhILMIS), while others have not (e.g. direct delivery to all health facilities). The MOH and GHS are currently working with partners to update the master plan focusing on the next five years, and there are plans to fully roll out the GhILMIS to health facilities that still report and order using paper forms.

### **3.2.1.1. Framework contracts**

Procurement is implemented by Budget Management Centers (BMCs) which can be health facilities, districts, regions, and the central level of the Ghana health system. This decentralized financing strategy results in a fragmentation of the supply chain's procurement function and huge variations in scale and costs. In response, the MOH/GHS has implemented framework contracts (FWC), a strategy aimed at pooling procurement resulting in high-quality and cost-effective essential medicines of critical importance to the health system, under the leadership of the Director of Procurement (MOH) and Director GHS SSDM. The list of 56 medicines included in FWCs includes all assessment tracer drugs (except for Salbutamol and Tamoxifen) as well as other hypertension and cardiovascular disease medicines. In 2020, the list was expanded to 66 priority medicines. Through strategic implementation of FWCs, the MOH/GHS hopes to achieve medicine standardization, availability, accessibility, and affordability for the public sector.

A joint MOH/GHS and USAID Global Health Supply Chain Program- Procurement and Supplies Management project (GHSC-PSM) monitoring visit to a sample of RMSs in November 2018 identified priority areas for improving the implementation of FWCs. They reported a high median order placement compared to forecast quantities ranging between 45-77.8%, yet one RMS performed at 100% and another was as low as 1.7%. While one RMS experienced supplier order fill rates (OFR) of 71.1%, the rest ranged between 15.7% and 50%. Sixteen companies made up the pool of suppliers with FWCs and five performed at less than 30% OFR. Five suppliers recorded lead times greater than 60 days<sup>15</sup>, which is excessive for local manufacturers with existing contracts and does not represent quality service.

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<sup>15</sup> MOH/GHS. 2018. *Report on Framework Contracting Monitoring Exercise*. Ghana.

The MOH/GHS is working to improve the implementation of FWCs to achieve strategic profit margins that help sustain supply chain operations, increase commodity availability, and help contain costs for the NHIA. The strengthened approach aims to ensure that the public sector supply chain has more than one source of supplier under framework contracts for each product, and that the implementation of the framework contracts is responsive to regional needs and includes reasonable pricing of the full availability of quality medicines for PLWNCDs. It will be important to systematically monitor the performance of RMSs, manufacturer and supplier performance, and to address gaps in a strategic and productive manner that avoids repeats of the problems experienced by both manufacturers and the MOH in the past. Well implemented framework contracts have the potential to greatly improve the availability of NCD medicines and lower their price in the public sector.

### **3.2.1.2. Ghana Integrated Logistics Management Information System**

Supply chain data within the public sector supply chain are recorded and reported in the GhILMIS, a digital platform used by RMSs and regional and district hospitals. GhILMIS supports inventory management, and order preparation, processing, and fulfillment as documented in the SOPs for all health products, including NCDs, managed by the Ghana Health Service for public health facilities. The GHS plans to deploy GhILMIS to health centers beginning with Northern and Upper West regions beginning in April 2020 and to extend GhILMIS to CHPS facilities in 2021, with the technical support of Chemonics and funding from USAID. This is a major opportunity to support health facilities with tools that will facilitate sound logistics management practices and data-driven supply chain decision making for all health commodities, including NCDs, at all levels of the supply chain.

### **3.2.1.3. Last Mile Delivery Programme**

The Last Mile Delivery Programme (LMD) is one of the initiatives implemented by the GHS to improve access to health commodities and supplies including medicines. This program delivers orders to health facilities according to an agreed schedule that supports the cyclical order and delivery needs of the supply chain, ensures health facilities receive orders in a timely manner, and allows health facilities to plan orders according to a routine schedule and a specific calculation methodology. The Global Fund covers the costs of the LMD in most regions, with some regions funding the costs themselves. The deliveries are for all essential health commodities, including those for NCDs.

The LMD delivers medicines to all public hospitals, FBO and quasi-government hospitals, and some health centers. Most last mile deliveries for health centers, dispensaries, and CHPS facilities are delivered to the District Health Directorate (DHD), requiring lower-level facilities to pick up their orders at the DHD.

### **3.2.2. Faith-based organization sector supply chain**

Procurement for FBO health facilities that are members of the Christian Health Association of Ghana (CHAG) is through a pooled procurement program (PPP) that is designed to obtain volume discounts from suppliers by pooling demand for health products and medicines. The PPP has contracts signed with selected suppliers that all CHAG facilities can procure medicines and products from. CHAG facilities primarily procure their medicines and products through the PPP and when they are not able to get full orders, the facilities have the option of ordering from the public RMS or directly from private suppliers. CHAG health facilities manage their inventories using other digital platforms such as the Health Administration Management Information System (HAMS) or ELIPSE, which do not interoperate with GhILMIS and have different functionality.

### 3.2.3. Private sector supply chain

In the private sector, private health facilities and pharmacies procure most of the tracer products from local distributors for international manufacturers, paying market rates, and receive direct delivery to their facilities within a few days if the distributor has the product in stock. Private retail pharmacies procure from distributors or directly from manufacturers, and select their suppliers based largely on quality, affordability, reputation, pricing, brand, and demand for the products in markets. Suppliers with flexible terms of payment and who extend credit were highlighted by one of the 17 pharmacies assessed. To operate in Ghana, all suppliers must register with the Ghana Food and Drug Authority (FDA).

Within the private sector, we assessed availability of medicines, order and procurement processes, and the availability of SOPs at private pharmacies. Among private pharmacies, 12 out of the 17 pharmacies reported getting 100% of orders fulfilled, two pharmacies reported getting 80% of orders fulfilled, and one each received 90% and 70% of their orders. Facilities not receiving complete orders indicated that this was largely due to either stockouts at the supplier end or their own indebtedness to the supplier.

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Only 5 out of the 17 (29.4%) private pharmacies had SOPs for inventory management and disposal of expired drugs.

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Public and FBO health facilities reported strong order fill rates from private sector suppliers with 92.8% receiving orders in full. Of those facilities reporting high order fill rates, 2 were district hospitals, 2 FBO hospitals, 5 health centers, and 4 private hospitals. Regional and quasi-government hospitals did not answer this question.

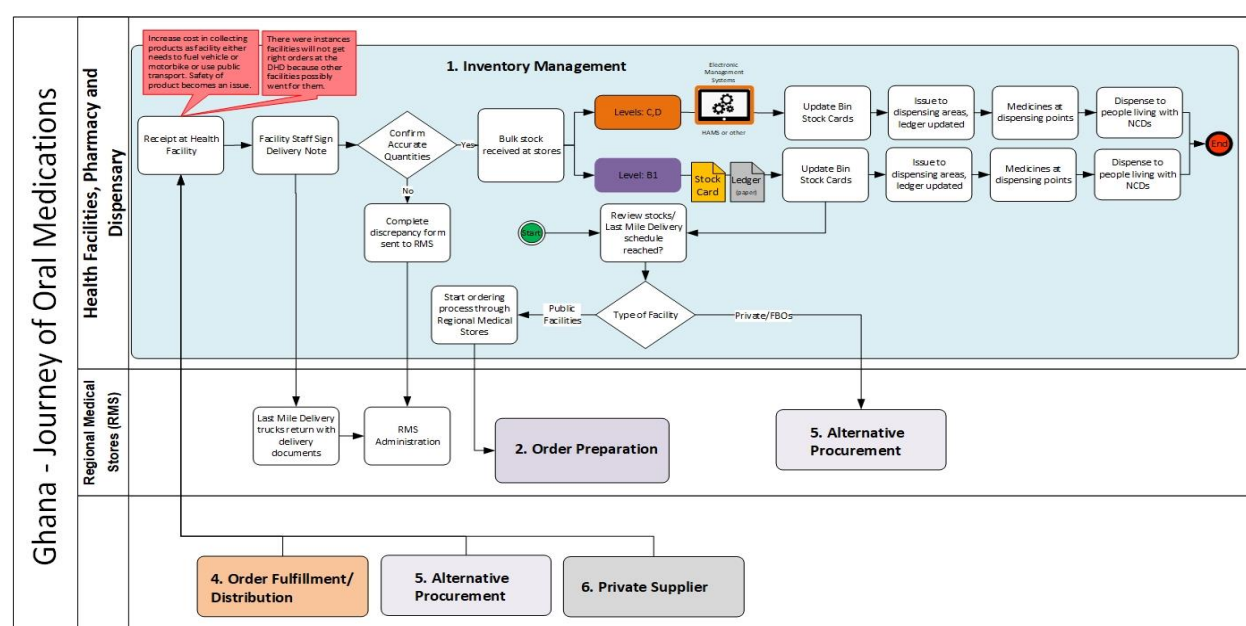
## 3.3 The journey of the pill

The supply chain assessment findings are summarized in a series of process maps prepared from the results of interviews at all levels of the supply chain which illustrate the steps, time required, strengths noted with green flags and opportunities for improvement noted with red flags we identified from the qualitative interviews conducted during site visits. The discussion on our findings is complemented by information available on the design of the Ghana integrated health commodities supply chain tools, policies, and procedures documented in the GHS SSDM's *Logistics Management of Public Sector Health Commodities in Ghana, Standard Operating Procedures, June 2010*, herein referred to as the SOPs.

### 3.3.1. Inventory management

The following process map outlines all the steps in inventory management from receipt of the product to dispensing NCD commodities to people living with NCDs. Instructions for conducting these steps are well documented in the SOPs which provide guidance on how to receive deliveries, issue commodities within a facility, record dispensing data, monitor the quantities of stock on hand (stocktaking), assess stock status (knowing how long the quantities you have will last), store health commodities, protect them against damage and theft, as well as how to conduct a visual inspection for quality assurance. Each above-cited inventory management task has an accompanying job aid.

**Map 1. Inventory management (full page version available in the appendices)**



The assessment confirmed that products are delivered directly to hospitals while lower-level health facilities need to arrange transportation to pick up their health commodities from the DHD, where they are dropped off. There have been instances of a health facilities' order being picked up by the wrong health facility.

The assessment observed a wide variation in how inventories were managed at health facilities. Health care workers had inadequate training and support to effectively manage inventories and order NCD products. Despite the existence of operational policies standardizing health facility supply chain management processes, only 42% of all health facilities visited had SOPs for inventory management and disposal of expired drugs, 31% had SOPs for forecasting and quantification. Only 35.5% of health facilities used electronic systems for stock management and dispensing, including all FBO hospitals, and half of all regional hospitals, quasi-government hospitals, and private hospitals, while only 25% health centers used an electronic system (Excel) but only for dispensing.

From the qualitative interviews, storage capacity constraints were a challenge at many facilities that impacts supply chain management. Limited space resulted in challenges with implementing the SOPs and ordering up to the established maximum stock levels. Reduced order quantities created a need to order more frequently, increasing the risk of stockouts and emergency orders. More frequent orders outside the established delivery schedule increase transaction costs putting additional strain on human resources, creating exceptions that need to be managed outside a standardized system, and increase transportation needs. It contributes to unbalanced stock levels and complicates quantification at all levels. Some facilities will wait until the next order cycle, living with the stockouts. Non-standardized operations at health facilities complicate the job of the supplying RMSs, that then do not stock enough to fulfill a complete order. To mitigate this, the facilities that can, will order large quantities from the open market.

Over the last decade, the SSDM, with financial and technical support from partners, has invested significant resources in strengthening the systems and capacity of supply chain staff that are the foundation of the integrated health commodity supply chain. Comprehensive SOPs and tools exist in the Ghana health system and the largest health facilities operate an electronic logistics management system called the GhILMIS.

### 3.3.2. Order preparation

The Ghana system design, as documented in the SOPs, operates from the principle that health facilities set a maximum stock, a reorder quantity, and an emergency order point for each product using average monthly consumption calculated using the last six months of dispensed-to-user data. This exercise should take place every six months, allowing the supply chain to adjust to the changing needs of the population and health system. This feature is very important for NCD commodities given the routine resupply needs for patients dealing with chronic conditions as well as the likely increase in consumption as NCD programs reach more people in a more consistent way. A copy of the Worksheet for Setting Maximum and Re-order levels and Emergency Order Point is found in the Appendices.

The main challenge with the documented reorder calculation methodology for NCDs and other “non-full supply” medicines, is that it does not appear to provide guidance for how to adjust the rate of consumption for days out-of-stock. The job aid for setting maximum reorder levels states on page 52 of the SOPs, “Divide the Total Dispensed Past 6 Months (column A) by the number of months for which you have data, and write the answer in column B. If you have six months data, divide column A by 6; if you have 5 months’ data, divide column A by 5, and so on.” If there have been significant stockouts during the last six months, unless the stock manager adjusts for lack of availability (or unmet need) orders are based on what was dispensed, not true need, perpetuating a cycle of insufficient supply, and not reporting true demand up the supply chain.

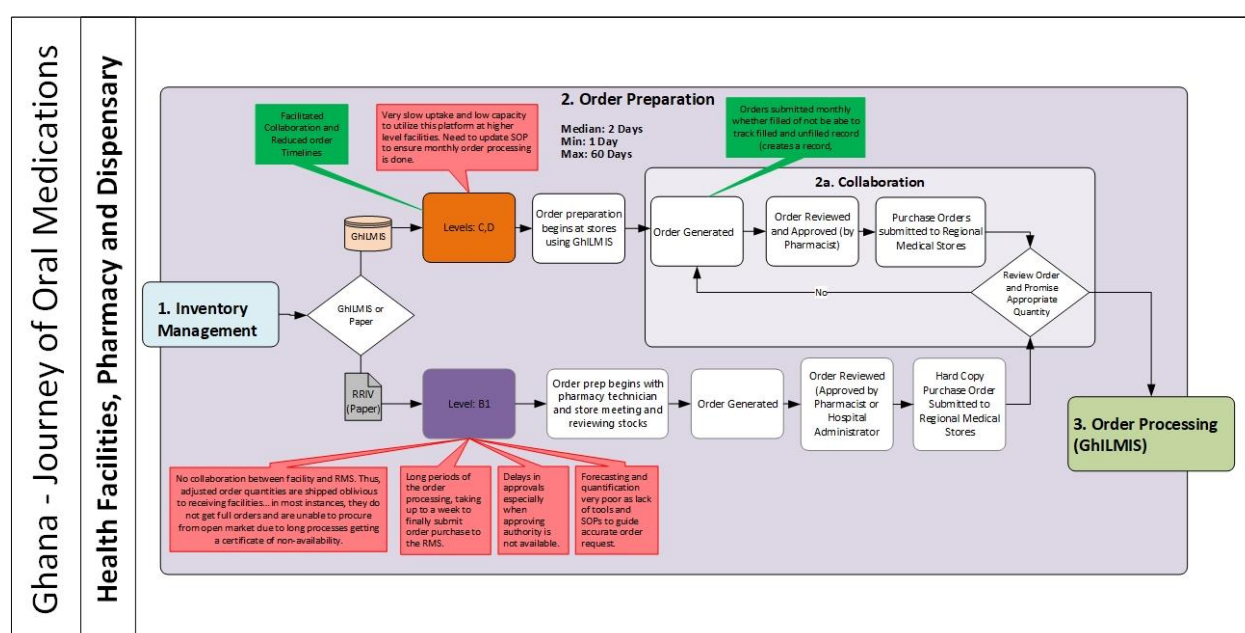
The SOPs outline the tasks and activities supported by worksheets and all the LMIS forms and accompanying job aids needed for routine ordering. The system was thoughtfully developed and applies a standardized approach to all health commodities, supported by the well-designed Requisition, Issue and Receipt Voucher (RIRV) that serves the dual purposes of supporting ordering and serving as an information system at once. A copy of the RIRV is found in the Appendices.

From the assessment, the routine order and reporting cycle for all health facilities was monthly and facilities ordered up to a maximum of three months of supply only when they have reached the reorder quantity for that product. Given the formulas, the frequency of resupply of an NCD product would be approximately every two months, unless consumption was increasing steadily, in which case they would be likely to reach their reorder quantity monthly, resulting in the possibility to submit more frequent orders for that item and avoid a stockout. Because the RIRV is also a supply chain report, even if a medicines quantity to order is “0,” essential logistics data are still required to be reported monthly, providing consumption and stock on hand data visibility to upper levels of the supply chain.

Since the SOPs were published, Ghana has embarked on automating and integrating its information system. This is still a work in progress, with some health facilities ordering online and others submitting monthly orders on the paper RIRV.

Our assessment visits identified some strengths and various red flags with how order preparation is currently being implemented. The GhILMIS facilitates collaboration between supply chain actors and reduces order processing timelines. Nonetheless, the district and regional hospitals (Levels C) were having difficulty using the GhILMIS platform and needed to be more consistent in implementing the tasks and activities that will result in its proper use monthly. In Upper West and Northern regions, we found hospitals that received hardware that needed installation and others who were not using the GhILMIS because they had not yet been trained.

**Map 2. Order preparation (full page version available in the appendices)**



The health centers (B1 (no doctor) and B2 (with doctor)) and lower-level facilities operated the same system using paper records and manual RIRV forms to report logistics data and place orders from the RMSs, where the data are entered into GhILMIS prior to fulfilling the order. Because they operated from paper tools, health centers had no visibility into the order adjustments that happened at the district level until they received their order. Also, order processing time is longer for those working from paper, as the clerks at the RMS needed to enter data into GhILMIS for processing and submission. While these facilities managed fewer products, they often had fewer staff as well, and will greatly benefit when they have access to the system via automated GhILMIS tools.

There was poor awareness and availability of the tools needed to implement the Ghana SOPs at the health centers visited. The assessment found that personnel at both facility and district level lacked adequate training and tools to determine routine order quantities or to estimate their annual needs for budgeting and procurement planning. These same gaps were noted in the SCMP in 2012. The inconsistent application of the SOP methodology (which requires updating average monthly consumption every six months), manual order calculations at lower levels, and the insufficient training in the use of the GhILMIS at the various hospitals results in a non-standardized resupply methodology. In the end, unreliable data are reported through the system, complicating the ability to forecast future annual commodity and financial requirements.

The current difficulty being experienced in implementing a standardized, routine order and reporting system at the health facility level, whether paper-based or electronic, complicates the quality of logistics data needed for forecasting, financing, and procuring the essential NCD and other health commodities that the Ghana public sector needs to deliver. Quality logistics data are essential to achieving improved commodity security.

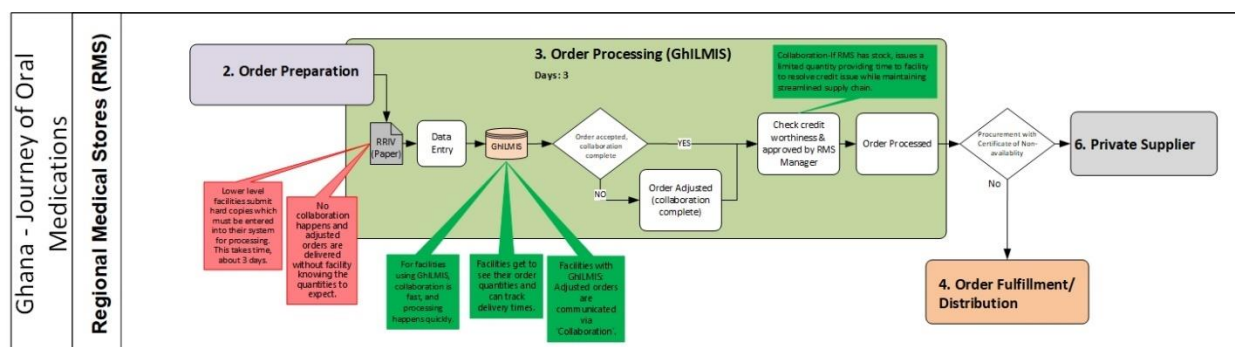
*"We have challenges with forecasting because we do not have data. Also, getting data from the private sector is a big challenge. Sharing their data is very difficult and this is the responsibility of the district health directorates to talk to the private sector to share their data. The GhILMIS is a tool for forecasting and quantification but has been rolled out only to the regional and district levels, and...not all facilities are using it. On ordering, the facilities are supposed to prepare worksheets which is used to supply minimum and maximum quantities. But the challenge is most facilities do not have or use worksheets. Therefore, the quantities we get at the RMS are not guided by any data when ordered."* **GHS SSDM**



### 3.3.3. Order processing

In the public sector, 10 regional medical stores operate under regional health administrations (RHA) and source<sup>16</sup> NCD products from local or international suppliers either directly or through framework contracts established by the MOH and managed by the GHS SSDM. Public health facilities—regional and district hospitals, health centers (HC), and health posts—order NCD products from the RMS in their region. The steps in order processing are documented in Map 3, below.

**Map 3. Order Processing (full page version available in the appendices)**



Public sector facilities must procure from RMSs. When the RMS is unable to fulfill an order, the health facility or its subdistrict or DHA is allowed to source directly from approved suppliers under the framework contracts, but first they must receive a Certificate of Non-availability from the RMS. However, the process of obtaining the certificate can be slow for facilities not implementing the GhILMIS, which has automated this process, further delaying access to the product, increasing the risk of or duration of a stockout, and compromising patient health. Facilities use funds from their revolving drug fund account for these purchases. Approved suppliers charge health facilities the price negotiated under their framework contracts with MOH and provide direct delivery if they have the requisite product in stock. If these suppliers are unable to supply the product, health facilities' last option is to procure from the open market, but at considerable risk of paying higher prices and/or receiving medicines lacking the quality assurance provided by the RMS and required by the framework contracts. We found some health facilities stocked products that could only be procured from the private market or referred their patients directly to retail pharmacies.

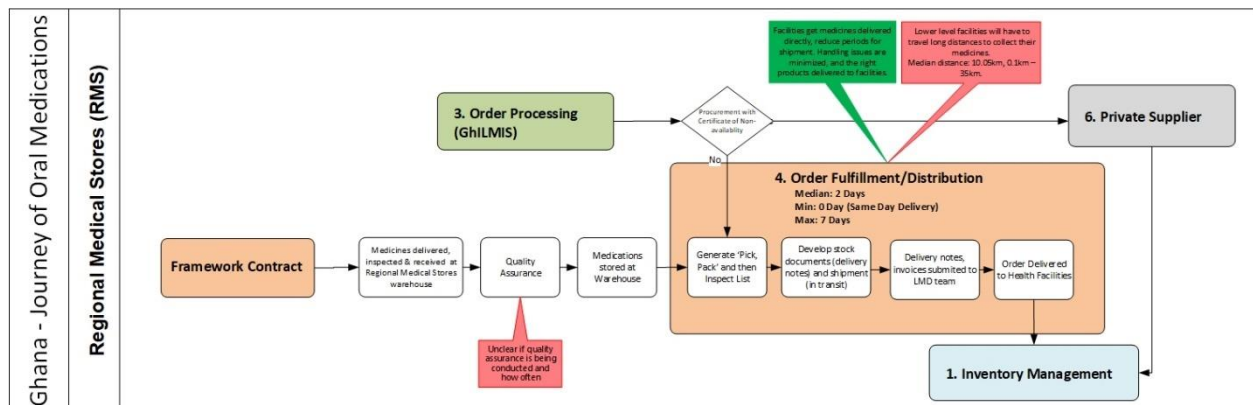
For the facilities using GhILMIS, the two-way data visibility provided by the system has increased collaboration and resulted in quick order processing time. Certificates of non-availability, which allow them to source outside the RMS, are approved electronically. In addition, they can see their order quantities, know what adjustments have been made, and can track delivery times. For those facilities not yet operating online, order processing takes longer (about three days) and the order quantities delivered often come as a surprise, since they do not know what was approved or supplied until it arrives.

<sup>16</sup> RHAs issue tenders and manage procurements based on input from their RMS.



### 3.3.4. Order fulfillment

**Map 4. Order fulfillment (full page version available in the appendices)**



The RMS receives its medicines from suppliers who hold framework contracts. It is unclear what the frequency or process for quality assurance is. It takes an RMS a median of two days to pick and pack an order. The LMD delivers medicines to all public hospitals, FBO and quasi-government hospitals, and some health centers. The average lead time (number of days from order placement to delivery) at LMD facilities is two days  $\pm$  1.5, with a range of 0 (same day delivery) to a maximum of seven days. These delivery lead times show the benefit of a responsive supply chain that delivers products to their clients, the health facilities. The LMD program helps to minimize lead times and ensures quick access to the clients of the supply chain served by the LMD.

“Last mile delivery system saves cost and time for facilities, making sure tracer medicines are available at facilities...drugs are carried to the doorstep of facilities (regional and district hospitals) this saves time for the facilities.” ***Regional Health Directorate, Upper West***

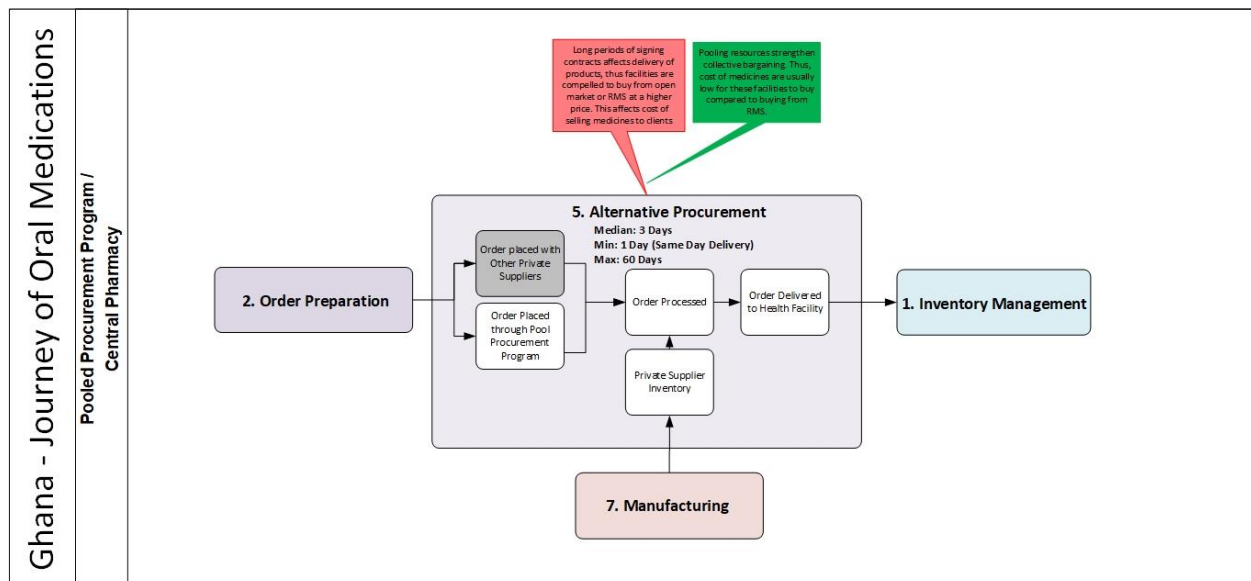
Most health centers and CHPS facilities are not directly served by the LMD and as a result, have a longer delivery lead time. RMS pack facility-specific consignments, which the LMD trucks deliver to the appropriate DHDs. The DHD holds these consignments for pick up by health facility staff at the facility's own cost.<sup>17</sup>

The assessment found that the average distance from health centers to their DHD is 10 km, ranging from 0.2km to 35km. Lead time is typically one day from time of submission of purchase orders to arrival at facilities unless transport is impeded due to road conditions or other issues or the facility needs to clear its debts.

<sup>17</sup> The Ghana Health Commodity Supply Chain Master Plan 2015-2020 envisioned providing direct delivery to all health facilities but left it to regions to determine how that would be accomplished. Not all regions have implemented last mile delivery.

### 3.3.5. Alternative procurement

Map 5. Alternative procurement (full page version available in the appendices)

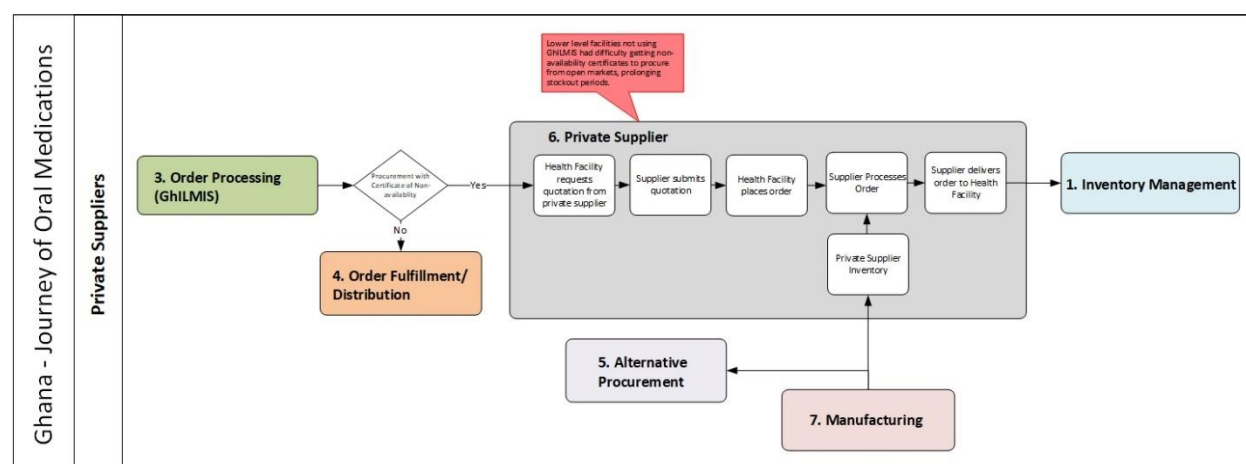


Map 5 describes how FBO facilities that are members of CHAG procure medicines and products. They are primarily resupplied through a PPP where they order from suppliers under contract that in turn deliver to the health facility. Pooling the needs and resources of the different FBOs strengthens their collective bargaining capacity, enabling procurement economies of scale, resulting in lower prices for their facilities compared to buying at the prices extended to the individual FBOs by the RMS or other private sector suppliers. However, the length of time it takes to sign contracts for the PPP can delay the availability of products, compelling FBOs to order from their RMS or open market at higher prices, which impacts the cost to patients. If the medicine is not available at the RMS, a certificate of non-availability is issued to the health facility, creating the possibility for alternative procurement from another source of supply. A contracting mechanism exists between CHAG and the suppliers for alternative procurement, which is supposed to be exceptional. The necessary lead time for the new procurement process and contracting by the health facility is reportedly short with competitive procurement prices.

The Seventh Day Adventist affiliated hospitals operate a different model, which includes a central pharmacy that supplies their hospital network's health commodity needs. When the central pharmacy cannot fill an order, 7<sup>th</sup> Day affiliated hospitals have the option of leveraging CHAG's PPP or ordering from an RMS.

### 3.3.6. Private suppliers

Map 6. Private suppliers (full page version available in the appendices)



In the event an RMS cannot fill an order for a product received from the public and FBO facilities, the RMS issues a certificate of non-availability to the health facility, allowing alternative procurement from another source of supply, as outlined in Map 6. Lower-level facilities reported long delays in getting non-availability certificates. Because no contracting mechanism exists for alternative procurement, which is supposed to be exceptional, the necessary lead time for the new procurement process and contracting by the health facility often results in delays in availability and higher costs on the open market.

*“Some regions pay on time others do not, [we] will prioritize and deliver immediately to regions who pay their bill. Ashanti in particular pays on time.” **Local pharmaceutical manufacturer representative***

### 3.3.7. National NCD commodity needs forecasting and procurement

Forecasting national NCD commodity needs is essential to inform annual and medium-term financing, procurement, and delivery of health products. Accurate, complete, and timely data on NCD services (morbidity), commodities (consumption) from the facility level, stock available throughout the supply chain, and information on program policies, plans, and budgets at the national level are necessary to conduct a reliable forecast, quantify consolidated needs for inclusion in tenders and supplier framework agreements, and identify commodity funding gaps. The assessment found that forecasting for NCD medicines at both the health facility level and at regional and national levels is problematic in part due to gaps in the availability, reliability, and timeliness of consumption and morbidity data. The health facilities are not using the established ordering methodologies and tools (GhILMIS) because staff are poorly trained in their use.

RMSs and teaching hospitals are responsible for generating forecasts using consumption and service data that are consolidated into tenders for FWCs. At the central level, the MOH coordinating committee which includes key program stakeholders, partners, and different sectors, provides oversight of the quantification process for Global Fund program area (HIV/TB/Malaria) commodities. The NCD program has not previously participated in this committee and NCDs have not been the subject of review.

The above challenges with NCD supply chain leadership and forecasting NCD needs present an opportunity to leverage the NCD demand forecasting methodology being developed by the Coalition

for Access to NCD Medicines & Products to produce a five-year financial needs forecast for hypertension and diabetes medicines for PLWNCDs.

The Ministry of Health's Entity Tender Committee and the National Steering Committee are responsible for the FWC tendering process with participation by the FDA, NHIA, Head of Pharmacy at the regional levels, and the Public Procurement Authority.

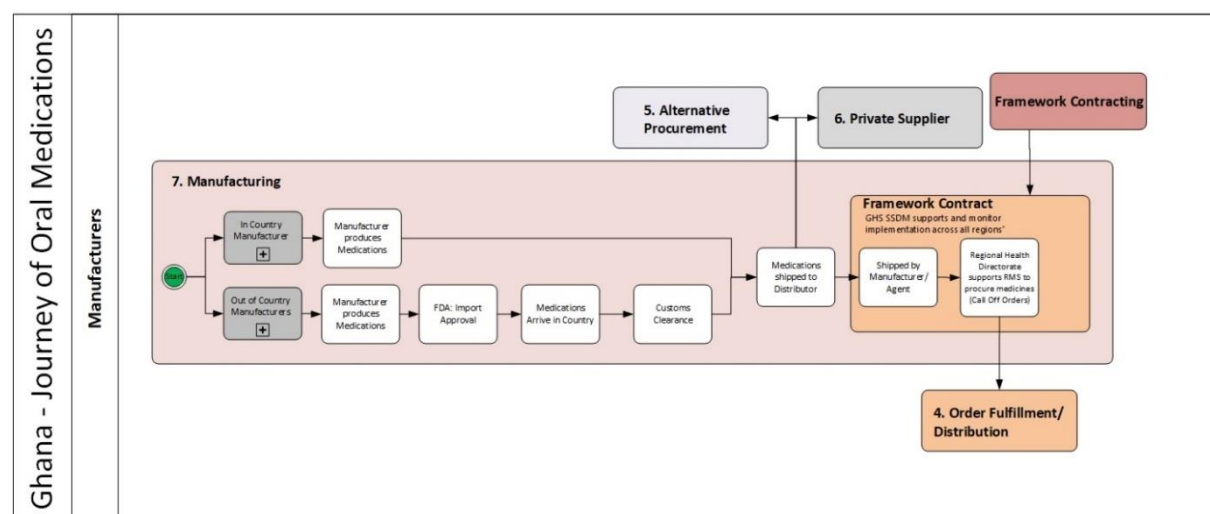
There needs to be alignment between NHIA and FWC pricing for the system to function sustainably. While FWC prices are determined by an interplay of market forces and economies of scale, the NHIA prices are often lower, requiring adjustments to align NHIA prices to FWCs, as well as negotiations with suppliers.

Delayed and non-payments to suppliers were identified as a critical issue that needs to be resolved to improve the performance and sustainability of FWCs and the supply chain. When regions are reimbursed by the NHIA for the medicines provided to patients of the health system with NHIS coverage, the regions often delay paying suppliers. The GHS has added an NHIA office at the SSDM headquarters to facilitate communication and improve coordination on debt servicing. There is also a directive on how facilities can use internally generated funds.

Some "compliant" regions that have successfully implemented the forecasting, ordering, and payment of FWC suppliers have reportedly begun to experience savings on their Drug Accounts. The SSDM intends to regularly monitor compliance with FWC operational policies and resolve bottlenecks that arise in regions that threaten the financial viability of the health commodity supply chain.

### 3.3.8. Manufacturing

**Map 7. Manufacturing (full page version available in the appendices)**



Except for insulin and tamoxifen, which are only available through local distributors of international manufacturers, all other tracer medicines are available through both Ghanaian and international pharmaceutical manufacturers. Both the local industry and wholesalers/distributors who carry NDC commodities from regional and/or international manufacturers compete for the public sector FWC tenders. Supplier performance is an issue the GHS hopes to improve in the current round for FWCs where they have awarded contracts to more than one supplier for each product, assigning a different percentage to each, thus reducing risk to the public sector supply chain.

When an RMS needs to resupply, the Regional Health Directorate (RHD) places an order from the existing FWCs for delivery from the supplier to the RMS. The SSDM conducts quality monitoring visits before suppliers deliver to the RMSs and teaching hospitals.

## 3.4 Supply chain human resources

The assessment found that the supply chain workforce continues to be a limiting factor to system performance. While this has been recognized in prior assessments and in the SCMP, staff attrition remains a significant challenge, and personnel who are posted and assigned supply chain responsibilities do not have the requisite training and expertise. Key informants reported that there has not been a significant recruitment of critical staff with expertise in supply chain since 2009. Today, 70% of supply chain staff are casual workers.

*The quantification problem is major at the lower-level facilities where we do not have staff with the right skills. Once they are trained, they travel, and no one stays or is interested in the supply chain issues.”*  
**Deputy Director, Pharmaceutical Services, Volta Region**

Interviews suggest that supply chain monitoring and supervision is a challenge to implement because of a small pool of staff skilled to conduct supply chain oversight responsibilities at the regional level coupled with limited resources for monitoring site visits to health facilities.

The June 2010 SOPs focused on strengthening support to supply chain human resources. The manual includes job aids on the topics of performance monitoring, supervisory visits, and a sample schedule of activities and deadlines for logistics activities based on scheduled delivery. In 2013, supply chain management pre-service training (PST) was reportedly introduced to ensure a sustainable pipeline of health workers trained in the Ghana logistics system. Since 2015, all students in nursing and pharmacy schools in Ghana receive PST in supply chain as part of the curriculum. According to the USAID|DELIVER Project final report, PST in supply chain management is offered at the pharmacy schools of the Kwame Nkrumah University of Science and Technology, the University of Ghana, Central University, 109 MOH-accredited nursing and midwifery schools, and four other health institutions.<sup>18</sup>

Despite a system strengthening strategy clearly aimed at resolving the challenging issue of insufficiently trained supply chain management human resources, findings from site interviews highlight this is still a major issue. In the introduction to the SOPs, the overarching principles of “self-monitoring” and “local empowerment teams” are used to explain why “most of the activities and tasks that are described in this manual are not assigned to specific individuals or job titles. Instead, each facility head, in consultation with his or her staff, will determine and designate which staff member(s) will perform each of the various tasks. These decisions will be based on the number and type of staff available, overall workloads, and other local factors. However, the commodity management activities and tasks must be implemented as outlined in this manual.”<sup>19</sup>

The last decade of supply chain systems strengthening achievements of donor-supported projects have allowed Ghana to build a best-in-class integrated health commodities supply chain system. Given the SOPs were developed in 2010, prior to the 2013 and 2015 investment by Ghana and its partners in PST, it is time to formalize supply chain management responsibilities in the job

<sup>18</sup> USAID | DELIVER PROJECT. 2016. *USAID | DELIVER PROJECT Final Country Report: Ghana*. Arlington, Va.: USAID | DELIVER PROJECT, Task Orders 4 and 7.

<sup>19</sup> John Snow, Inc/DELIVER. 2010. *Ghana: Logistics Management of Public Sector Health Commodities, Standard Operating Procedures*. Arlington, Va.: USAID | DELIVER PROJECT, Task Order 1 and Task Order 3.

descriptions of pharmacists, nurses, and midwives, the cadre of health workers who have been formally trained in the functioning of the Ghana public health supply chain. There is a need to reap a return on the investment that Ghana health schools are making building supply chain capacity in its human resources for health. In addition, a new partnership was announced in July 2020 between Kwame Nkrumah University of Science and Technology and Arizona State University to create the Center for Applied Research and Innovation in Supply Chain – Africa (CARISCA), which will serve as a “global center for training, generating, and translating supply chain management research and innovations into positive development outcomes for Ghana and across Africa.”<sup>20</sup> One of the goals of CARISCA is to significantly improve the efficiency and effectiveness of health care value chains.

Ghana’s experience with inclusion of health supply chain in health worker PST and the launch of CARISCA are important resources for finding sustainable solutions to the current challenges.

The GhILMIS presents an opportunity to strengthen supply chain performance monitoring in a more cost-effective way. Once fully rolled out, the GhILMIS should provide the SSDM, RMS, and facilities with supply chain management information to identify supply chain issues, policy needs, prioritize problem resolution, and target supervision and capacity building.

### **3.5 Availability of NCD tracer commodities**

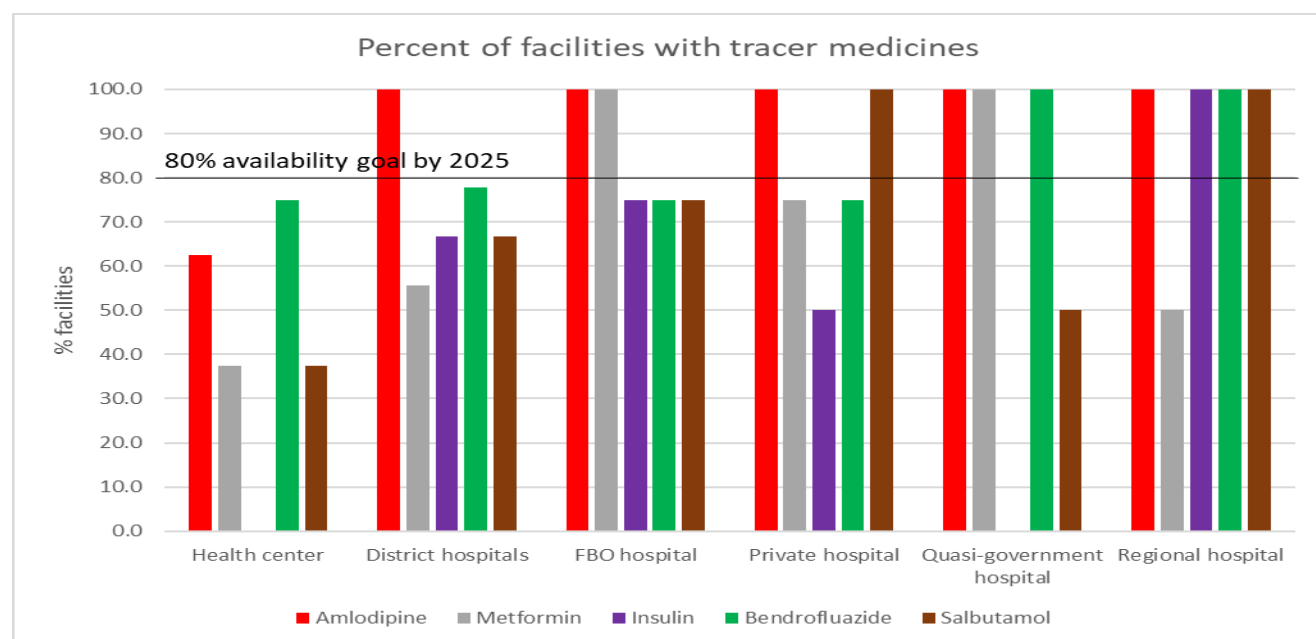
The Global NCD Action Plan sets a goal of an 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major noncommunicable diseases in both public and private facilities.

The assessment found a wide variation in medicine availability on the day of visit of the tracer medicines, with the availability of insulin uncommon at the hospitals and private pharmacies assessed, and Tamoxifen available in only some private pharmacies. Most tracer medicines were available at the appropriate level of care as specified in the NHIA Medicine List, although within the level of care availability varied at the health facilities (HFs) assessed (Figure 2). All tracer medicines, except Tamoxifen, are authorized for use at regional and district level hospitals, private and faith-based hospitals, although not all products were available on the day of visit. Some health centers also carried Amlodipine (mostly 10mg), Metformin, Bendroflumethiazide (mostly 2.5mg), and Salbutamol but HCs are not allowed to stock insulin or Tamoxifen. It is important to note that according to NHIA policy, Amlodipine, Bendroflumethiazide 5mg, and Salbutamol inhalers can only be stocked at B2 health centers that have a doctor on staff to prescribe them. This means the NHIA will not provide coverage for these medicines at the health center level, posing a financing policy constraint to provision of NCD care at the primary care level as part of UHC. This situation increases out-of-pocket costs for the time to travel to a district hospital. It is important to note that Insulin and Salbutamol, the two lifesaving drugs, were only fully available at regional hospitals. Tamoxifen is classified for use at the tertiary level hospitals, which were not part of our site sample selection. Patients screened for breast cancer are referred to the specialists at the tertiary level of care. The availability of tracer medicines at the RMSs varied across regions.

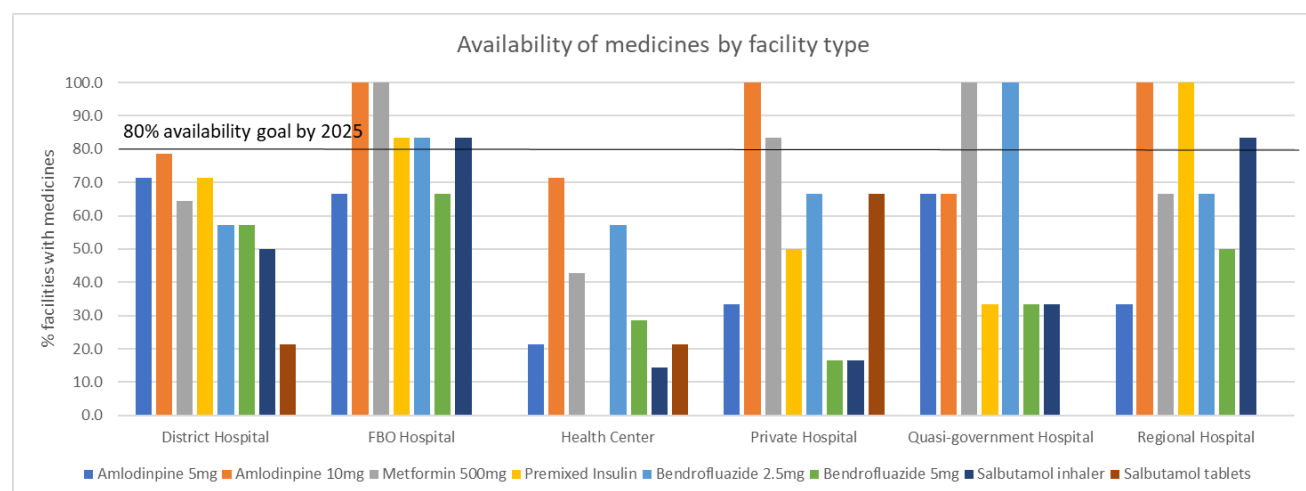
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<sup>20</sup> <https://www.usaid.gov/what-we-do/GlobalDevLab/BRIDGE-Train/carisca-fact-sheet>

**Figure 2: Availability of tracer medicines, irrespective of strength, at health facilities on the day of visit**



**Figure 3. Availability of tracer medicines, including strengths, at health facilities on the day of visit**



**Figure 4. Availability of tracer medicines, including strengths, at the RMS on the day of visit**

	Amlodipine 5mg	Amlodipine 10mg	Metformin 500mg	Metformin 850mg	Insulin vials	Bendro 2.5mg	Bendro 5mg	Salbutamol inhaler	Salbutamol Tablets
Ashanti	Available	Available	Available	Available	Available	Available	Available	Available	Available
Bono	Available	Available	Available	Available	Available	Available	Available	Available	Available
Northern	Available	Available	Available	Available	Available	Available	Available	Available	Available
Upper West	Available	Available	Available	Available	Available	Available	Available	Available	Available
Greater Accra	Available	Available	Available	Available	Available	Available	Available	Available	Available
Volta	Available	Available	Available	Available	Available	Available	Available	Available	Available

**Key**

Available (Blue)

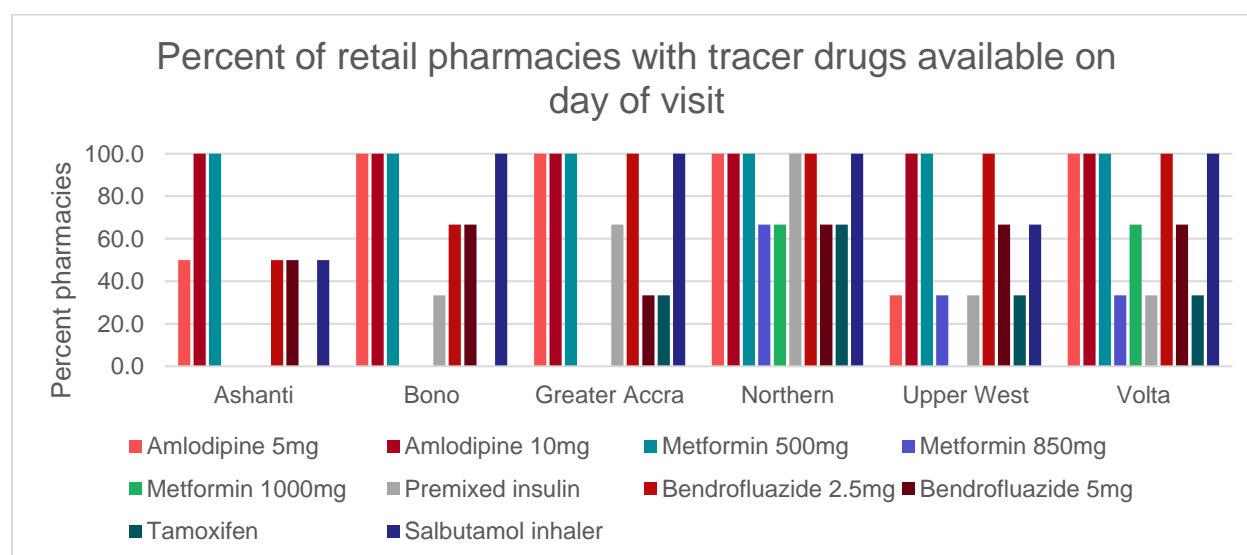
Not available (White)

“Getting the right quantities for the facilities is a challenge. We owe suppliers and cannot pay them, which is affecting the quantities we get to supply facilities. Facilities owe us too and because of that we cannot supply the quantities that are usually ordered.” *Upper West RMS*

As shown in Figure 4, most of the RMSs were stocked with both strengths of Amlodipine and Metformin and one or both strengths of Bendroflumethiazide on the day of the assessment visit. The availability of insulin and Salbutamol inhalers was less consistent across RMSs visited. No RMS stocked insulin pens or Tamoxifen, which is a specialty drug. Northern and Volta RMSs only had 50% of tracer drugs in stock, while Greater Accra had all tracer medicines except insulin. The inconsistent availability of priority NCD products at the RMS hinders access for the health facilities that are RMS’s customer base and drives health facilities and PLWNCDs to the private sector. Despite availability of Metformin 500mg at the RMSs, this low-cost, locally manufactured first-line drug for diabetes was unavailable at 65% of health facilities and 45% of district hospitals.

Private retail pharmacies offered a variety of presentations of most tracer medicines (Figure 5), although Tamoxifen was not available at retail pharmacies visited in Ashanti or Bono Regions.

**Figure 5. Percent of retail pharmacies with tracer drug availability on the day of visit**



## 3.6 Supply chain for insulin

Two private sector wholesalers import insulin vials and pens sourced internationally from Novo Nordisk, Lilly pharmaceuticals, Biocon Limited, India, and Sanofi and distribute them throughout Ghana. After order placement through the manufacturer’s online portal, an order is ready to ship in one week. Shipping can take between 1-8 weeks to arrive at the port in Ghana. In the rare cases when production is needed, it adds 2-4-week lead time. Urgent and small orders transit by air in two days. Bulk orders are shipped by ocean in 40ft containers with transit time to port ranging from 2-8 weeks. Insulin lead time can be as long as 60 days if the local supplier is stocked out and needs to order from an international manufacturer.



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One wholesaler imported 100,000 vials and 20,000 pens in 2019.

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Clearing consignments at the port takes two days to one week. Tax exemptions are obtained from the Ministry of Health and the required duty and fees paid to the Ghana Revenue Authority before

consignments are released to the importers (wholesalers). Wholesalers have invested in building cold rooms to store imported insulin prior to delivery to the RMS and health facilities. The wholesalers transport deliveries of insulin by truck or van directly to the RMS and health facilities in cold storage boxes with ice/gel packs to maintain the cold chain. Batch numbers and expiry date tracing information is available. Poor road networks and flooding in the rainy season can extend delivery time from three hours to a day in some localities.

For the two wholesalers of insulin in Ghana, procurement from foreign manufacturers does not present problems. Supply chain challenges arise when health facilities do not account for lead time and place urgent orders after stocking out. When a wholesaler cannot fill these emergency orders, they often will purchase insulin from the other wholesaler to meet the facility's need, maintain client/supplier relationships, protect their client base, even in the case of indebted facilities.

Because the entire purchasing system in Ghana is credit-based, when facilities with 60-90 days of outstanding credit with one wholesaler need to reorder insulin, negotiations about clearing debt and payment terms are necessary before filling an order. The medicines financing and reimbursement cycle depends on the government providing the NHIA with funds to reimburse health facilities before they can pay their suppliers. A delay at any point in this process weakens the supply chain.

The availability of insulin on the day of visit ranged from 66.7% available at district hospitals to 100% available at regional hospitals, as summarized in Figure 3. While we did not collect quantitative data on the availability of syringes for insulin administration, the availability of syringes in the public health facilities is a known issue that impacts patient safety and cost. Facilities do not order syringes when ordering insulin because the RMS only stock syringes for the Expanded Programme on Immunization (EPI) and instead procure syringes from the open market with a certificate of non-availability. Furthermore, the NHIS does not cover the cost of syringes. Anecdotal information suggests that if facilities access insulin at a lower than usual price, they might provide a syringe free of charge. Otherwise, the patients must purchase syringes. Although a syringe costs 1.00 GHS, anecdotal information suggests patients reuse one syringe multiple times, which is not recommended. Insulin strips are not provided in health facilities for home use and must be purchased in private pharmacies (see section 3.10).

### 3.6.1 Cold chain for insulin

Insulin is shipped to Ghana in a 2-8 °C temperature-controlled environment (thermo-containers) and immediately moved into the cold rooms at the port. The consignment is transferred to the wholesalers' cold rooms following customs clearance. All insulin consignments must be labelled 2°C – 8°C to be stored in the cold room while awaiting customs clearance. The additional cost of port cold storage results in relatively higher markups for insulin. Temperature data loggers (probes) placed by the manufacturers monitor the cold chain during transport. The data is transferred back to the manufacturers on arrival at the wholesaler's warehouse for quality assurance prior to concluding the transaction, after which product is ready to supply to facilities. Wholesalers have invested in cold storage and transport infrastructure.

Availability of Insulin 70/30 premix is particularly limited for patients. While all RMSs have walk-in cold rooms, 74.3% (26/35) of health facilities assessed had functioning cold chain equipment and stocked insulin, which they stored in domestic refrigerators or, in one case, a walk-in cold room. Only 7.7% (2/26) facilities had a temperature chart, and with these two, temperatures were not completely charted for the past month from the day of visit. The other facilities did not have thermometers and charts. All the facilities that stock insulin reported receiving insulin in a cold box with ice packs from their suppliers. Critique of this cold chain method during transport claims that it can result in unequal cooling and risk of freezing. WHO has simple, pre-qualified products, such as bio-monitor stickers that change color over time with exposure to certain temperature that could be incorporated to monitor cold chain during transit and at the patient level.

“Unavailability of appropriate cold chain can be cited as the reason most facilities do not stock insulin. You know the storage of insulin needs special facilities and fridges. Now facilities without fridges do not stock insulin at all. We have been trying to engage with the EPI to see if they will allow us stock insulin in some of their fridges instead of the domestic fridges we see in the health facilities, which cannot guarantee quality storage conditions.”  
**GHS SSDM**

The immunization supply chain operates in a parallel system, only stores vaccines, and has its own system strengthening strategy based on effective vaccine management (EVM) assessments and country improvement plan, the most recent of which was conducted in 2014 (a new EVM assessment was planned for 2019 but postponed to 2020). Of note were the EVM findings<sup>21</sup> that most (84%) cold chain points for vaccines at the HF level had adequate fridge capacity; 71% were routinely monitoring temperature on charts, and digital temperature monitoring devices were installed on all cold chain equipment. The relative strength of the vaccine cold chain at health facilities presents an opportunity for quick gains to the insulin supply chain through integration with vaccines in the short and long term. The country improvement plan included interventions to further expand cold chain capacity and strengthen routine temperature monitoring through trainings and supervision. In July 2018, Ghana conducted a cold chain equipment inventory that revealed the cold space capacity required to support immunizations at the national level had a deficit of 14,061 liters. Out of 4,598 facilities that perform immunization services only 2,042 have functioning fridges. Much of the equipment is over 15 years old and needs to be replaced due to high maintenance costs, breakdown rates, and required repairs. Two hundred and six facilities that provide immunization services have no refrigerators and require over five liters of cold space on site.<sup>22</sup>

Given the COVID-19 pandemic, WHO and UNICEF released recommendations to encourage greater health commodity supply chain integration for temperature-sensitive vaccines and other pharmaceuticals, including insulin. This forward-thinking guidance should be considered in Ghana in light of the planned EVM assessment and updated Supply Chain Master Plan under discussion. This

<sup>21</sup> UNICEF & WHO. 2014. *Ghana EVM Assessment: Findings and recommendations*.

<sup>22</sup> Ghana Ministry of Health, Ghana Health Service, *Ghana Cold Chain Equipment Inventory Report*, August 2018

in an opportunity to plan, fund, and implement strategic plans to expand Ghana's cold chain capacity to meet the needs of the health system and support UHC in the medium to long term.

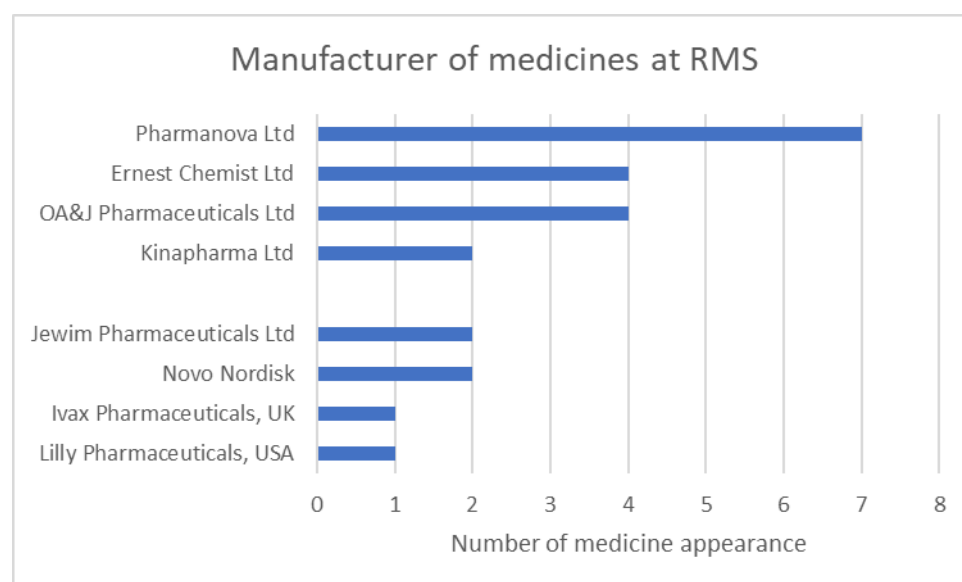
All private pharmacies used domestic refrigerators for their cold chain management, but not all pharmacies stocked insulin. Eight pharmacies with insulin on the day of assessment reported that insulin is usually delivered in cold boxes with ice packs, directly by the supplier (in Greater Accra, Volta, Ashanti and Bono Regions) or via public transport (in Northern and Upper West Regions). No refrigerator thermometers nor temperature charts were available in any of the private pharmacies assessed.

### 3.7 Source of medicines

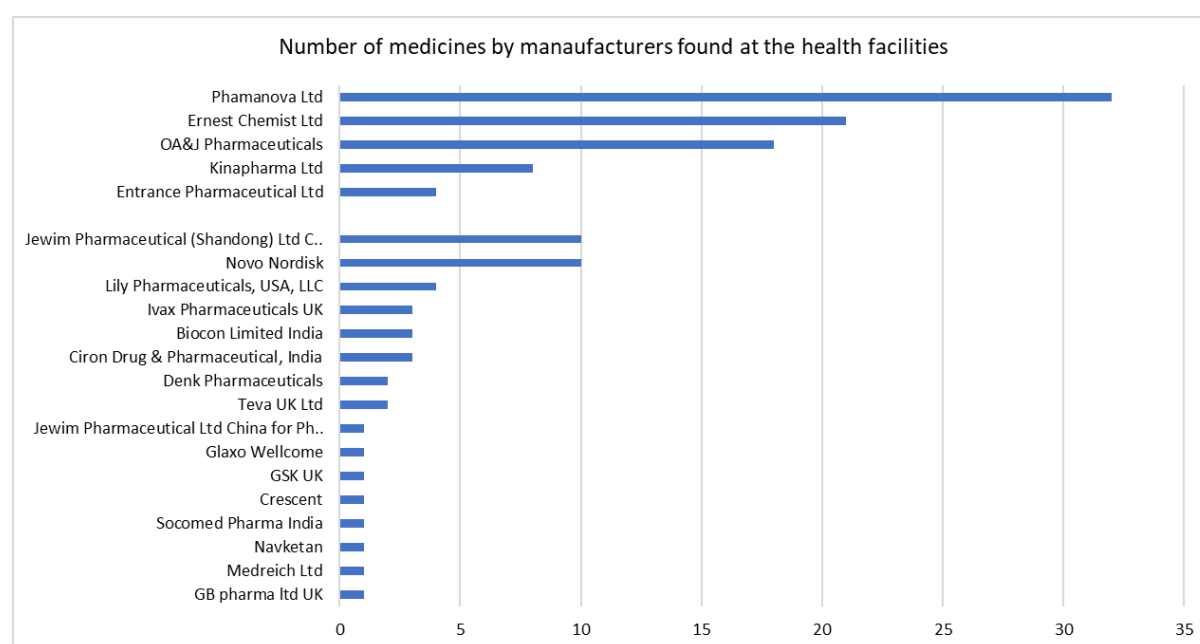
The source of medicines, both their manufacturing origin and the immediate supplier, can have an impact on their availability, price, and quality. The assessment found that the origin of NCD medicines—foreign or locally manufactured—was varied across the supply chain, but foreign manufactured products were much more commonly found at health facilities compared to local products, which predominated at RMSs. This apparent contradiction, clearly illustrated in Figures 6 and 7, is a direct result of low availability at the RMS, requiring health facilities to apply for certificates of non-availability to buy product available from wholesalers, which most often carry medicines of foreign origin. This results in additional transaction and higher purchase costs for health facilities and pushes up the cost of treatment for PLWNCDs.

At regional and district hospitals and HCs, 24% of the NCD medicines in stock were from local manufacturers while the remaining 76% were foreign products. The local products were Amlodipine, Metformin, and Bendroflumethiazide. At RMSs, (Figure 6) locally manufactured NCD tracer products were more common than foreign products. Premixed insulin and Tamoxifen are only available from foreign manufacturers. Lack of availability of tracer medicines at the RMSs is reflected in NCD medicines from a larger mix of suppliers, which includes one local and sixteen foreign manufacturers.

**Figure 6. Number of NCD tracer medicines supplied by manufacturer available at RMSs**



**Figure 7. Number of NCD medicines by manufacturer available in health facilities**



Private retail pharmacies offered a variety of presentations of most tracer medicines although Tamoxifen was not available in pharmacies visited in Ashanti, Volta, and Bono Regions, and available in only one or two pharmacies visited in each of the other regions. Only 16% of the local brands and manufacturers (for Amlodipine, Metformin and Bendroflumethiazide) were found in the private pharmacies, while foreign manufacturers' brands were common and included all the tracer medicines including Tamoxifen (Figure 7).

### 3.8. Stockouts of medicines

Stockouts at the public health facilities resulted in clients shifting to the private sector for care, compromising access and affordability in managing chronic conditions especially in rural areas. According to key informant interviews and focus groups, these stockouts have many causes, including:

- Poor inventory management and ordering practices at health facilities, including lack of SOPs, inadequate training for store managers and health care workers, manual data management using paper records, and long lead times.
- Inadequate forecasting tools and methodologies at health facilities for annual forecasting and routine reordering, and at regional and national levels for annual quantification for budgeting and procurement planning.
- Incomplete order fulfillment. More than two-thirds (70.5%) of assessed facilities did not receive the full amount of their most recent order.
- Inconsistent understanding and application of alternative procurement options including slow issuance of certificates of non-availability by RMS to enable HFs to procure from alternative sources.
- Indebtedness of health facilities to RMS due to budget constraints, and indebtedness of RMS to suppliers due to cash flow problems stemming in part from unpaid HF debts.

- Delay in reimbursements from NHIA to health facilities, and low reimbursement rates for medicines that cost more than the NHIA recommended price. This long-standing problem was noted in the 2012 SCMP: “the supply chain is marked by payment delays and long-standing indebtedness: from the NHIA to facilities, from facilities to the RMS, from the RMS to (suppliers).”
- Disincentives to stock medicines—particularly at RMSs—for which NHIA reimbursement is lower than the cost of procuring and handling the products.
- Supplier failures to deliver under the framework contracts.

“Aging debts affect the quantities we can supply. If a facility has a debt that is old, we usually will not be able to supply all quantities ordered. For hospitals we give up to 6 months as a threshold in to supply. This means if your debt is more than 6 months, it affects the quantity of products we can supply.” **Ernest Chemist Ltd, Tamale**

“The NHIA prices drive product availability at the facilities. Formerly, the RMS would add about 10% markup to make sure they earn something to run the RMS. This is no longer the case as NHIA determines that the medicines are sold to patients at the same price they are bought from the suppliers. Therefore, for some medicines, the RMS and facilities run at a loss and are reluctant to stock them.” **GHS SSDM respondent**

## 3.9 Financing and pricing

The purchase of medicines is financed either by the NHIS or people’s out-of-pocket expenditures. All the NCD tracer products (primarily generics) are covered by the NHIS Medicines List which determines the reimbursement amount for each product and reimburses accredited health facilities for medicines they dispense to insured patients. Approximately 40% of the Ghanaian population are active members in national health insurance which is funded by voluntary contributions of employees to Social Security and the National Insurance Trust (SSNIT) or through non-social security contributors who pay an annual premium. In 2019 the annual registration fee was 30 Ghana Cedis<sup>23</sup> for persons 18-69 years of age working in the informal sector. Children, the indigent, persons older than 70 years of age, pensioners, and pregnant women are covered and exempt from paying the premium. Data from 2012 suggest that more than 50% of Ghanaians with NHIA coverage are children while 35.5% are contributors from the informal sector and only 4.2% are SSNIT contributors from the formal sector. The remaining population enrolled in NHIS represents non-contributing groups, such as indigents, SSNIT pensioners, or individuals 70 years and above.<sup>24</sup> A large percent of the Ghanaian population at risk for NCDs have no health insurance coverage.

The NHIS Medicines List includes maximum reimbursable prices for 512 drug formulations, including the NCD tracer drugs. The prices were set following price surveys, stakeholder engagements and deliberations of the technical committee which includes representatives from various government institutions, Ghanaian pharmaceutical professional associations, WHO, and representatives of the private pharmaceutical sector. The NHIS schedule specifies which drugs are authorized to be prescribed at each level of the health care system. Prices are free of value added tax in keeping with a policy to reduce the price of medicines in support of UHC.

<sup>23</sup> 1USD is approximately 5.8 Ghanaian Cedi

<sup>24</sup> Dramani Kipo-Sunyehzi, Daniel, Martin Amogre Ayanore, Daniel Kweku Dzidzonu, Yakubu Ayalsuma Yakubu. Ghana’s Journey towards Universal Health Coverage: The Role of the National Health Insurance Scheme, European Journal of Investigation in Health, Psychology and Education, 2020, 10: 94-109.

**Table 4: July 2018 NHIS Tracer Medicines Prices and Prescribing Levels<sup>25</sup>**

Medicine	Unit	Price (GH¢)	Prescribing Level
Amlodipine 5mg	Tablet	0.15	B2 - Health Center with Doctor
Amlodipine 10mg	Tablet	0.21	B2 - Health Center with Doctor
Bendroflumethiazide 2.5mg	Tablet	0.05	B1 - Health Center without Doctor
Insulin premixed (30/70) HM Injection 100 units/mL in 10mL	Vial	45	C - District Hospital
Metformin 500mg	Tablet	0.08	B1 - Health Center without Doctor
Salbutamol Inhaler, 100 microgram/metered dose	200 doses inhaler	12.6	A - Community-based Health Planning and Services (the lowest level)
Tamoxifen 10mg	Tablet	1.05	SM - Specialist Medicine
Tamoxifen 20mg	Tablet	0.84	SM - Specialist Medicine

At the primary care level, NHIA accreditation is based on the available cadre of staff capacity and infrastructure, so B2 HCs that have a doctor on staff can stock a wider array of NCD medicines than B1 HCs without a doctor. For example, Amlodipine 5mg/10mg can only be dispensed at hospitals or B2 HCs with doctors, preventing many stable patients with hypertension from refilling their routine prescription at their local B1 HC (which lack doctors).

When conducting tenders for the FWC, the NHIS prices are used as benchmarks, but the final contract prices are determined by market forces and negotiation. If final FWC prices are above the NHIS rates, a coordinating council engages with the NHIA to adjust NHIA price setting to not disrupt the framework contracting process. The intention is to ensure that medicines remain affordable for health facilities to purchase from the RMS. Health facilities in turn implement price markups to generate income to procure additional medicines and services as needed from the private market. Table 4 lists the most recent NHIS prices for the tracer drugs, set in July 2018. The assessment findings suggest the need for more frequent NHIS pricing updates that incorporate changing market forces (such as inflation and fluctuating currency exchange rates). This would reduce financial risk to manufacturers and wholesalers.

While there is a standard methodology to determine price markups and a standard price for commodities supplied to insured clients of the health system, there has been no analysis or formal process to establish health facility markup benchmarks and resulting price of commodities sold to uninsured people, who do incur significant out-of-pocket costs. The assessment found considerable variation in prices paid by the uninsured at public facilities. Furthermore, when an RMS is stocked out and health facilities source their medicines from the private sector, even insured patients incur out-of-pocket expenses to make up the difference between the price of a branded drug and the NHIS reimbursement amount for generics.

Patients who purchase their medicines from the private sector pay out of pocket unless the pharmacy is accredited by the NHIA and stocks the generic. Prices for the tracer products were higher in private pharmacies, which sell mostly brand name products. Except for insulin, tracer drug prices were consistently higher than the NHIS prices at all retail pharmacies assessed, requiring out-of-pocket expenditures by insured PLWNCs, even at NHIA accredited pharmacies.

<sup>25</sup> Ghana National Health Insurance Administration, National Health Insurance Scheme, Medicines List, July 2018.

### 3.9.1. Price of medicines

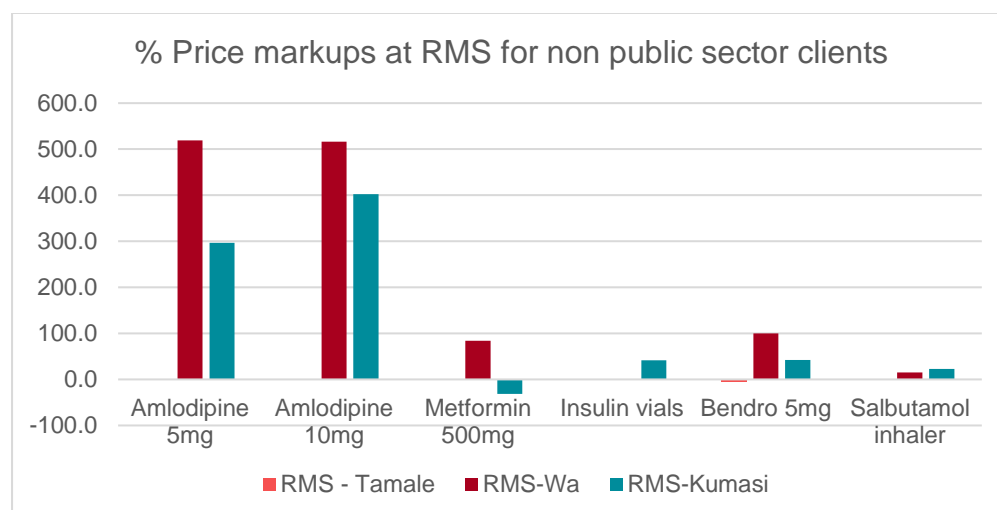
The 2015 Supply Chain Master Plan noted that pricing, reimbursement, and mark-up policies and guidelines needed to be rationalized and more carefully managed and/or controlled, and markups at all levels should be directly related to the actual cost of providing the commodity.

In the section that follows, we present the mismatch between the price of NCD tracer medicines charged clients of public facilities with NHIA insurance and those without coverage. The actual prices paid by uninsured patients in the public sector vary significantly between health facilities because of markups along the supply chain.

RMSs implement different markups for public sector and non-public sector clients. Data on price markups to non-public sector clients were available only at 3 of the 6 RMSs. Those limited data presented in Figure 8 show significant markups for non-public sector clients above the NHIA stipulated 7%-15% markup for public facilities, especially for Amlodipine.

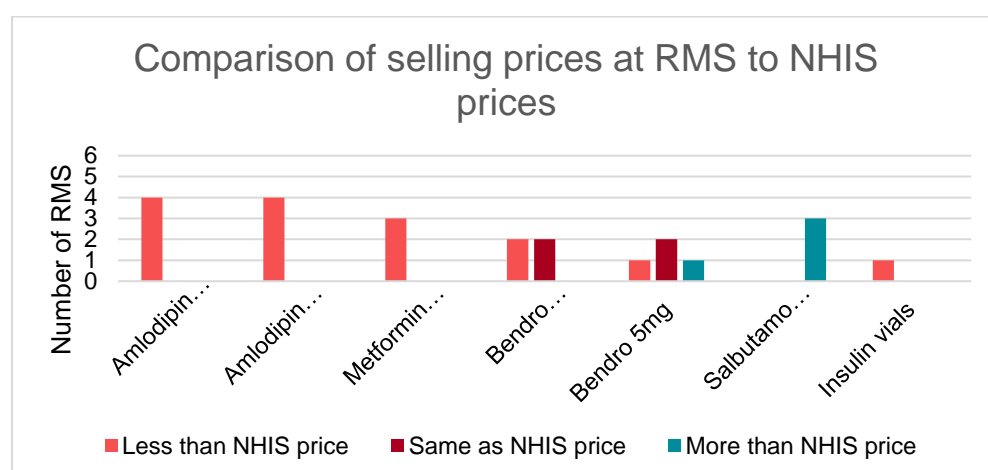
Price markups at three of the Regional Medical Stores assessed (Tamale in Northern Region, Wa in Upper West, and Kumasi in Ashanti) varied across tracer medicines but were significant in Wa and Kumasi for both strengths of Amlodipine, for which all markups exceeded 290%. These markups are passed on to faith-based and private clients that procure from those RMSs. Even though there were significant percent markups for some tracer drugs, in general, as shown in Figure 9 below, the selling price was within the NHIS pricing, with the exception of Salbutamol inhalers and the 5mg strength of Bendroflumethiazide, which despite having lower percent markups, sold either at or above the NHIS price, either leaving no markup margin for health facilities, or passing on to patients a price that was already beyond the NHIS maximum reimbursable price.

**Figure 8. Percent price markups for tracer drugs for non-public sector clients**



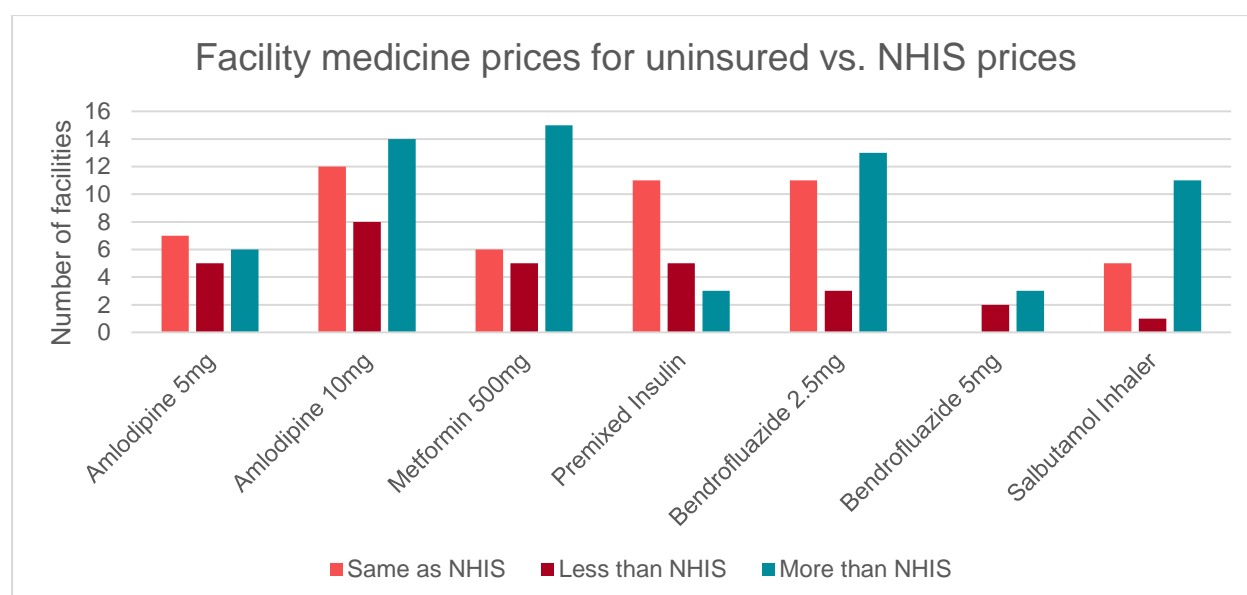


**Figure 9. RMS non-public sector client pricing compared to NHIS reimbursement amount**



The limited data available at the RMS on their selling prices are shown in Figure 9 in relation to the established prices approved by the NHIS. Despite the RMSs offering Amlodipine at lower than NHIS prices, as shown in Figure 9, below, in Figure 10 we see how by the time the drugs reach the uninsured patient, the cost of essential NCD medicines often exceeds that set by NHIS for insured patients.

**Figure 10: Prices at facilities for uninsured vs. NHIS prices**



The price markups for NCD medicines sold at health facilities to uninsured people living with NCDs were as much as 1200% in some cases and were higher than the NHIS price for 43% of the tracer items assessed at health facilities (Figure 10). Publicly owned health facilities generally sold tracer products at prices much higher than the recommended NHIA price, while FBO hospitals and quasi-government hospitals had lower prices. However, most facilities sold Insulin Premix 70/30 at or lower than the recommended NHIA prices.

“Prescription patterns change with prices of medicines. If a particular drug becomes more expensive for the facilities to stock, prescribers will change the pattern and prescribe drugs that are available and can be stocked.” *Deputy Director, Pharmaceutical Services, Volta*



**Figure 11. Percent price markup for diabetes tracer drugs sold to uninsured by health facility type**

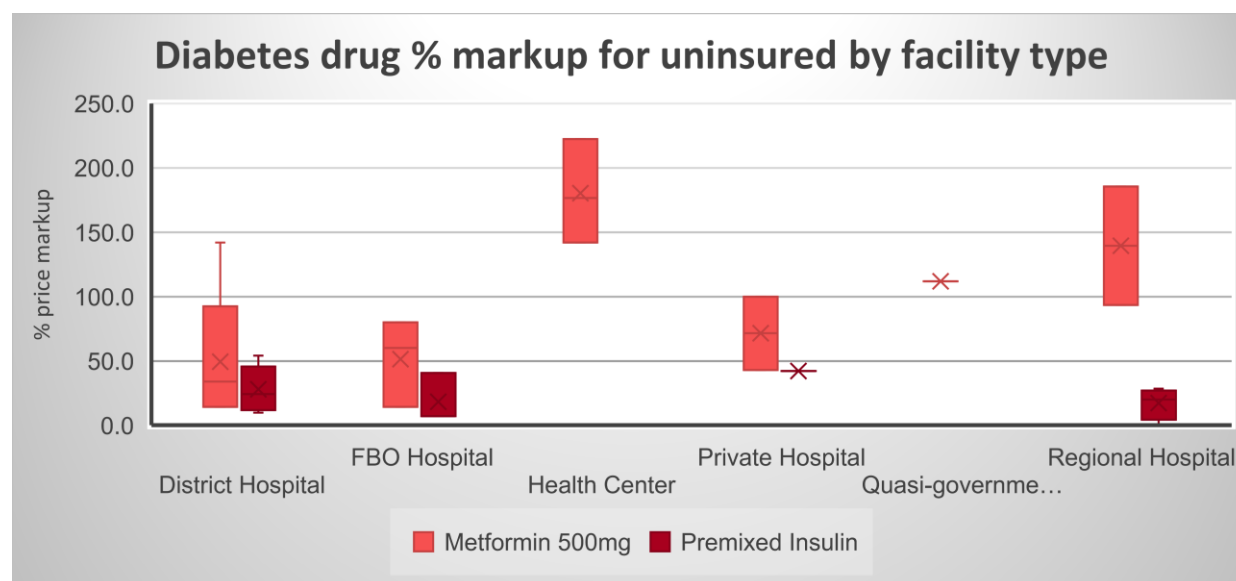


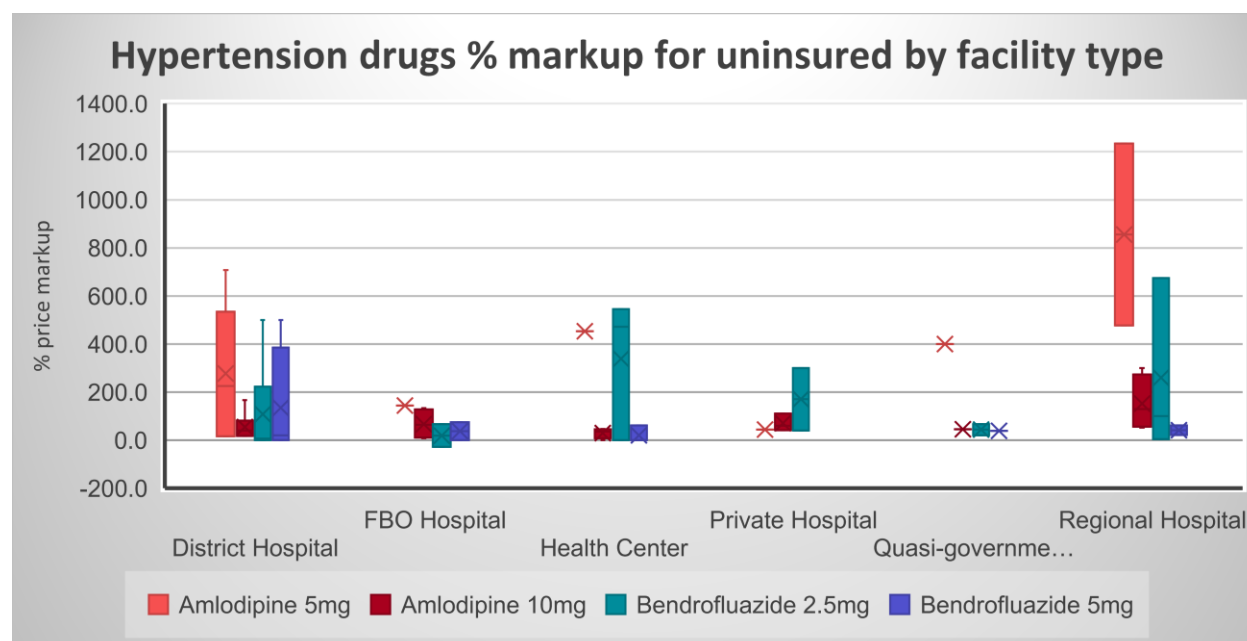
Figure 11 communicates the median value (horizontal line), the mean (x), the range (bar) and outliers (lines that extend above and below the bars). In the case of medicines with only one data point, the x and the line are superimposed and represent the same value.

Figure 11 shows the wide range of markup percentages for Metformin sold to uninsured people by type of facility assessed. Health centers are the most expensive outlets for this medicine, followed by regional hospitals, which represent the bulk of the 15 facilities visited that price Metformin above the NHIS price. Three of the health facilities visited price insulin above the reimbursable price. Despite UHC and NHIS coverage, where a person living with diabetes resides will determine their access and out-of-pocket cost to available treatment.

Despite both strengths of Amlodipine being sold by RMS at less than the NHIC price, the 5mg formulation presents a wide range of price markups at regional and district hospitals. While the health centers assessed present a very limited range in price markups, their median markup is almost twice that of district hospitals, leading to inequities in affordability for rural patients compared to those with greater access to higher-level, more urban facilities. The ranges for the Amlodipine 10mg formulation were more limited and the median markup percentage much lower at all types of health facilities except for the quasi-government hospital. Despite that, at 14 health facilities the price to uninsured people living with hypertension is above the NHIS maximum.

In the case of Bendroflumethiazide 2.5mg we see a high range of markups within facilities of each type. Again, health centers have the highest median percent markup, followed by the regional hospitals. The 5mg strength, where available, demonstrated a consistently lower range of percent markups, except for district hospitals.

**Figure 12. Percent price markup for hypertension tracer drugs sold to uninsured by health facility type**



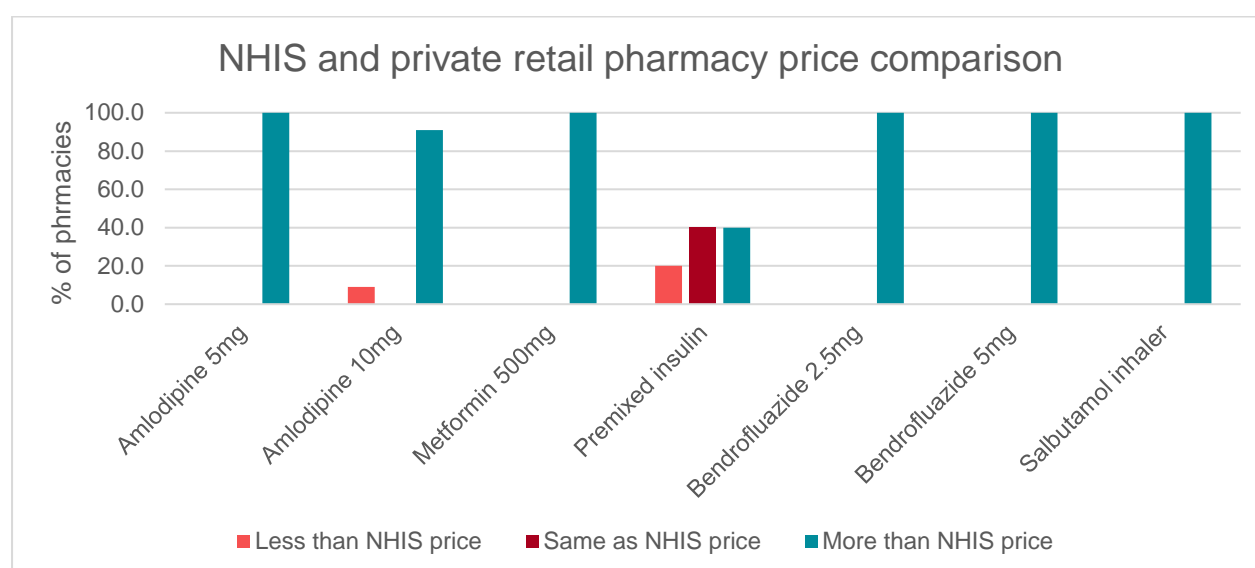
The above box graph in Figure 12 communicates the median value (horizontal line), the mean (x), the range (bar) and outliers (lines that extend above and below the bars. In the case of medicines with only one data point, the x and the line are superimposed and represent the same value.

A 2016 study<sup>26</sup> found that health facilities saw delays in reimbursements and reimbursement rates from the NHIA insufficient to cover the full cost of providing the medicines, resulting in some people being charged a supplement. It is important to note that clients of NHIA accredited facilities should not have to pay out of pocket if the price charge for their medicine was equal to or less than the NHIA reimbursement price.

There is a need for a consistent and harmonized application of pricing and markup policies for NCD tracer medicines, all of which are covered by the NHIS for their essential role as a public health good for the people of Ghana. Without this, equitable access, and affordability of NCD commodities in support of Ghana's UHC goals will not be possible.

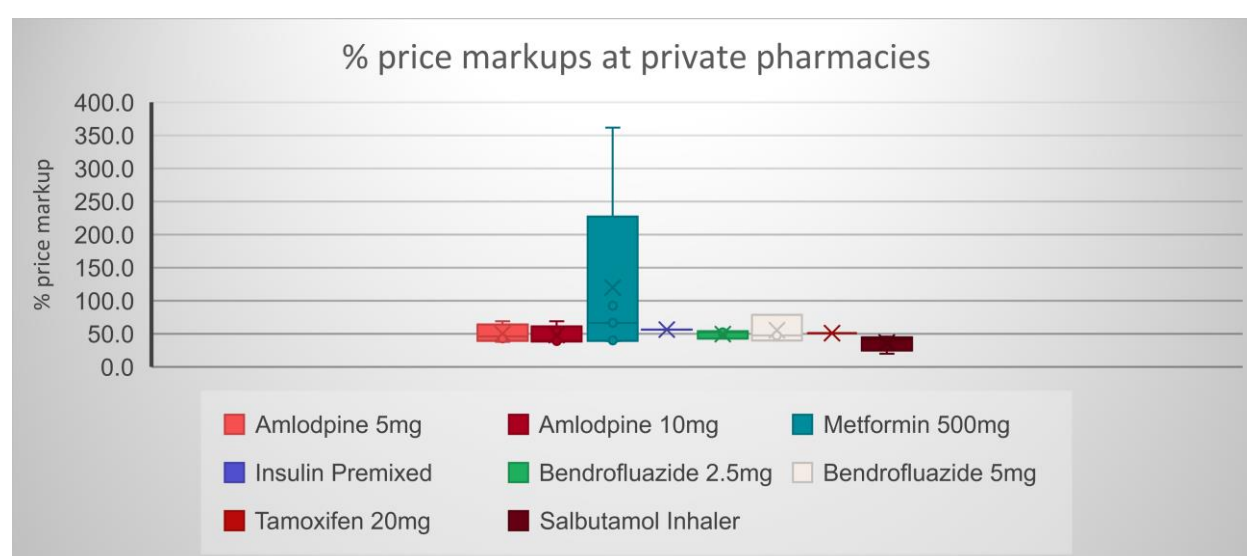
<sup>26</sup> Ashigbie, Paul G et al. "Challenges of medicines management in the public and private sector under Ghana's National Health Insurance Scheme - A qualitative study." *Journal of pharmaceutical policy and practice* vol. 9 6. 24 Feb. 2016, doi:10.1186/s40545-016-0055-9

**Figure 13. NHIS and private pharmacy price comparison**



Majority of retail pharmacies visited were close to district hospitals. As seen above (Figure 13), private retail pharmacy prices for tracer medicines were generally higher than in the public sector and were consistently and significantly higher than the reimbursement rates set by the NHIA, with a few exceptions. In the rare cases where a NHIS accredited retail pharmacy stocks generic NCD medicines, the insured person will be able to purchase at NHIS prices, but most pharmacies only stock branded medicines. Markups at private pharmacies were below 80% of their procurement prices across all tracer medicines except for Metformin 500mg, which in one case showed an outlier markup of 362%, as shown below. Price markup percentages in the private retail pharmacies were lower compared to both the RMSs and health facilities, demonstrating the public sector advantage that stems from procurement economies of scale through FWCs.

**Figure 14. Percent price markups at private retail pharmacies.**

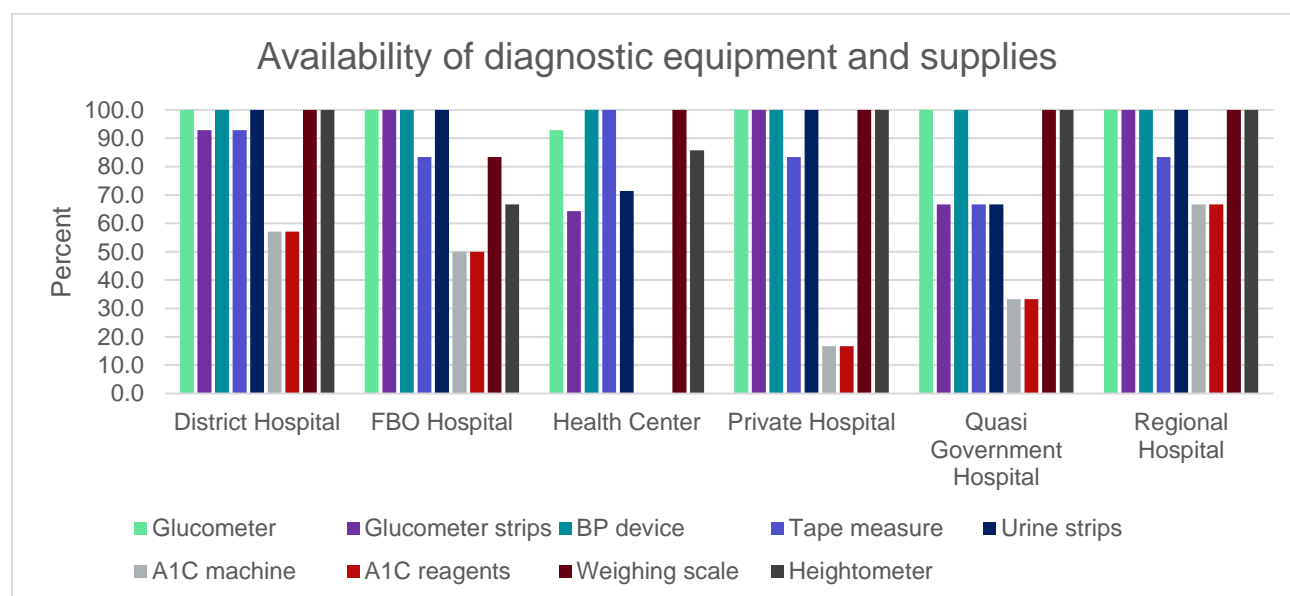


The box graph in Figure 14 communicates the median value (horizontal line), the mean (x), the range (bar) and outliers (lines that extend above and below the bars). In the case of medicines with only one data point, the x and the line are superimposed and represent the same value.

### 3.10. Availability of diagnostic equipment and supplies

At the HF level, the assessment found that blood pressure devices, glucometers with strips, tape measures, urine strips, weighing scales and heightometers were found at health centers and most hospitals in the outpatient dispensary, consulting rooms, wellness clinics and some wards (Figure 15). However, 35% of health centers with glucometers lacked the strips and had to refer patients to the district hospital for testing. A1C Analyzers and reagents (for measuring blood glucose) were available at only 48.6% of hospitals. In addition, key informants reported that quality assurance testing of diagnostic devices to ensure they are properly calibrated is insufficient.

**Figure 15. Availability of diagnostic equipment and supplies**



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## 4.0 Conclusion

Ghana is implementing UHC, yet the priority NCD medicines that were the subject of this assessment are not consistently available and affordable to PLWNCDs at the PHC level. The COVID-19 pandemic has underscored the need for resilient health systems and agile supply chains that reliably deliver quality and affordable NCD medicines and products.

The seven maps document the steps in the processes of the Ghana health commodities supply chain. We established the flow of NCD tracer products and identified strengths and red flags observed in the functioning of the system. The timelines documented in each process point to where efficiencies can be gained through process improvement, staff capacity building, automation, and improved availability of NCD products at the RMS.

The multiple price markups applied to NCD commodities as they move from framework contracts, through the RMS and health facilities to the patient are important contributors to the patient's cost of treatment, especially for uninsured patients who pay higher prices for NCD commodities. Consistent availability of generic NCD medicines at the RMS will help minimize instances where health facilities have to procure branded medicines from the private sector and pass on the higher than NHIS costs to patients through a co-pay to cover the difference.

The poor and inconsistent availability of the NCD tracer drugs at the RMS and health facilities underscores the need to improve the supply chain's performance through strengthened forecasting, financing, procurement, and delivery of these essential drugs to the people who need them. While equipment was available and mostly functioning, cold chain capacity and quality are a concern that, if unresolved, will limit the expansion of access to insulin. Improving consistent access to glucose testing at health centers and district hospitals is a necessary priority.

Some of the challenges found in this assessment are not unique to NCD products and reflect wider problems that Ghana has been working to resolve in its health commodity supply chains. Many of the challenges were well documented in the previous SCMP, and strategies and workplans were put in place to address them. As the Ghana supply chain evolves and systems strengthening initiatives, such as the GhILMIS, are implemented, change management should be strengthened so that the gains of the past are not lost while reaching for the promises of the future system. There is an opportunity for supply chain advances to impact the availability and affordability of NCD medicines and products by elevating their importance at all levels of the system. It is essential for Ghana to have systems to support the distribution of NCD medicines and products down to the lowest level of care and into the community. The gains achieved by the HIV community should be instituted for NCD meds and health products.

Examples of transformational progress are the deployment of GhILMIS to all RMS and public hospitals and the implementation of the Last Mile Delivery Programme. Both achievements offer successes upon which to build. Other problems remain to be solved, such as the cost markups for NCD medicines sold to uninsured people, supply chain human resources, and the issue of accumulated debts that constrain cash flow, extend lead times, and pose an important financial risk to manufacturers doing business with the public sector.

Many of the recommendations in this report are not specific to NCD products and present opportunities for collaboration with other disease and prevention programs managed by GHS to strengthen the integrated health commodities supply chain. The recommendations that follow should help inform priorities and planning for the next five-year Supply Chain Master Plan for 2021-2025.

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## 5.0 Recommendations

Not only is access to and affordability of NCD medicines and products a human right and a critical step towards UHC, the management of cardiovascular disease and diabetes and the management of cancer have been identified by WHO as cost-effective and feasible “best buys” for country investment that generate impact and value for health, the economy, and national development. However, the assessment found frequent stockouts and high price markups resulting in lack of access and affordability for PLWNCDs. Based on our assessment findings, we recommend the following interventions.

### 5.1 Strengthen leadership, governance, and financing of the NCD supply chain at the central, regional, and district levels

Strong leadership and governance of health commodity supply chains ensures that measurable improvements in availability and affordability of priority NCD commodities is achieved in the public and private sectors through standardized system implementation and reliance on individual initiative. There should be standardized, system-level staff accountability for supply chain process implementation at all levels.

- Formally adopt the Global NCD Action Plan goal of “80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major noncommunicable diseases in both public and private facilities by 2025” for a specific list of priority NCD medicines and products that need to be available to meet UHC goals.
- Establish increasing annual benchmark goals to improve availability between now and 2025 to progressively close the availability gap and reach the 80% availability goal.
- Forecast need and plan financial resources to close the NCD commodity financing gap and meet availability goals.
- Establish a multi-stakeholder NCD commodity security TWG (modeled after other disease commodity security TWGs) to ensure coordinated planning and action that results in better data-driven decisions when forecasting, financing, procuring, and delivering NCD commodities. Leverage the experience of similar TWGs that coordinate supply needs for HIV/AIDS, malaria, family planning, and other “full supply” health commodities.

### 5.2 Expand reach of supply chain to increase access

**Establish, monitor, and maintain a consistent supply of quality NCD medicines and products in PHC facilities as an essential part of UHC.** To increase access and availability, we recommend policy and practice changes to allow for lower-level facilities to store and dispense critical NCD medicines and products. Per the NHIA Medicines List, Amlodipine 5mg/10mg, and Bendroflumethiazide 5mg cannot be stocked at B1 health centers without a doctor. These lower-level facilities could refill patient prescriptions issued by higher-level facilities. This action will reduce the traffic at the higher-level facilities (allowing them to attend to severe and complicated cases) while lower-level facilities provide refills and health promotion as part of their mandate. Health care workers will need to be assessed for their knowledge and trained as needed to ensure rational dispensing of NCD medicines at the primary care level. This will improve access for most clients at the community level while reducing the economic costs for PLWNCDs to travel for care. It will also redistribute clients from the hospitals to lower-level facilities, allowing hospitals to focus on managing complicated and severe cases. The COVID pandemic has underscored the need for resilient health systems and agile

supply chains that reliably deliver quality and affordable NCD medicines and products to the PHC level. These policy changes and investments are a key to building back better.

- **Extend the reach of LMD from the RMS to all PHC facilities** to deliver essential NCD and other health commodities to the right place, shortening distribution lead times for health centers and dispensaries and resolving transportation bottlenecks for “last mile” facilities.
- **Accelerate the deployment of GhILMIS down to the PHC-level health facilities** to provide health centers and dispensaries with the same access to automated LMIS functionality that supports ordering and reporting functions at higher levels.
- **Ensure adequate pharmaceutical storage capacity** to support established reorder intervals and maximum order quantities that define resupply levels.

### 5.3 Strengthen supply chain workforce capacity

- **Expand and strengthen the capacity of the supply chain workforce to use updated tools and follow best practices for managing health commodities with a focus on improving NCD supply chain management as a matter of priority.** Building on the legacy supply chain system tools and strengthening approach, refresh training on quantification and procurement, storage, inventory management, with a special emphasis on reporting, whether manual or electronic. Health facility staff must be trained on the importance of NCD as the greatest cause of morbidity and mortality, the continuous need for quality medicines and products, and NCD rational medicine use and supply management especially if dispensing is devolved to more primary health centers. Routine DHA meetings and supervision visits should be leveraged to develop skills in and a culture of supply chain data review and use, per the spirit of the 2010 SOPs. Regular supervision including periodic audit visits must be implemented to ensure adherence to regulations on price mark-ups. RMSs should recruit, train, and retain permanent supply chain workers to reduce reliance on untrained casual workers.
- Rollout updated SOP manuals and tools to health facilities, and curricula to supervisors, trainers, and faculty to ensure advancements in technology and adjustments to processes are implemented as soon as possible.
- Facilities, districts, regions, and the TWG **leverage data from GhILMIS to track supply chain KPIs as outlined in the SOPs manual, and prioritize supervision support to parts of the supply chain** that need to strengthen their implementation of SOPs, accountability, and improve performance with supply chain processes and availability of NCD medicines and products.
- Publish an updated SOP manual and curricula to update trainers and faculty to adjustments in the procedures and tools needed for a well-functioning supply chain. This is essential to strengthen the impact of all other investments.
- Leverage supply chain strengthening efforts with other partners, such as USAID, to impact NCDs, and explore opportunities for collaboration with CARISCA that focus on NCD medicines and products.

### 5.4 Develop a business case for investing in NCD commodity security for Ghana

- Document the investment case for Ghana to invest in achieving NCD commodity security and gain the support of policy makers in the Ministry of Finance and the NHIA to close the

financing gap that currently constrains availability of NCDs and leads to a harmonized coverage by NHIA and reasonable cost to consumers.

- There is a need for a consistent and harmonized application of pricing and markup policies for NCD tracer medicines, all of which are covered by the NHIS for their essential role as a public health good for the people of Ghana. Without this, equitable access and affordability of NCD commodities in support of Ghana's UHC goals will not be possible. For the uninsured, determine reasonable pricing for NCD commodities that aligns facility markups for generic NCD commodities to ensure equitable access without risk of catastrophic spending.
- Align NHIA and FWC pricing to increase reimbursement rates and strengthen system sustainability.
- Identify and resolve the causes of delays in reimbursements from NHIA to health facilities, and health facilities to suppliers.
- Ensure that shared benefits of greater economies of scale afforded by better quantification and framework contracts extend to consumers, public sector organizations, and manufacturers, encouraging a healthy marketplace that incentivizes manufacturers to supply the public sector and sustains the public sector supply chain.
- Monitor the performance of framework contracts against a set of key performance indicators.
- Partner with the Consumer Protection Agency to monitor price markups and out of pocket spending by insured and uninsured PLWNCDs.
- Extend national health insurance to a larger proportion of the population.

## 5.5 Digitalize supply chain functions

- **Digitalize supply chain functionalities** with a focus on linking dispensing, ordering, and stock management systems including tools for forecasting and quantification at lower-level facilities. There are ongoing efforts to deploy mobile applications and tablets at CHPS to collect HMIS data that could be leveraged for digitizing the supply chain at the HCs. Implementing digital supply chain tools and platforms is critical to ensuring the right quantities are ordered, available, tracked, managed, and accessible to PLWNCDs.
- **Expand GhILMIS functionality to include a prescription and dispensing application** that integrates with the existing ILMIS functionality and supports the forecasting needs of NCD commodities and other "non-full supply" health commodities.

## 5.6 Improve forecasting and procurement

- **Review reorder calculation methodology for NCDs and other "non-full supply" medicines in the GhIMIS to include guidance for how to adjust the rate of consumption for days out-of-stock**, ensuring the guidance for setting maximum reorder directs stock managers to adjust for lack of availability (or unmet need). This will ensure that routine resupply orders are based on true need and facilities report true demand up the supply chain, providing reliable logistics data to inform NCD commodity forecasting and quantification.
- **Develop and test a demand forecasting methodology** tailored for NCD medicines in collaboration with the Coalition for Access to NCD Medicines and Products. GHS SSDM and RMSs need to collaborate with districts and health facilities to ensure a consistent methodology is used so national and region supply plans and budgets are based on accurate forecasts and quantification. The methodology must compensate for current data gaps but



should also be adaptable as access to quality supply chain data improves. Ghana can leverage and refine a provisional algorithm developed by the Coalition for Access to NCD Medicines & Products that will be piloted by the Access Accelerated partners in Kenya and Uganda in late-2020. Accurate demand forecasting is a critical component to preventing stockouts and helping suppliers plan sufficiently to meet demand.

- **Monitor performance of new framework contract implementation against a set of key performance indicators:** To reduce the risk of supplier failure as a cause of stockouts of NCD medicines, more than one supplier should be considered to supply each product. This will ensure the continuous supply of products to the RMSs and subsequently to the facilities even when one supplier experiences shortages. Although competition to sell to the RMS and facilities can increase the complexity of supplier relationships, it may reduce the selling price of products to the RMSs, and subsequently lead to lower cost prices to the clients. RHAs and RMSs should participate in the review of the framework contract mechanism. Supplier performance must be monitored using key performance indicators that are incorporated into service level agreements, that include lead time, on-time/in-full, quality, customer service, as well as other indicators to be included in service level agreements. Contracting multiple suppliers and monitoring their performance will mitigate the risk of supplier failure and help ensure medicine availability, affordability, and access at the health facility level.

## 5.7 Meet the unique needs of the insulin supply chain

- **Address unique requirements of insulin administration** including need for syringes, blood glucose monitors and strips. Explore options for financing and “bundling” insulin with syringes and glucose monitoring strips to improve accessibility to the consumables needed for safe insulin administration.
- **Leverage the planned EVM assessment and Supply Chain Master Plan update** to expand Ghana’s cold chain capacity to meet the integrated cold chain storage needs of vaccines and non-vaccine diagnostics and treatments requiring refrigeration at 2-8 °C that do not pose any risk when integrated with vaccine products. Conduct a volumetric analysis of projected cold chain throughput needs for the next 5-10 years and include an additional 20-25% for surge cold storage capacity for emergency needs such as experienced during COVID-19. Replace domestic refrigerators with medical grade cold chain equipment with built-in temperature monitoring devices and expand the number of health facilities with appropriate cold chain equipment.
- **Ensure that all existing cold chain equipment has tools and job aids for temperature monitoring, recording, and problem solving.** Engage the EPI program to leverage trainers and SOPs for cold chain management, and potentially integrate insulin into the vaccine cold chain if there is spare capacity.<sup>27</sup> Infrastructure (such as remote temperature monitoring devices) and staff training on temperature monitoring should be implemented wherever insulin and other cold chain dependent medicines are stored, including at district and regional hospitals.
- **Strengthen quality assurance and availability of medical devices and testing capacity.** Advocate for additional national funding to expand NCD diagnostic testing capacity to additional health facilities. Strengthen existing protocols and allocate adequate resources for scheduled quality assurance testing and recalibrating medical devices and diagnostic

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<sup>27</sup> WHO and UNICEF have issued guidance on managing other products in the vaccine cold chain: WHO/UNICEF Joint Statement. Temperature-sensitive health products in the Expanded Programme on Immunization cold chain. Available at [https://www.unicef.org/health/files/EPI\\_cold\\_chain\\_WHO\\_UNICEF\\_joint\\_statement\\_A4\\_rev2\\_5-14-15\\_\(3\).pdf](https://www.unicef.org/health/files/EPI_cold_chain_WHO_UNICEF_joint_statement_A4_rev2_5-14-15_(3).pdf), 2015.

equipment. To improve availability of diagnostic consumables (test strips, reagents), collaborate with RMSs to improve quantification and supply planning to ensure they can fulfill the volumes (and storage capacity) required at health facilities.

## **5.8 Develop a costed NCD Supply Chain Strategy**

- **Develop a costed strategy and detailed roadmap for NCD supply security.** A national Supply Chain TWG should be established—or engaged if one already exists and is functioning—involving manufacturers, pre-service training institutions, civil society and local stakeholders as appropriate. The strategy should address supply chain management; appropriate prescribing, dispensing and use including at lower levels of care; necessary policy and regulatory updates; good governance, improved data use and quality; and strengthening of the health supply chain workforce capacity. The strategy would be used to inform development of national and sub-national plans.

## Appendices

### Appendix 1. Assessment team and technical advisors

Name	Position
<b>Data Collection Team</b>	
<b>Dr. Efua Commeh</b>	NCD Deputy Program Manager, GHS
<b>Dr. Wallace Ollennu</b>	Program Officer, GHS NCDP
<b>Fred Awittor</b>	NCDP
<b>Clement Abuga</b>	Enumerator
<b>Porcia Akuettey</b>	Enumerator
<b>David Nartey</b>	Program Officer, GHS NCDP
<b>Betsy Wilskie</b>	Procurement Officer (Consultant), PATH
<b>Williams Kwarah</b>	M&E and Data Manager, PATH
<b>Kofi Aburam</b>	Field Project Coordinator, PATH
<b>Patience Dapaah</b>	Advocacy & Communication Advisor, PATH
<b>Dominic Gyimah-Boakye</b>	Administration & Finance Officer, PATH
<b>Technical Oversight</b>	
<b>Dr. Badu Sarkodie</b>	Director Public Health, GHS
<b>Dr. Dennis Laryea</b>	NCD Program Manager, GHS
<b>Dr. Patience Cofie</b>	Chief of Party, PATH
<b>Helen McGuire</b>	NCD Global Program Director, PATH
<b>Marilyn Noguera</b>	Sr. Supply Chain Officer, NCD Program, PATH

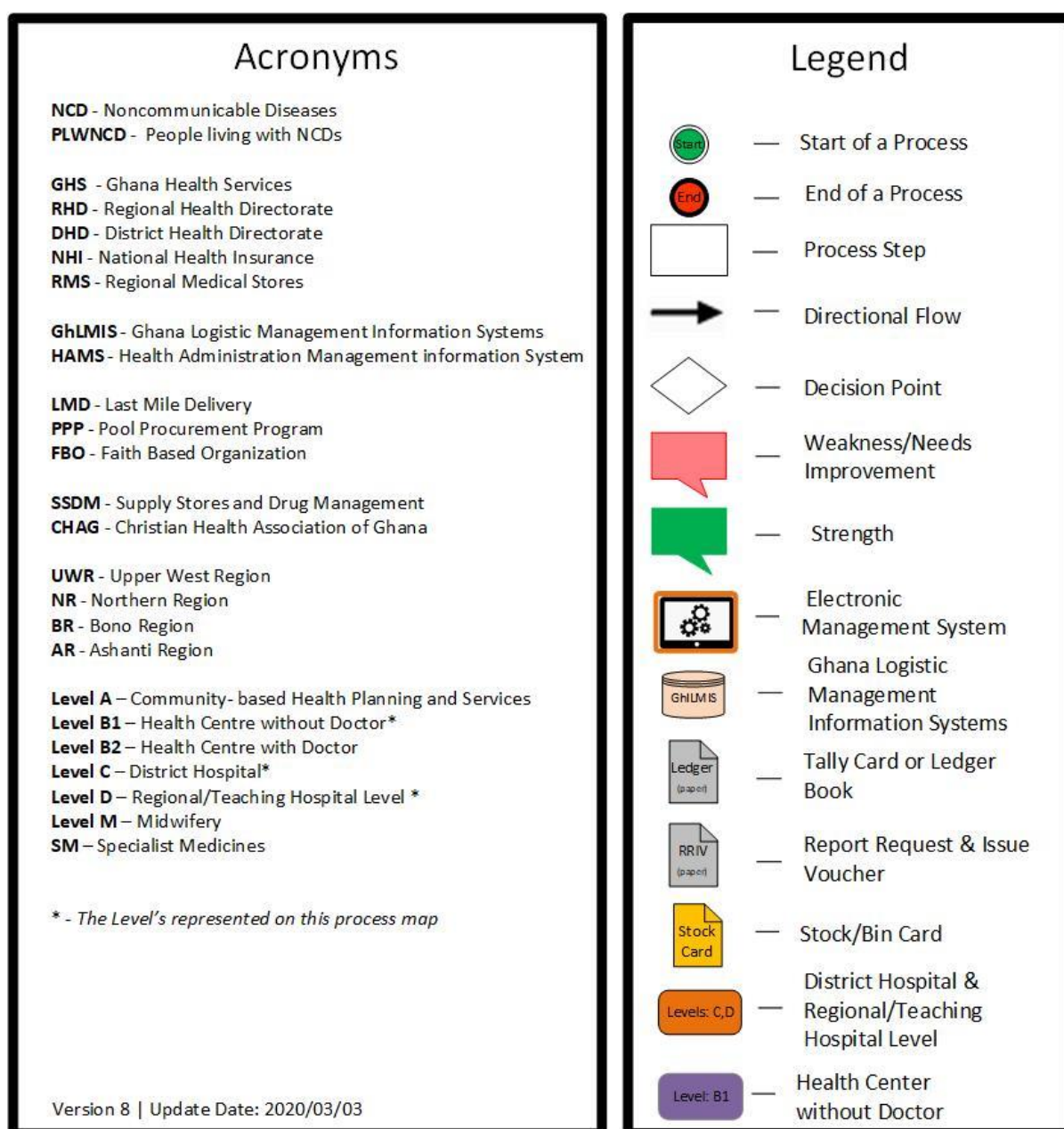
## Appendix 2. Sites visited and interviewed

	Region	Health site	Health sector
1	Northern	SDA Hospital	FBO/CHAG
2	Upper West	St Joseph Hospital	FBO/CHAG
3	Bono	Holy Family Hospital, Berekum	FBO/CHAG
4	Ashanti	Methodist Hospital, Ankaase	FBO/CHAG
5	Volta	Margaret Marquart District Hospital	FBO/CHAG
6	Greater Accra	Valley View	FBO/CHAG
7	Northern	Kabsad Scientific Hospital, Tamale	Private
8	Upper West	Homeland Clinic	Private
9	Bono	Owusu Memorial Hospital	Private
10	Ashanti	Asafo Boakye Specialist Hospital	Private
11	Volta	St. Patricks Hospital	Private
12	Greater Accra	Lifeline Hospital	Private
13	Northern	Tamale Central Hospital	Public
14	Northern	Yendi Government Hospital	Public
15	Northern	Savelugu District Hospital	Public
16	Northern	Kumbungu Health center	Public
17	Northern	Sang Health Centre	Public
18	Upper West	Wa Municipal Hospital	Public
19	Upper West	Nandowli District Hospital	Public
20	Upper West	Lawra Municipal Hospital	Public
21	Upper West	Wa West District Hospital	Public
22	Upper West	Dorimon Health center	Public
23	Upper West	Dafiama Health Center	Public
24	Bono	Sunyani Regional Hospital	Public
25	Bono	Goaso District Hospital	Public
26	Bono	Bechem Govt Hospital	Public
27	Bono	Drobo Health Centre	Public
28	Bono	Yamfo Health Centre	Public
29	Ashanti	Kumasi South Hospital (Ashanti Regional Hospital)	Public
30	Ashanti	Manhyia Government Hospital	Public
31	Ashanti	Ejisu Juaben Government (District) Hospital	Public
32	Ashanti	Foase Health Center	Public

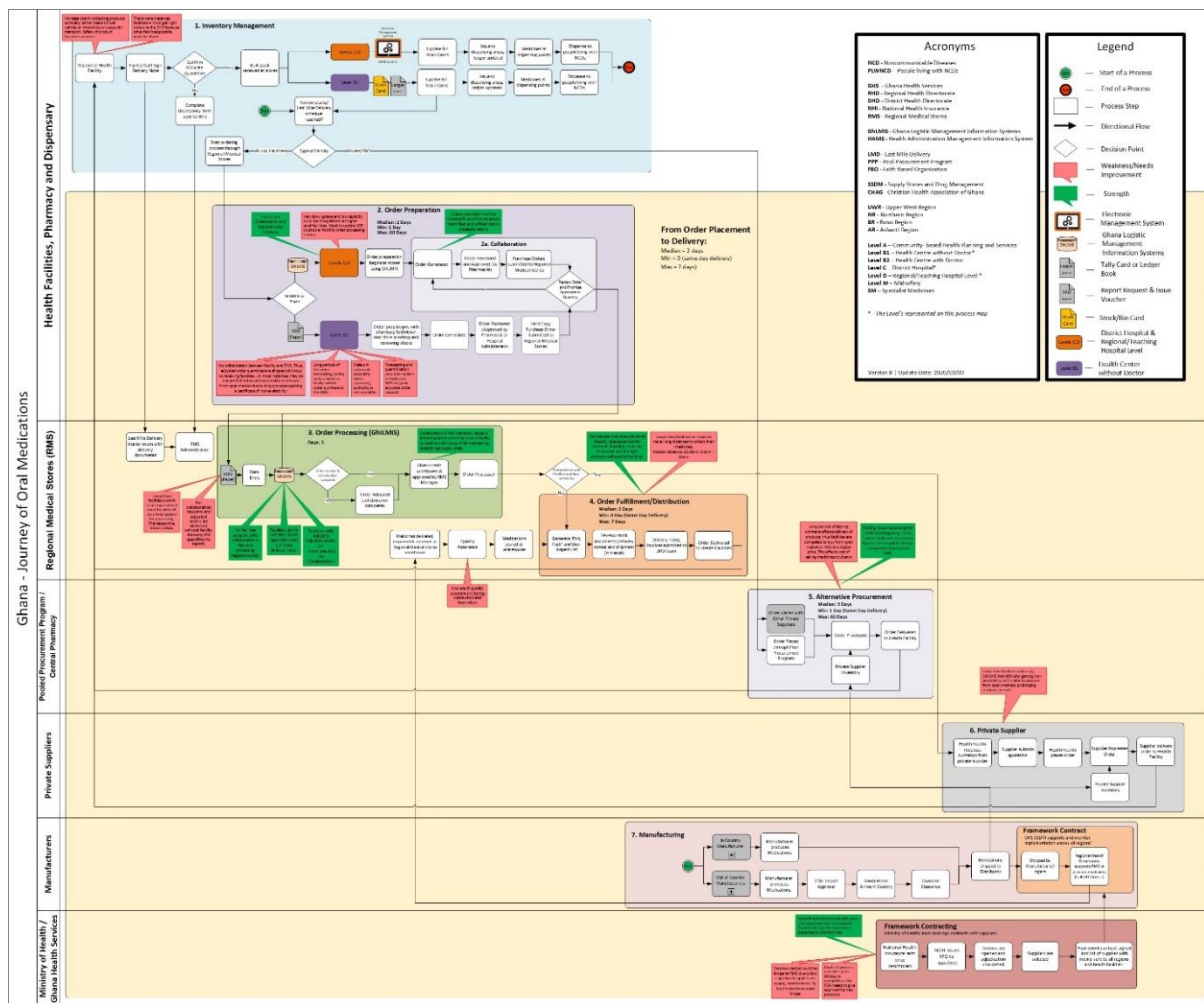
33	Ashanti	Kwaso Health Centre	Public
34	Volta	Ho Municipal Hospital	Public
35	Volta	Adabraka Health Center	Public
36	Volta	Hohoe Hospital	Public
37	Volta	Keta Municipal Hospital	Public
38	Volta	Anyanui Health Center	Public
39	Volta	Kpando Health Center	Public
40	Greater Accra	Ridge Hospital	Public
41	Greater Accra	Ada East District Hospital	Public
42	Greater Accra	Ada East Health Center	Public
43	Greater Accra	Shai Osudoku District Hospital	Public
44	Greater Accra	Agomeda Health Center	Public
45	Greater Accra	Oblogo Health Center	Public
46	Greater Accra	Weija-Gbawe Municipal Hospital	Public
47	Northern	RMS, Tamale	Public
48	Upper West	RMS, Wa	Public
49	Bono	RMS, Sunyani	Public
50	Ashanti	RMS, Kumasi	Public
51	Volta	RMS, Ho	Public
52	Greater Accra	RMS, Accra	Public
53	Northern	RHD	Public
54	Upper West	RHD	Public
55	Bono	RHD	Public
56	Ashanti	RHD	Public
57	Volta	RHD	Public
58	Greater Accra	RHD	Public
59	Greater Accra	GHS SSDM	Public
60	Northern	Tamale Technical University Hospital	Quasi-government
61	Ashanti	KNUST Hospital	Quasi-government
62	Greater Accra	SSNIT	Quasi-government
63	Northern	Alma Chemist Savelugu	Private pharmacies
64	Northern	Mauplus Pharmacy, Tamale	Private pharmacies
65	Northern	Ethical Pharmaceutical Ltd Yendi	Private pharmacies
66	Upper West	Green Beam Chemist	Private pharmacies

<b>67</b>	Upper West	Extra Life Pharmacy Ltd, Lawra	Private pharmacies
<b>68</b>	Upper West	Yassin Pharmaceutical Ltd	Private pharmacies
<b>69</b>	Bono	Medcourt Pharmacy	Private pharmacies
<b>70</b>	Bono	Bestlife Pharmacy	Private pharmacies
<b>71</b>	Bono	Greenlight Pharmacy	Private pharmacies
<b>72</b>	Ashanti	COPS Pharmacy	Private pharmacies
<b>73</b>	Ashanti	E&E Pharmacy	Private pharmacies
<b>74</b>	Volta	Sebatos Pharmacy	Private pharmacies
<b>75</b>	Volta	Bubune Pharmacy	Private pharmacies
<b>76</b>	Volta	Cel Chemists	Private pharmacies
<b>77</b>	Greater Accra	Add Pharmacy	Private pharmacies
<b>78</b>	Greater Accra	DaveJoy Pharmacy	Private pharmacies
<b>79</b>	Greater Accra	Mcarthy Hill Pharmacy	Private pharmacies
<b>80</b>	Upper West	Kinapharma, Wa Supplies from Tamale	Wholesale / manufacturers
<b>81</b>	Northern	Ernest Chemist Ltd, Tamale	Wholesale / manufacturers
<b>82</b>	Northern	Kinapharma, Tamale	Wholesale / manufacturers
<b>83</b>	Ashanti	Ernest Chemist Ltd, Kumasi	Wholesale / manufacturers
<b>84</b>	Greater Accra	Osons Chemist Ltd	Wholesale / manufacturers
<b>85</b>	Greater Accra	Gokals Laborex Ltd	Wholesale / manufacturers
<b>86</b>	Northern	Ginapharma Ltd	Wholesale / manufacturers

## Appendix 3. Process map acronyms and legend

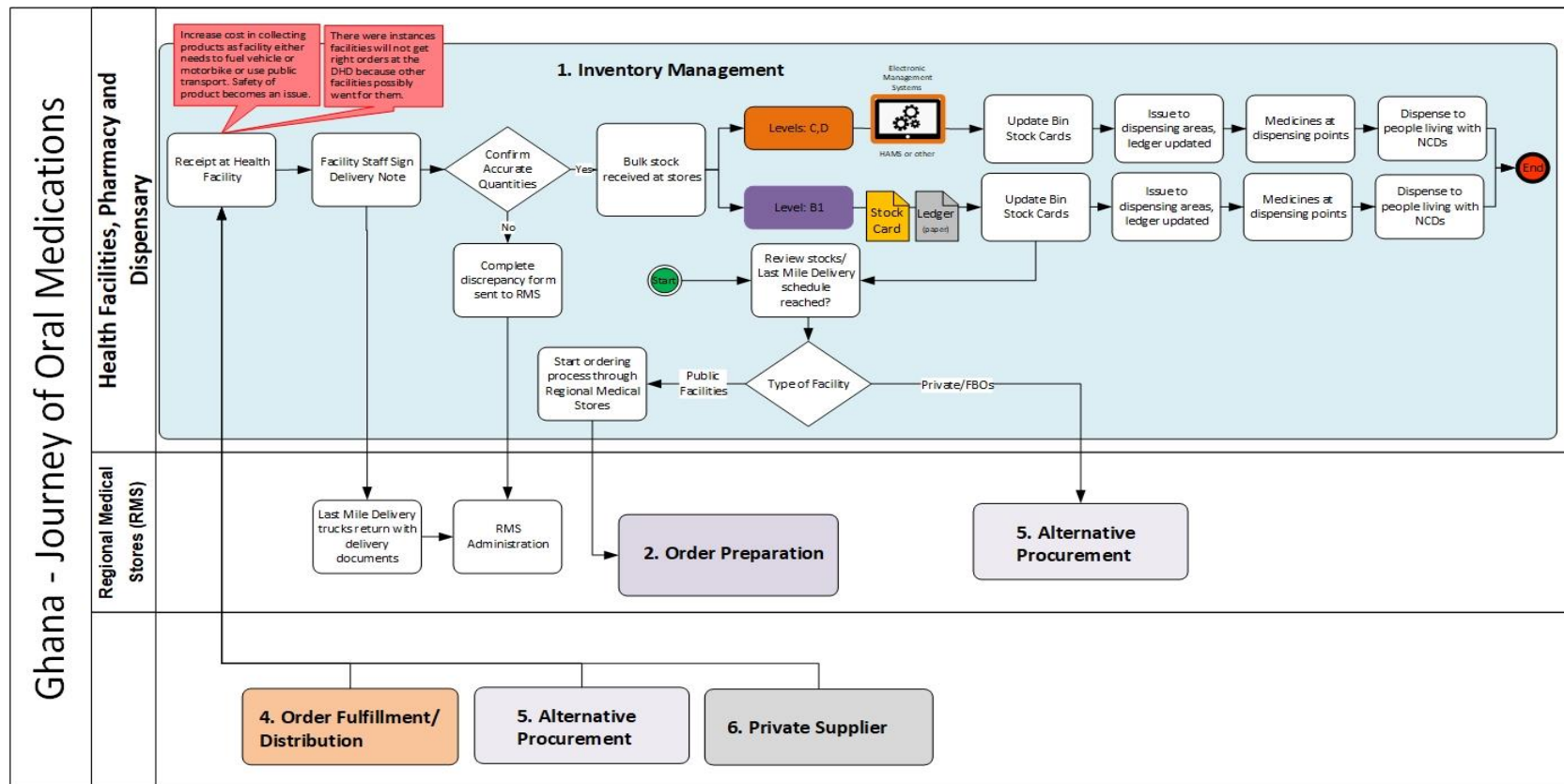


## Appendix 4. Ghana health supply chain process map

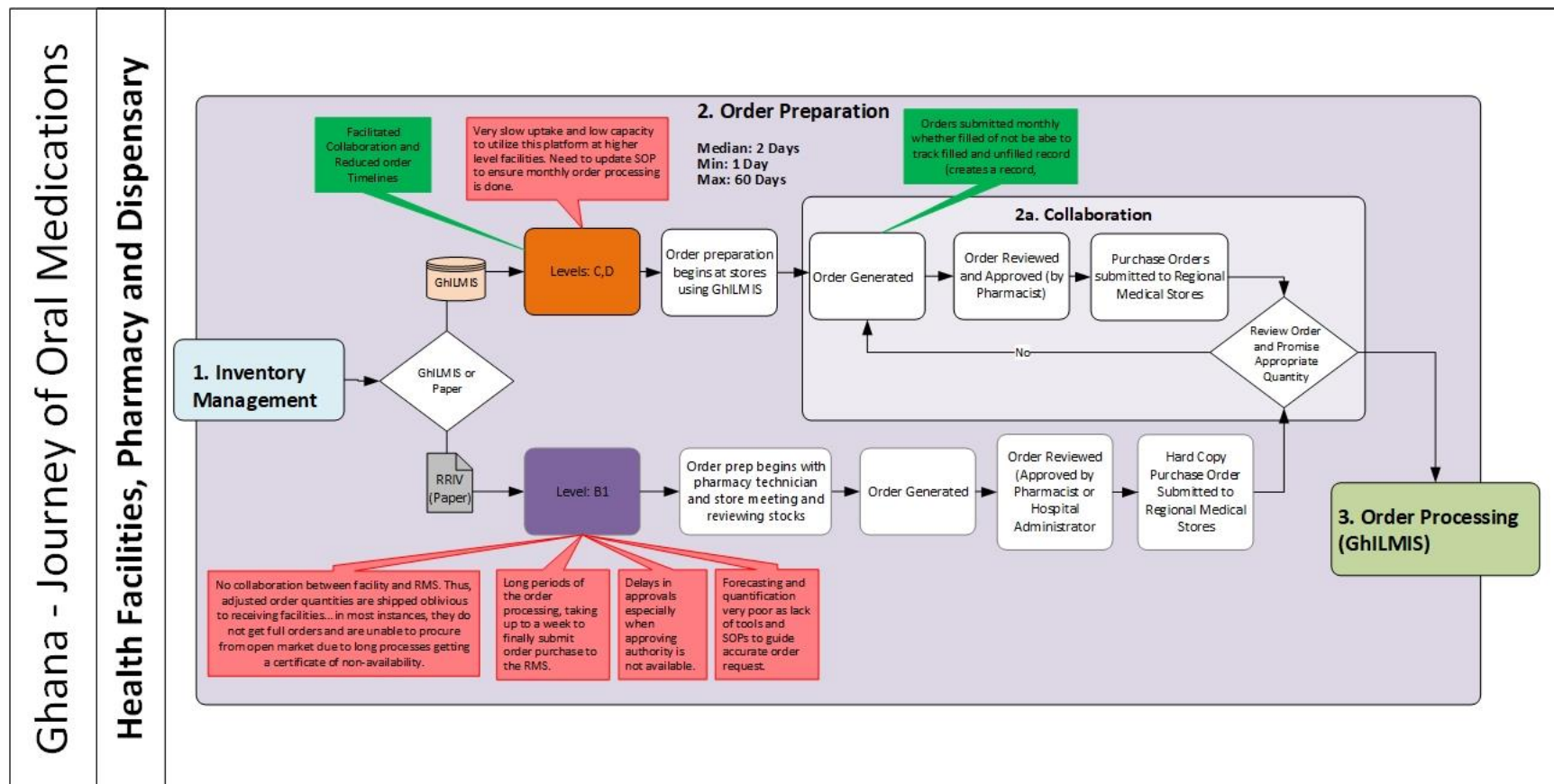




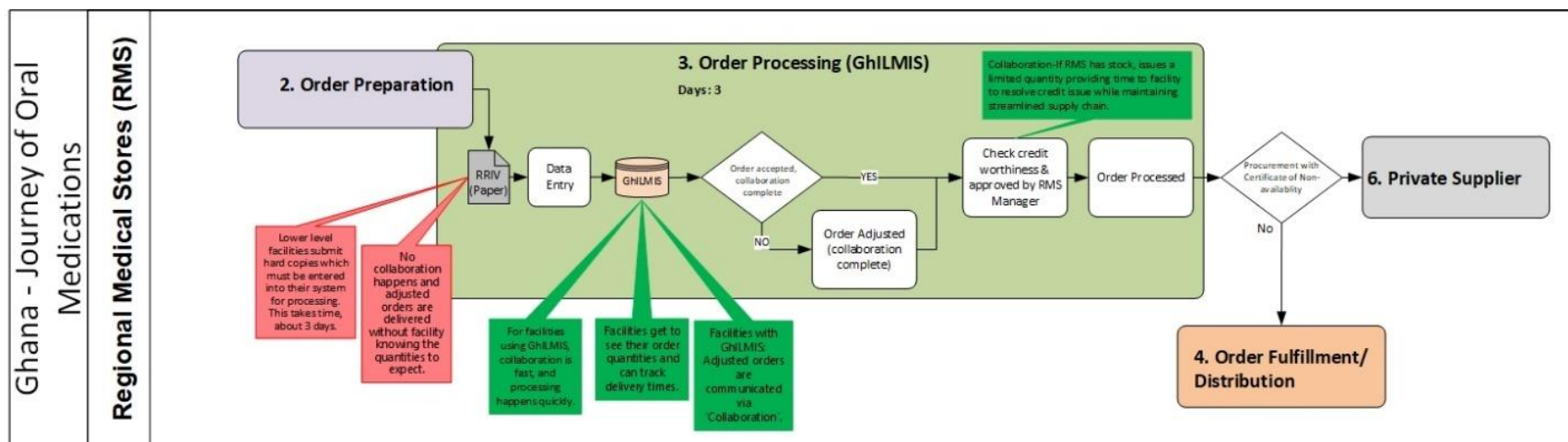
## Appendix 5. Inventory management process map



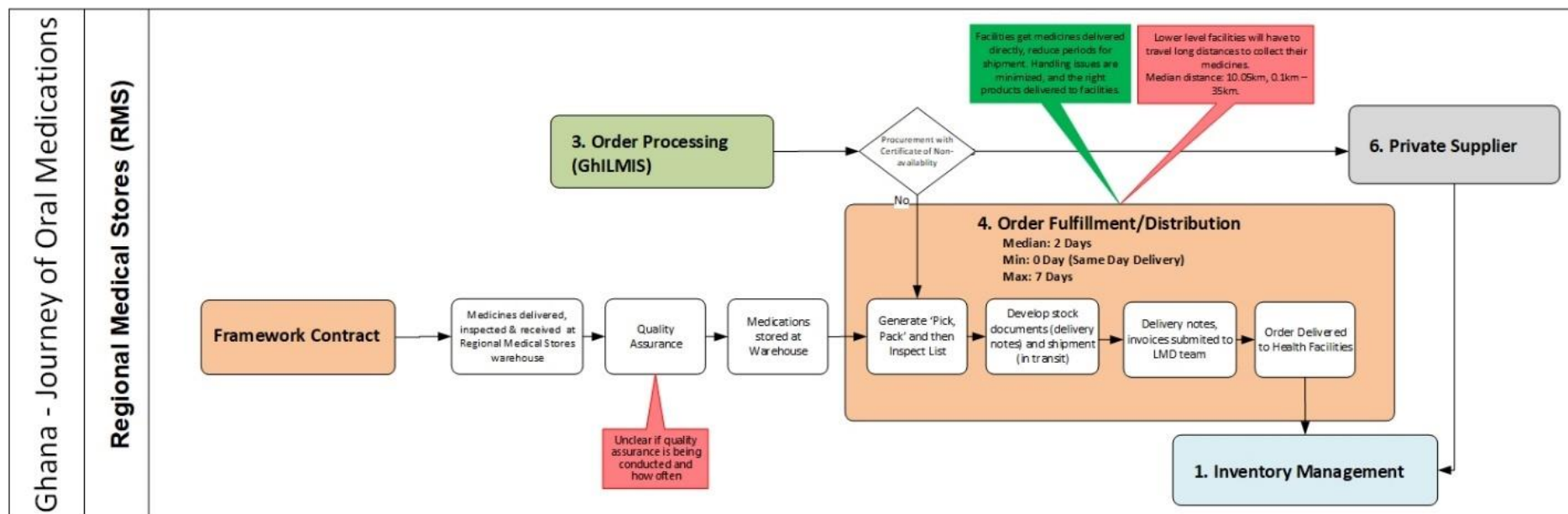
## Appendix 6. Order preparation process map



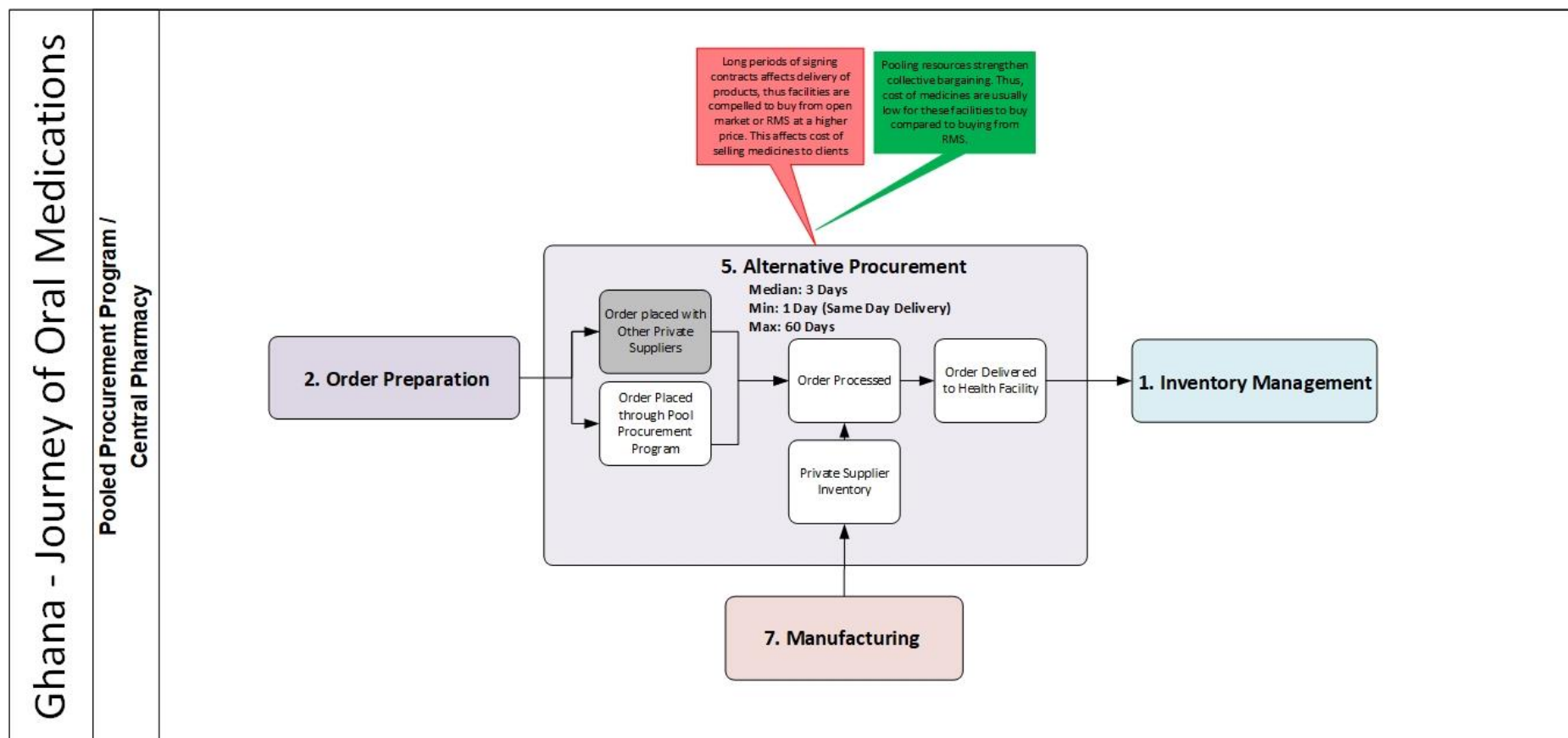
## Appendix 7. Order processing (GhILMIS) process map



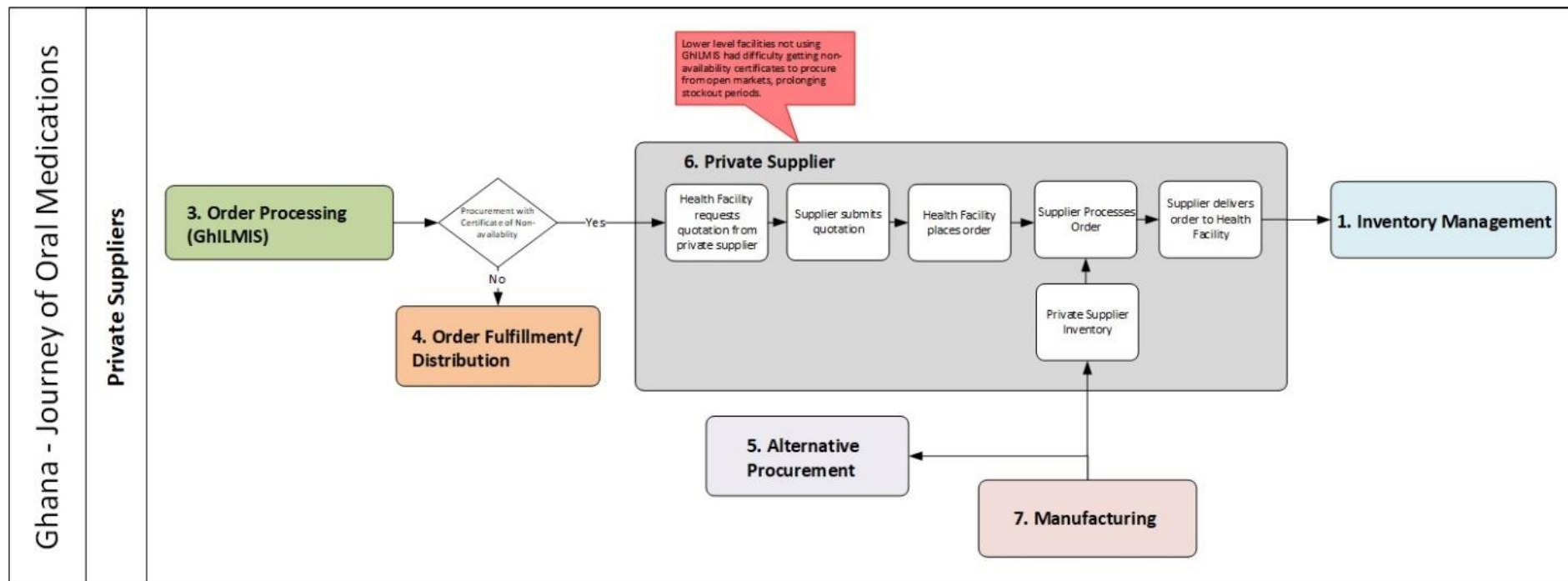
## Appendix 8. Order fulfillment and distribution process map



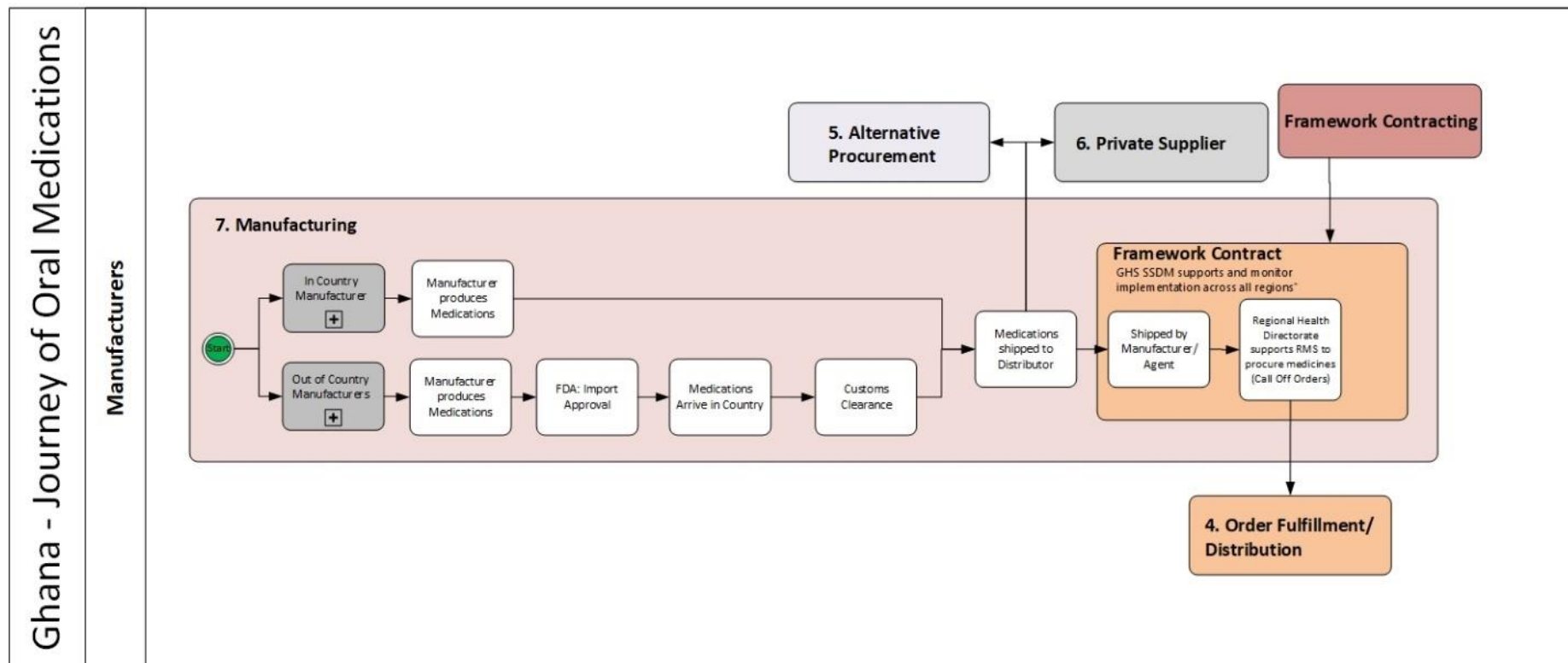
## Appendix 9. Alternative procurement process map



## Appendix 10. Private supplier process map



## Appendix 11. Manufacturing process map



## Appendix 12. Worksheet for setting maximum stock and re-order quantities

### Worksheet for Setting Maximum Stock and Re-order Quantities

(to be completed every six months)

Facility Name: \_\_\_\_\_

District: \_\_\_\_\_

Region: \_\_\_\_\_

	A	B	C	D	E
Product	Total Dispensed Past 6 Months	Average Monthly Consumption = A / 6	Maximum Stock Quantity = B x 3	Re-Order Quantity = C / 2	Emergency Order Point = D / 3
<b>Tablets and Capsules</b>					
Acetylsalicylic Acid Tab 300mg	3420				
Albendazole Tab 200mg	1580				
Amoxicillin Cap 250mg					
Artesunate + Amodiaquine Tab 50/153 mg (6+6 Tab Blister Pack)	360				
Chloroquine Tab 150mg	1200				
Metronidazole Tab 200mg	280				
Paracetamol Tab 500mg					
<b>Oral Liquids</b>					
Chloroquine Base 80mg/5ml	20				
Amoxicillin suspension 125mg/5ml, 100ml	240				
<b>Injections</b>					
Chloroquine Injection 40mg/ml	80				
Streptomycin injection 1gm					
Benzathine penicillin Injection 2.4mu	120				
<b>Medical Supplies</b>					
Blood Bags (Double)	20				

Copy the Maximum Stock Quantity, Re-order Quantity and Emergency Order Point in the appropriate box on the Inventory Control Card for each product.

Completed by: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

Verified by: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_



## Appendix 12. Requisition, issue, and receipt voucher

### Requisition, Issue and Receipt Voucher

Commodities to be received during the Month of (month, year).....

Facility Name: .....

District: .....

Region: .....

Date: .....

Serial No: 0038402

Voucher No: .....



Product	Commodity No:	Last month's Consumption	Usable Stock on hand	At or below re-order Quantity?	Quantity to reach Max	Minimum Units Issued	Unit Price	Quantity Ordered	Total Item Price	Quantity Issued	Unit Price at Issue	Total Item Price	Quantity Received	Folio Number
		A	B	C	D	E	F	G	H=F x G	I	J	K=I x J	L	M
Updated Price List														
<b>Tablets and Capsules</b>														
Acetylsalicylic Acid Tab 300mg	002769 TAB			Y/N										
Albendazole Tab 200mg	002762 TAB			Y/N										
Amoxicillin Cap 250mg	002770 CAP			Y/N										
Artesunate + Amodiaquine Tab 50/153 mg (6+6 Tab Blister Pack)	002778 TAB			Y/N										
Chloroquine Tab 150mg	000765 TAB			Y/N										
Metronidazole Tab 200mg	001105 TAB			Y/N										
Paracetamol Tab 500mg	000159 TAB			Y/N										
<b>Oral Liquids</b>														
Chloroquine Base 80mg/5ml	001447 SYR			Y/N										
Amoxicillin suspension 125mg/5ml, 100ml	001448 SYP			Y/N										
<b>Injections</b>														
Chloroquine Injection 40mg/ml	000760 INJ			Y/N										
Streptomycin injection 1gm	000301 VIAL			Y/N										
Benzathine penicillin Injection 2.4mu	000760 INJ			Y/N										
<b>Medical Supplies</b>														
Blood Bags (Double)	000071 PCS			Y/N										
									Total Order Price		Total Issue Price			



Requisitioned by: .....

Name/Signature/Date

Picked by: .....

Name/Signature/Date

Received by: .....

Name/Signature/Date

Reviewed by: .....

Name/Signature/Date

Packed by: .....

Name/Signature/Date

Verified by: .....

Name/Signature/Date