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REVIEW

Moving towards a value-added procurement process in the medical laboratory in Africa

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Procurement processes are guided by rules and policy frameworks to ensure transparency and efficiency, and to avoid preferential treatment of any bidders. The process is usually managed by three committees, the bid specification (BSC), bid evaluation (BEC), and bid adjudication (BAC) committees, each of which has clearly defined roles. Personnel involved have diverse skills and expertise, which include legal, financial, and supply chain management.

Due to the scarcity of resources, many developing countries rely on donated equipment to address their healthcare needs. However, ill-defined donation practices culminate in these goods becoming a burden to the recipients. The World Health Organization (WHO) has developed donation guidelines to be considered by both the donor and recipient.

During a state of disaster, as was seen with the prevailing COVID-19 pandemic, governments around the world made large sums of funds available for securing resources necessary to sustain lives and livelihoods. Unfortunately, crisis situations provide fertile ground for inefficiency and corruption. Inexperienced officers often fall prey to overpriced supplies that may be of inferior quality. Governments with ample resources, out of panic, procure beyond what is necessary, overlooking the needs of low-income states.

This manuscript reports on the procurement process in resource-scarce settings, challenges associated with donated equipment, and emergency procurement practices experienced amid the unprecedented COVID-19 pandemic.

A well-managed procurement process is needed to enable medical laboratories to carry out their crucial role in the diagnosis, management, and prevention of disease. In Africa, there is a need for procurement systems to be accountable, transparent, effective, and efficient. The COVID-19 pandemic taught us that the traditional route of procurement, though slow-paced, has checks and balances that limit the misuse of resources and power.

Keywords: procurement process, tender, bid, laboratory reagents, laboratory consumables, laboratory equipment

Introduction

Medical laboratories play a critical role in the diagnosis, management, and prevention of diseases, as 70–80% of clinical decisions are based on laboratory results. For laboratories to play these key roles, the procurement process must be properly managed. However, the procurement of in vitro diagnostics and services remains a challenge in resource-restrained countries.[1] Furthermore, these countries are constantly confronted by the need to make a trade-off between available sophisticated technology and economic priorities.[2] The World Health Organization (WHO) recognises the importance of in vitro diagnostics and urges countries to carefully select, procure, and manage these technologies.[3] Failure to properly execute cautious procurement can result in broken or unused equipment, frequent stockouts leading to unavailable tests, and the expiring of reagents. We report on the procurement process in resource-scarce settings, challenges associated with donated equipment, as well as emergency procurement practices experienced amid the unprecedented COVID-19 pandemic.

Intricacies and disparities of the procurement process

The diagnostic supply chain is governed by six important factors, which include bringing the right product in the right quantity and right condition, to the right place at the right time for the right price. If one of these is incorrectly managed, even the best-equipped laboratory with exceptionally skilled staff will not be able to provide reliable and efficient laboratory services. Laboratories require constant upkeep and continuous access to essential laboratory commodities and reagents, both of which are necessary for laboratory testing.[3] Due to their complexity, efforts to improve the medical laboratory supply chain have not been very successful compared to the distribution of pharmaceuticals. For a single laboratory test, several commodities must be tailored to the laboratory's specific environment and circumstances.[4,5]

Laboratory commodities can be classified into reagents, consumables, and durables. Reagents include chemicals and biological agents used in laboratory assays for the detection or measurement of analytes. These reagents are sourced from different suppliers and thus vary widely in cost, stability, cold or cool chain requirements, availability, and associated hazards. Consumables are items required to perform the test and are mostly not reusable, such as pipettes, microscope slides, and cover slips. Other consumables cut across testing services and are referred to as general laboratory consumables, which include alcohol, bleach, and gloves. Durables are items that can be reused for multiple tests and include glassware and equipment.[6]

The variety of laboratory equipment and reagents required in most countries complicates the procurement process concerning the development of specifications and establishment of service contracts.[7] Additionally, high levels of diversity across the laboratory, diagnostic instruments, and services further contribute to the differing levels of compliance and expected service delivery standards.[8] Laboratory services are required to ensure standardised equipment without overreliance on a single manufacturer or supplier.[3,9]

Harmonisation of testing and the standardisation of laboratory equipment commands strong leadership, while coordination with the benefits of harmonisation and standardisation include reduced procurement costs using economies of scale.[9] Additional factors to consider include sustainable cost-effective laboratory services, comparable test results between laboratories, the implementation of quality assurance, standardisation of training modules, and the planning of laboratory maintenance. Harmonisation and standardisation also enhance the coordination of public and private sector partnerships, improved planning of preventive maintenance, the procurement of service contracts, the establishment of efficient, cost-effective and responsive service, as well as infrastructure maintenance. Laboratory equipment and reagents can be shared in the event of a breakdown or stock shortage.

However, the disadvantage of harmonisation is the overreliance on similar platforms and the vulnerability to supply bottlenecks.[10] Dependence on a single manufacturer or vendor encourages monopoly, which may lead to inflated pricing tendencies and cessation of production, eventually crippling the system. Furthermore, sole agents or suppliers often take a long time to install equipment in a diverse country and need more time to train laboratory personnel, due to geographical challenges and human resource constraints.[11]

On the other hand, an open system laboratory equipment policy does not require specific brands of reagents, thus they can be purchased from a large number of possible sources.[5] The increase in choice leads to the competitive pricing of reagents and reduces reliance on one manufacturer. Alternatively, a closed system generally provides high-quality results and is easier to manage.[3]

Equipment placement is an option in which the vendor owns the equipment and is responsible for its maintenance. This form of procurement is tied to reagent purchases, while in the case of equipment purchase or procurement, the buyer owns the equipment and is responsible for its maintenance. Equipment placement, as opposed to equipment procurement, can be useful for very expensive, highly sophisticated equipment. Equipment placement is advantageous because there is no need for initial capital outlay, lower prices per test, and flexibility in response to technology changes. Furthermore, equipment management issues are transferred to the vendor and include servicing of equipment.[11] In contrast, an outright purchase may be the most practical option for general-purpose laboratory equipment such as refrigerators, centrifuges, and heating blocks.[5]

The efforts invested in the planning and selection of suitable laboratory equipment result in fewer challenges in preventive and curative schemes.[10] In lower- and middle-income countries, undiscerning procurement processes have resulted in approximately 40–70% of medical devices and equipment being broken, unused, or unfit for purpose. This situation impairs service delivery to patients and results in lost resources.[2] Laboratory supply chain management is a weak link in laboratory network systems. The identification of best practices and common pitfalls in laboratory procurement may lead to improvement, which will not only ensure improved use of scarce financial resources, but also operational equipment that is used competently for improved patient care.[2] In effective and efficient healthcare systems, laboratory medicine should play a critical role, which is often not the case in Africa where there is mistrust of proficient laboratory performance.[9]

Selecting procurement approaches

In most African countries, a large portion of the population relies on the public sector for their healthcare needs. Governments are tasked with the responsibility to use public resources responsibly. In vitro diagnostics have become increasingly important in the diagnosis, monitoring, and evaluation of prognosis for a wide variety of disease processes. Selection should take into consideration disease processes in the community receiving the service.[5] Ideally, clinicians should be consulted at the beginning of the planning process to properly establish the needs regarding patient care. This approach tends to bring harmony and avoids the unnecessary provider-user divide. Laboratory professionals take the lead in this process.

A procurement strategy is driven by need, technical specifications and design, with prioritisation of equipment based on previous experience. An experience-based procurement approach is useful because both the positive and negative features of equipment will be known upfront.[3] Drawn specifications are such that the desired product can be aligned with the ambient conditions and infrastructure for service production. It is important that the procurement team considers the full lifecycle of the equipment and that other requirements such as reagents, maintenance, staff skills, and training as well as refresher courses are included to avoid unnecessary and unexpected costs.[7]

As circumstances in African countries may be different from those of the manufacturers, it is important to consider robust diagnostic technology that is adaptable to changes and improvements to scientific advancements. Selected in vitro diagnostics should have high specificity and sensitivity to avoid missed or false diagnoses. Owing to limited resources, supply chain management in low- and middle-income countries should focus on both affordability and the potential lifespan of the equipment to ensure sustainable long-term profitable use.

Deciding on the winning bidder

Procurement accounts for a large portion of goods and service acquisition in both the public and private sectors. Unbiased, competitive, equitable bidding is encouraged and plays an enormous role in public service. Before embarking on the procurement of goods or services, it must first be established that funds are available, the proper market research was done, a budget was planned, and the required goods or services are following the organisation's strategic plan.[3] The procurement process usually involves three committees, bid specification (BSC), bid evaluation (BEC), and bid adjudication (BAC) committees, each of which has distinct and specific roles. Individuals in these committees have diverse skills, which include technical, financial, legal, and supply chain management expertise.[12]

The BSC develops unbiased specifications, draws terms of reference, any special conditions and evaluation criteria, as well as the preparation of bid documents. Following the closing of advertisements, bid evaluation is carried out by the BEC. This process involves critical consideration of received bid responses to ensure transparency and fairness, and that the organisation receives value for money. This committee doesn't have the authority to decide on the winning bidder but can recommend to the BAC, who, after having studied the recommendations and all documents, can either accept or reject the proposed winning bidder.[12,13] The BAC scrutinises bid documents by looking for any mistakes or inconsistencies that may threaten the integrity of the buyer.

There are several approaches to bid evaluation, such as a simple scoring system whereby participants earn points based on the agreed system that was indicated upfront in the bid documents. Ideally, the preferred scoring system should be multicriteria based, as a single criterion such as looking only at the lowest price may disadvantage other bidders.[14,15] While others may choose sophisticated models, Lin and Chen suggested a simplified calculation in their fuzzy linguistic method for assessing bidders.[16-18] The buyer is legally bound to ensure that the call for tenders and indicated evaluation criteria are published, as well as ensuring that the evaluation process does not deviate from pre-determined criteria.[19]

Although price is important in the bidding process, especially in resource-scarce settings, the buyer needs to take a holistic approach and consider non-price attributes when deciding on the bidder. These attributes are valuable and will be clearly indicated in the specifications. The winning bid has to prove to be economically advantageous, thus price may not always be a major determinant as the buyer awards the bid to one with impressive characteristics and not necessarily to one with the lowest price.[17] Healthcare facilities prioritise equipment based on technical specifications, taking into consideration features that include durability, simplicity of use, electrical surge resistance, and meeting regulatory approval.[20]

It is the overall score that affords the winner the opportunity. The buyer needs to be consistent and transparent to avoid preferential treatment and may reject any bidder that appears suspicious, as this may result in questionable bidder integrity.[21] The buyer first chooses the extent of competition among sellers, and thereafter negotiates the terms of the contract with the winning seller.

Consequences of economic inadequacies

Most healthcare systems in Africa were inherited from colonial governments that were focused mainly on the healthcare of colonial administrators and expatriates. Furthermore, healthcare systems have been affected by the lack of investment, resulting in the general weakening of health infrastructure with foreign aid unable to resolve the issue of insufficient resources.[9] Most laboratory services within resource-poor countries face challenges which include shortage of financial resources, inadequate laboratory equipment, lack of skilled and trained personnel, and inadequate infrastructure (such as reliable electricity, water supply, and facilities). Many African laboratories are also affected by the lack of clear laboratory policies, insufficient management skills, poor equipment maintenance, inadequate supply chain management, and a lack of investment. These challenges all lead to weak health infrastructure.[22]

The other realities of procurement in Africa are the low exchange rate of currencies, difficulties in conducting foreign transactions, and corruption.[23,24] In an article assessing progress in harmonising tiered HIV laboratory systems in eight African countries, the lack of adherence to procurement policies was identified as one of the challenges faced by the countries.[8] In Africa there is a need for procurement systems to be accountable, transparent, effective, and efficient.

Donated laboratory equipment

Because of limited resources, several developing states rely on donated equipment for medical laboratory diagnostics and research. While this gesture may be well meant, it has proved to be vulnerable to misuse as donations do not always achieve their intended purpose but instead become a burden on the already restrained resource. Equipment donated with the best intentions may be problematic because of regional differences between the donor and recipient. These may include voltage incompatibility, lack of spares available locally, and limited technical expertise for equipment maintenance. Studies reported that over 90% of equipment in developing countries is donated, and of these, approximately 40% are out of service.[25,26] These unused pieces of equipment are not only occupying much-needed space but also affect laboratory service delivery and patient care.[27]

It is for this reason that there are guidelines in place when securing donated material to ensure the benefit of both the donor and the recipient.[28]

The WHO published guidelines outlining the principles that can be followed in equipment donation. Donation should benefit the recipient, be given with respect, and only be accepted if it is permissible and of acceptable quality to the donor. Additionally, the donation should only be made following effective communication and agreed on terms between the donor and recipient.[28] One of the most important requirements in the process is that the recipient has indeed expressed a need for the equipment, and has expertise as well as resources for equipment maintenance.

Impact of COVID-19 on procurement

Procurement of goods and services traditionally follows strict stipulated rules to ensure transparency and equity, and to avoid favouritism and corrupt activities.[29,30] Public procurement under normal circumstances is characterised by red tape and bureaucratic decision-making processes that involve multiple steps with complicated administrative forms. Accountability is achieved by subjecting processes to auditing and public scrutiny.

States of disaster such as floods, hurricanes, earthquakes, and epidemics necessitate the urgent acquisition of goods and services. Emergency procurement allows for the temporary suspension of the usual steps. This deactivation of procurement rules overlooks advertising and competitive bidding, leading to the rapid acquisition of required goods or services under extraordinary circumstances.[31] The unprecedented circumstances brought by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), the pathogen responsible for COVID-19, called for emergency procurement of medical supplies ranging from personal protective equipment (PPE), testing kits, equipment, human resources, and vaccines.

Countries around the world had to bend their procurement policies to allow for the acquisition of supplies. Contracts involving PPE (masks, gloves, aprons, sanitisers, goggles, face shields, and gowns) are the most awarded, costing multimillions of dollars.[32,33] Owing to the required need to act quickly to save lives and livelihoods, the relegation of signing powers and overlooking the rigorous procurement process allowed public sector officials to enter into a purchasing agreement with suppliers without going through a proper tendering process.[23,34]

Public procurement is challenged in an emergency. Procurement officers are under pressure to rapidly acquire the required goods and services. Out of desperation and because of limited supplies, officials may strike deals with inexperienced vendors who may even provide items of poor quality. Also, procurement processes may involve no-bid contracts that are likely to be costly.[35] Sole-source suppliers of laboratory diagnostics may charge exorbitant prices, as was seen at the beginning of the pandemic when SARS-CoV-2 testing was introduced.[36]

Many governments provided excessive funding and supported emergency procurement strategies. Owing to the lack of adequate policy and regulatory framework procedures that govern emergency procurement, many businesses and individuals, even those with no experience in medical supplies developed a sudden interest to benefit from funds.[37]

Problems could arise when transparency, conflict of interest and due diligence are overlooked. Such activities predispose officials to poor procurement practices and corruption. Businesses with connections to public servants usually have an added advantage and are generally favoured. This careless procurement tendency was observed in many countries, including South Africa and the United Kingdom.[32,33,37] Relaxed procurement rules amid the threatening health crisis provide government officials, even the inexperienced, with the authority to purchase supplies directly. The focus is mainly on material availability and speed of delivery, with buyers permitted to secure goods without considering competitive bidding or advertising.

Elsewhere, procuring authorities were encouraged to look for alternative, possibly innovative solutions.[38] While allowing for less stringent procurement is beneficial as it removes unnecessary delays, it tends to leave sufficient room for procuring inflated pricing, decreased accountability and transparency, with increased vulnerability to corruption and fraud.[39,40] Most governments sought to relax their procurement process to avoid being disadvantaged as suppliers may deliberately only sell needed products to buyers that can offer contracts and payment within a short period.[24]

Amid increased demand, international suppliers took advantage of governments, some even demanding upfront payment. The situation becomes reversed whereby instead of suppliers competing to secure a tender, governments competed for overpriced goods. The COVID-19 pandemic gave suppliers control of the markets, favouring a seller's market wherein multimillion deals were made.[31] Many governments developed policies to guide procurement amid the pandemic. Some clearly indicate the removal of publication requirements and that officials may contact suppliers directly with no limit placed on the number of suppliers that may be contacted.[32]

Some businesses may benefit from bribery when dealing with corrupt officials. In this instance, the focus will shift towards certain suppliers regardless of their exorbitant charges, even on goods of inferior quality. Greed and self-preservation culminate into inhumane practices wherein richer bidders overtook other bidders with materials that were already bought or agreed upon, being suddenly diverted to those with more financial resources.[31,34,41]

To avert the shortage of human resources, some countries recruited additional health workers nationally, requesting even retired professional workers to offer their services to newly constructed health facilities, and also seeking international aid, with many countries benefitting from the foreign medical teams.[42,43]

The COVID-19 pandemic's extraordinary situation also revealed other challenges, such as a shortage of sought-after supplies.

Competitive purchasing during the pandemic affected weaker public buyers. Greed and selfishness were observed during the procurement of vaccines as countries with ample resources were seen to hoard vaccines with others even contemplating booster doses, while many low-income countries, in particular those on the African continent, had not had their first jab.[35,41]

Lessons learnt from the COVID-19 pandemic is that although the traditional route of procurement is slow-paced with checks and balances, it, to some extent, limits the misuse of resources and power. While the system itself is not failproof, it provides an appreciable basis from which public service can improve to ensure transparent and equitable procurement contracts.

The pandemic has revealed loopholes in the emergency public procurement processes that laid fertile ground for corruption and self-serving tendencies. It has shown that the current measures of emergency procurement are not practical and that there needs to be a strategy to revise the approach to urgent procurement. Even during an emergency, there should be stern rules enforcing some level of transparency and accountability to eliminate ill practices and prevent favouritism. Although disasters that are usually encountered are hardly at the same scale as we have seen with the COVID-19 pandemic, there are many and they should be perceived as opportunities for effective emergency procurement.

Risks associated with poor procurement practices

The consequences of weak procurement practices are the inability to produce a quality laboratory result in a cost-effective manner and, ultimately, the loss of money. The laboratory manager is faced with the dual challenge of reducing costs while still maintaining consistent, high-quality laboratory test results. The risks associated with inferior laboratory procurement are far-reaching and include an increase in laboratory test result errors, long turnaround times, inaccurate diagnoses, and delayed or incorrect treatment. These could potentially result in weak healthcare responses, especially in under-resourced settings.

Potential risks in procurement are many, including product development, logistics, technological skills, delays, and overrun costs owing to incomplete or failed projects.[44] It is necessary to put together a risk assessment model in an attempt to predict potential failures in the process and plan measures to prevent occurrence. Strong leadership and political commitment are needed to ensure the development and implementation of policies that regulate procurement, donations, and disposal of diagnostics.[10]

Conclusion

To enable medical laboratories to carry out their crucial role in the diagnosis, management, and prevention of disease, there is a need for a well-managed procurement process. In Africa, there is a need for procurement systems to be accountable, transparent, effective, and efficient. The COVID-19 pandemic taught us that the traditional route of procurement, though slow-paced, has checks and balances that limit the misuse of resources and power.

Conflict of interest

The authors have no conflict of interest to declare.

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