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BENCHMARKING COSTS FOR NON-CLINICAL SERVICES IN BOTSWANA'S PUBLIC HOSPITALS

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BENCHMARKING COSTS FOR NON-CLINICAL SERVICES IN BOTSWANA'S PUBLIC HOSPITALS

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PREFACE

This report, *A Benchmarking of Costs for Non-Clinical Services in Botswana's Public Hospitals*, presents the methodology and findings of a study done to estimate the current costs of non-clinical services (i.e., cleaning, laundry, catering, and grounds maintenance) at public hospitals. This study was undertaken in the latter half of 2014. The need for this study arose out of the progress the Ministry of Health (MOH) has been making in the implementation of its outsourcing plan, laid out in *Health Services Outsourcing Strategy and Programme 2011-2016*. As more services have been outsourced at a greater number of hospitals, it is important for the MOH to have a better understanding of the total annual cost it incurs for the provision of non-clinical services, the drivers of those costs, and the unit cost of production for each service. Such information will aid the ministry in comparing the costs of public sector-led and outsourced service provision, making decisions regarding future outsourcing ventures – determining a fair contract price, getting value for money – and thereby strengthening the implementation of the current strategy and encouraging the pursuit of future ones.

The specific objectives of the Botswana cost benchmarking study for non-clinical services as outlined in the work plan were to:

1. Calculate the total estimated monthly and annual costs for each non-clinical service in each of the sampled hospitals
2. Provide estimates of the total direct and indirect costs for each non-clinical service in each of the sampled hospitals
3. Identify the cost drivers for each non-clinical service
4. Make recommendations on use of the study results, areas needing further investigation, and application of the costing tool.

In addition to the costing information, this study revealed strategic gaps in the monitoring of public sector service delivery. Many data needed for the analysis simply weren't available or had not been captured or tracked in a consistent manner. Study designers had to bridge these gaps by turning to commercial cost equivalents and extrapolating costs from a similar facility. As a result, the findings in this report should be taken as indicative rather than actual. Nevertheless, until better, more precise data are available, this study will play an important formative role in the implementation of the MOH's outsourcing strategy.

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ACRONYMS

BWP	Botswana Pula
DBES	Department of Building and Engineering Services
HFG	Health Finance and Governance
HIV	Human Immune-deficiency Virus
HQ	Headquarters
MOH	Ministry of Health
USAID	United States Agency for International Development

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EXECUTIVE SUMMARY

Botswana's health sector has embarked on a broad program of reforms and, to this end, the Ministry of Health (MOH) has developed the Health Services Outsourcing Strategy and Programme 2011-2016. This planning document emerges from major strategic thrusts outlined in the National Development Plan 10 and the revised National Health Policy. Decision makers at the MOH, as well as hospital managers and others involved in implementing the outsourcing strategy at the facility level, need to know, among other things, how much the provision of non-clinical services is already costing the government under the existing arrangements. The study described here intended to support the implementation of the outsourcing plan by generating actual costs for the delivery of four non-clinical services that are, or will be, the focus of future outsourcing efforts: cleaning, laundry, catering, and grounds maintenance. The study looked at costs in five public sector hospitals: Athlone District Hospital, Deborah Retief Memorial Hospital, Gumare Primary Hospital, Goodhope Primary Hospital, and Mahalapye District Hospital.

An analysis of the costs and cost drivers of delivering non-clinical services in hospitals that are not currently outsourcing service delivery provides a cost benchmark. This will enable MOH decision makers and implementers to better understand the costs and cost drivers of non-clinical services and to compare current costs with estimated private sector costs, effectively negotiate contracts, and move toward greater efficiency and cost-savings. Further, cost benchmarks will provide hospitals with the critical data needed to understand not only the cost foundation of outsourced services but also more about what they can expect to receive for that cost, such as the type, quantity, and quality of service or product they are purchasing.

The specific objectives of the Botswana cost benchmarking study for non-clinical services as outlined in the work plan were to:

1. Calculate the total estimated monthly and annual costs for each non-clinical service in each of the sampled hospitals
2. Provide estimates of the total direct and indirect costs for each non-clinical service in each of the sampled hospitals
3. Identify the cost drivers for each non-clinical service
4. Make recommendations on use of the study results, areas needing further investigation, and application of the costing tool.

The study is presented in six parts. The first part is an introduction that covers the background to the study as well as the study's objectives, scope, and limitations. The second part describes the methodology, the study sites, and data collection and management. Section three presents the results and findings of the study. Section four looks at the cost of non-clinical services as a proportion of the overall facility budget. The fifth section presents the estimated unit costs of non-clinical services by facility. Finally, section six provides for discussion and conclusions.

According to the data, the total costs for non-clinical service delivery ranged from about US$415,000 (BWP 3.7m) in Gumare Primary Hospital, to nearly US$1.5m (BWP 14.6m) in Mahalapye Hospital. For specific non-clinical services, the costs varied significantly. The most costly non-clinical service to deliver is catering, costing on average just under US$366,000 (BWP 3.4m) per year. Catering costs the most at Mahalapye Hospital, around US$870,000 (about BWP 8.1m). The least costly service to delivery is grounds maintenance, costing on average about US$36,900 (BWP 343,500).

The study revealed that, overall, direct costs were the greatest proportion of costs for the delivery of non-clinical services, accounting for, on average, over 80% of total cost across facilities. Indirect costs made up just under 18%. The primary cost driver in the direct costs, and overall, was supplies, averaging about 64% of all direct costs and 53% of total costs. This was followed by human resource costs, which averaged around 24% of direct costs and just under 20% of total costs. Of the indirect costs, management and operational costs are the most important drivers. Management costs average about 54% of all indirect costs and 9% of total costs. Operational costs account for on average about 42% of indirect costs and 7% of total costs.

The results of this study present indications of costs both in the aggregate, and for each service. While the study strives to provide useful data, it also recognizes the need for more in-depth studies that may, perhaps, be able to better address the significant challenges this study faced. It is hoped that this report will make a useful contribution to efforts being made by the MOH to outsource services by providing a reference for pricing service contracts and pursuing greater value for money.

1. INTRODUCTION

1.1 Background and Context

Botswana is classified as an upper-middle-income country with a population of just over 2 million people and a gross domestic product per capita of just under US$16,000 in 2014 (IMF, 2014). Despite the economic downturn in 2008/09, Botswana has increased its domestic spending on its health system every year and, according to revised 2013/14 estimates, investment in health is approximately US$530m (Bank of Botswana, 2013). Botswana's estimated per capita expenditure on health, US$384, is higher than any other Southern African Development Community country except South Africa (World Bank, 2015). However, while the government's expenditure on health has in the past exceeded the "Abuja target," which calls on African governments to contribute 15% of total government expenditures to health, current estimates place it more generally around 11% (Bank of Botswana, 2013, MFDP, 2014).

Despite the strides that have been made in health care in terms of health financing, and access to and availability of treatment, inequities persist in the health system. Populations in the remoter regions of the country continue to suffer from serious and preventable conditions. According to UNAIDS, Botswana has the second highest level of HIV prevalence in the world with 21.9% (20.8%–23.1%) of the adult population aged 15–49 years estimated to be infected (UNAIDS, 2013). High HIV prevalence has, in turn, meant high levels of HIV/TB co-infection rates, and there are still high rates of under-five mortality due to prematurity and acute respiratory infections.

Thus, while performing relatively well, in comparison to regional and global standards, the Ministry of Health (MOH) realizes that it must do more. In an environment of continuing health challenges and increasingly constrained domestic resources, where overall government revenues and, hence, expenditure is expected to gradually, and continuously, decline in the medium to long term, the MOH, and government more generally, is implementing broad reforms to increase the efficiency of its operations. Additionally, donor support for health, as well as other areas of cooperation, is expected to decline significantly in the coming years, precipitating the need for greater rationalization of funding, prioritization, and the application of alternative strategies to maintain quality health service delivery. As part of these reforms, the MOH has adopted a strategy whereby non-clinical services are being outsourced to private sector service providers in a bid to extricate itself from non-core functions and to increase allocative efficiencies in the public health system.

To this end, the MOH has developed the Health Services Outsourcing Strategy and Programme 2011-2016. This planning document takes as its precedent the National Development Plan 10, which has already identified outsourcing of non-clinical services to the private sector as one of its key strategies, and the Presidential Directive CAB 3 (8)/2011, which lays out the general approach to outsourcing and specifically tasks the MOH to take the lead in this area (MOH, 2011a). The move to outsourcing has also been written into the language of the revised National Health Policy. The policy describes outsourcing as an important part of the overall health systems strengthening agenda and directs the MOH, with broader government support, to "explore and develop contracting-out arrangements, based on agreed standards, with NGOs and the private sector . . ." for the delivery of both clinical and non-clinical services (MOH, 2011b).

As part of the MOH's Health Service Value Chain, under support services are Patient-related Non-medical Secondary Processes such as laundry and catering services, and Patient-remote Tertiary Process such as landscaping or grounds maintenance. The first areas that the ministry targeted for outsourcing were those services deemed to have low supply risk and low financial impact. These include laundry, catering services, cleaning, porter and grounds maintenance services, and security

services. The plan for outsourcing describe a phased approach where different services are to be outsourced at different facilities over the short term (2011/12-2012/13), the medium term (2013/14-2014/15), and the long term (2015/16) (MOH, 2011a). Currently, the MOH is also outsourcing some clinical services such as specialist health services, lab, managed care (referrals to private hospitals in Botswana and South Africa), warehousing and distribution of medicines and consumables at Central Medical Stores and dispensing of chronic medication.

While the MOH is moving ahead with its program of outsourcing specific services, there remain a few areas that require clarity to enhance understanding, planning, management, and implementation at the ministry and facility levels. These include:

- The current state of non-clinical service provision in public sector hospitals both in terms of implementation and quality
- Limited management capacity for managing stakeholder relations across sectors
- Differing views on outsourcing primarily between the MOH and trade unions (MOH, 2011a)

Decision makers at the MOH, as well as hospital managers and others involved in implementing the outsourcing strategy at facility level, need to know, among other things, how much the provision of non-clinical services is already costing the government under the existing arrangements. An analysis of the costs and cost drivers of delivering non-clinical services in hospitals that are not currently outsourcing service delivery will provide a cost benchmark. This will help MOH decision makers and implementers to better understanding the costs and cost drivers of non-clinical services, putting them in a better position to compare current costs with estimated private sector costs, effectively negotiate contracts, and move toward greater efficiency and cost-savings. Further, cost benchmarks will provide hospitals with the critical data needed to understand not only the cost foundation of outsourced services but also more about what they can expect to receive for that cost, such as the type, quantity, and quality of service or product they are purchasing.

The Health Finance and Governance (HFG) project, with support from the United States Agency for International Development (USAID), was tasked with exploring the costs and cost drivers of providing non-clinical support services at health facilities in Botswana to assist the MOH with planning, managing, and implementing its outsourcing strategy and program. This report provides an approach to examining and estimating the public service cost of providing non-clinical services to provide a baseline for assessing future private sector contracts and for making broad comparisons related to the costs and cost savings of a public sector or privatized approach to non-clinical service delivery in the health system.

1.2 Study Objectives

This study is aimed at providing support to the implementation of the MOH's five-year outsourcing plan, the Health Services Outsourcing Strategy and Programme 2011-2016, by generating actual costs for the delivery of four non-clinical services that are, or will be, the focus of outsourcing efforts: cleaning, laundry, catering, and grounds maintenance. The study analyzed the direct costs (human resources, equipment, consumables, etc.) and indirect costs (training, management, operational costs, etc.) of delivering these services at a sample of district hospitals that are currently not outsourcing to the private sector: Deborah Retief, Goodhope, Gumare; and two where outsourcing has started: Athlone and Mahalapye. The study results identify, among other things, total cost for each service delivered, cost by facility, and the cost drivers for each service. The study supports the MOH by putting it in a better position to compare current, actual costs with estimated private sector costs, negotiate contracts, and move toward greater efficiency and cost-savings.

Further, by collecting additional cost, quality, and quantity data from hospitals currently outsourcing services, subsequent analyses can build upon the data presented in this report to assess the costs

and benefits of outsourcing services with a particular focus on the quality of the non-clinical services being delivered.

1. The specific objectives of the Botswana cost benchmarking study for non-clinical services as outlined in the work plan were to:
2. Calculate the total estimated monthly and annual costs for each non-clinical service in each of the sampled hospitals
3. Provide estimates of the total direct and indirect costs for each non-clinical service in each of the sampled hospitals
4. Identify the cost drivers for each non-clinical service
5. Make recommendations on the use of the study results, areas needing further investigation, and application of the costing tool.

1.3 Scope of the Study

The benchmarking study of costs for non-clinical services in Botswana was conducted in five Government of Botswana-operated hospitals that were identified and agreed on with the MOH:

1. Athlone
2. Deborah Retief
3. Goodhope
4. Gumare
5. Mahalapye

While all at the same operational level, the participating district hospitals were purposively selected to represent the varied conditions of facilities in the public sector health system: from older hospitals like Deborah Retief to new, modern facilities like Mahalapye, and from hospitals like Athlone, serving more urban, built-up areas, to more remote and rural locations like Gumare. Despite the objective of costing non-clinical services in facilities that had not outsourced provision to the private sector, a number of the facilities in the study had already started outsourcing one or more service areas. Having started the outsourcing only recently, however, the study was able to collect and use the hospitals' data on non-clinical service delivery prior to outsourcing.

The non-clinical services selected for the study were based on agreement with the government and covered all service areas indicated in the Health Services Outsourcing Strategy and Programme 2011-2016 to be outsourced to private sector suppliers. The study did not cost security services because this is one non-clinical area that has already been outsourced in nearly all government facilities.

2. METHODOLOGY

2.1 Study Description

The benchmarking study of costs for non-clinical services in Botswana is a mixed-method study that includes both descriptive and analytical components. The overall design involved close collaboration with the MOH Office of Strategy Management to select the health facilities that would make up the study sites, to identify and agree on the non-clinical services that the MOH considered most important in terms of capturing costs, and to support refinement and pre-loading of the data collection tool. The study followed six steps as summarized in Table 1.

Table 1: Overview of Study Design and Approach

Steps	Description
Step 1: Consensus building	This involved discussions with key stakeholders including representatives of senior management and the MOH Office of Strategy Management, USAID, the Public Enterprises Evaluation and Privatisation Agency, and other partners supporting the MOH reform agenda, especially outsourcing to the private sector and the development of public-private partnerships. Consensus was built around the areas with which the MOH would need assistance and support, the scope of the overall work plan (including the costing activity), and potential challenges.
Step 2: Agreement on Benchmark Costing exercise approach and methodology	Through consultation with the MOH Office of Strategy Management and with HFG staff in the United States, key aspects of the study design were agreed including the number of facilities (three district hospitals, Athlone, Deborah Retief, and Mahalapye, and two primary hospitals, Goodhope and Gumare), the costs to be captured, and data collection strategy, as well as a general timeline for completion of each stage of the work.
Step 3: Development, piloting, and approval of data collection instruments	The Excel-based data collection tool was developed by constructing a series of interlinked worksheets, one for each of the direct and indirect costs of each non-clinical service being costed, These costing worksheets were combined into a workbook for each facility and were supplemented by a general information worksheet, a contact worksheet, and support worksheets in the form of a "useful lives" list for all equipment, and a master list that would contain all the data in the form of drop-down lists in each of the costing worksheets. Data were pre-loaded by the HFG in-country technical contributor working with the domestic and laundry officer from Princess Marina Hospital in Gaborone. Through this consultative process, key data that were generalizable across facilities (e.g., human resources cadres by non-clinical service, some supplies and consumables, and some equipment) were pre-loaded into the data collection tool. The tool was piloted at Athlone Hospital in Lobatse during the week of October 6-10, 2014. This piloting process brought to light a number of simple modifications that would be needed for the data collection tool to be approved and ready for wider use. Among the observations, it was determined that the tool needed more capability to manually input data, the pre-loaded lists were often long and cumbersome to use (e.g., equipment lists for catering), and there were a few areas where some key data were missing and would need a place to be entered (e.g., monthly utility bills for the facility). The tool was revised and was ready for use on October 13.
Step 4: Recruitment and training of data collectors	A total of four data collectors were recruited from the University of Botswana to apply the data collection tool in the five health facilities selected for the study. The training they received was in three parts. The first was an introductory overview and brief of the assignment. This presented the study, the method, and the context of health sector reform into which the study fit. The second was a two-day session that took them through all the various sections of the data collection tool, its lay-

Steps	Description
	out and data requirements. They were provided with "dummy" data to input into the tool to understand how the tool reacted when filled in. The second part of the training was through the piloting process of the data collection tool. Over the course of the week, the data collectors were accompanied by the HFG's in-country technical contributor to the study so that he could demonstrate various data collection techniques, point out whom to talk to in order to get the required data, and how to present and explain the project and the tool to hospital management.
Step 5: Data collection, validation, and verification	Data collection lasted from the pilot stage of testing the tool at Athlone Hospital during the week of October 6, 2014, through to the end of the week of October 24, 2014. The week of October 27-31 was used for follow-up to fill data gaps that emerged at each facility, as well as validation and verification of data that were obtained. After the follow-up week, the data collection tool for each hospital was completed to a near finalized level. However, despite the weeks of data collection from facilities and another trying to fill gaps, and validate and verify what had been obtained, numerous important voids remained, which required subsequent data tracing, capture, and validation. Among the data gaps were equipment costs that were not obtainable at either the facility level or at MOH HQ, some commodity costs, and monthly utility costs for nearly every facility. This involved following up with specific contacts at the health facilities as well as MOH HQ, finding sources for the cost, capacity, and electrical/water consumption of equipment, and tracking down some commercial commodity prices.
Step 6: Estimation of costs, analysis, and reporting	Once captured, validated, and used to populate the costing tools, the data were analyzed to produce cost estimates for each of the non-clinical services under investigation. Drawn from the summary worksheets from each of the data collection instruments, the analysis in the final report presented the cost of non-clinical services from a number of perspectives including central level, facility, and individual service.

2.2 Study Sites

The implementation of the MOH's policy to outsource non-clinical services to the private sector is initially focused only on referral and district hospitals. Table 2 lists all 27 hospitals and the current status of the outsourcing strategy in each. Several considerations attended the selection of study sites.

1. The scope of the study would dictate the number and geographic dispersion of facilities that would be able to be included.
2. As much as possible, site selection should include facilities of different size, localities (rural, urban), and age.
3. Sites should include all non-clinical services and should not yet have any services outsourced.[1]

[1] Both Athlone Hospital and Mahalapye Hospital had already starting outsourcing laundry services to the private sector. At Mahalapye Hospital, where the move to outsourcing was only within its first six months, the study was able to address this by costing the service as though it was still being provided through the public sector. This was possible because fairly recent records existed of the costs involved in delivering laundry services. At Athlone Hospital, where laundry services had been outsourced for more than two years, there were very little data that could be used to reconstruct the cost of laundry services prior to outsourcing.

Table 2: District-Level Health Facilities and Status of Outsourcing

Health District	Facility	Non-clinical Services Outsourced				
		Cleaning	Laundry	Catering	Grounds	Security
Ngamiland	Maun Hospital	✓	✓			✓
Northeast	Masunga Primary Hospital					✓
Palapye Sub-district	Palapye Primary Hospital					✓
	Bobonong Primary Hospital					✓
Bobirwa Sub-district	Mmadinare Primary Hospital					✓
Kweneng East	Scottish Livingstone Hospital	✓	✓			✓
	Thamaga Primary Hospital		✓			✓
Gantsi	Gantsi Primary Hospital					✓
Mahalapye Sub-district	***Mahalapye Hospital***	✓	✓			✓
	Sefhare Primary Hospital					✓
Kgatleng	***Deborah Retief Memorial Hosp***					✓
Chobe	Kasane Primary Hospital					✓
Kgalagadi South	Tsabong Primary Hospital					✓
Tutume Sub-district	Tutume Primary Hospital					✓
	Gweta Primary Hospital					✓
Boteti Sub-district	Rakops Primary Hospital					✓
	Letlhakane Primary Hospital					✓
Okavango	***Gumare Primary Hospital***					✓
Gaborone	Princess Marina Referral Hospital	✓	✓		✓	✓
Francistown	Nyangabgwe Referral Hospital	✓	✓		✓	✓
Lobatse	***Athlone Hospital***		✓			✓
	Sbrana Mental Referral Hospital	✓	✓		✓	✓
Selibe Phikwe	Selibe Phikwe Govt. Hospital					✓
Goodhope Sub-district	***Goodhope Primary Hospital***		✓			✓
Kgalagadi North	Hukuntsi Primary Hospital					✓
Serowe Admin. Authority	Sekgoma Memorial Hospital	✓	✓			✓

In consultation with the Office of Strategy Management, and taking into account the project parameters and the growing complexity of the progress of health sector reforms and the transition to the outsourcing of services to the private sector, five hospitals were purposively selected (Table 3).

Table 3: Selected Health Facilities

Facility	Number of Beds	Inpatients (Annually)	Outpatients (Annually)	Budget (US$)
Mahalapye Dist. Hospital	260	8,178	97,595	2,598,626.32
Deborah Retief Memorial Hosp.	240	4,493	79,604	1,214,243.82
Athlone District Hospital	177	4,973	64,104	3,621,383.36
Goodhope Primary Hospital	34	1766	14789	808,326.17
Gumare Primary Hospital*	34	2,489		

Note: Health facilities are listed in order of capacity.

*Gumare Primary Hospital was unable to provide the number of outpatients seen annually at the facility due to record-keeping challenges.

2.3 Data Collection, Management, and Analysis

This section contains brief explanations of the data collection, management, and analyses processes.

2.3.1 Development of Data Collection Tool

The Auxiliary Services Costing Tool was developed for this study to assist with the collection, categorization, and determination of costs for each non-clinical service under review (i.e., cleaning, laundry, catering, and grounds maintenance). The tool and its outputs can be used by hospital administrators, as well as MOH management and policy makers to gain insight into and understanding of the costs of non-clinical service delivery through either the public or private sector. Development of the tool was initiated within the context of the USAID-supported HFG project's activities in Botswana. It is an Excel-based tool with separate sections devoted to each non-clinical service and was designed for quick adaptation to multiple country contexts to support the collection and analysis of non-clinical service cost information, and to provide insights into several key questions:

1. What is the total monthly and annual cost for each non-clinical service: cleaning, laundry, catering, and grounds maintenance?
2. What are the total monthly and annual direct and indirect costs for each non-clinical service?
3. What are the primary cost drivers for each non-clinical service?
4. What are the costs for each service in relation to the inpatient and outpatient volumes of each facility?

The outputs of the tool may also be useful to the MOH and individual health facilities by providing a basis for comparing the costs of non-clinical services that have been outsourced and those that have not. Additionally, in conjunction with other tools, the outputs of the tool could also be used to form the foundation for an evaluation of performance or cost-benefit of each non-clinical service.

The Auxiliary Services Costing Tool has three main sections. Section 1 comprises:

- Facility data including the facility's name, location, and size; its annual budget; the annual number of inpatients and outpatients it sees; and the number of beds and offices it has
- The local currency and the exchange rate at the time of data collection

Section 2 is the largest and is divided into sub-sections, each dealing with a specific non-clinical service. These sub-sections are further divided into a number of worksheets dealing with all the direct or indirect cost inputs:

- Both public sector or contracted personnel[2] costs
- Consumable costs and quantities
- Capital and non-capital equipment
- Training
- Vehicles
- Management
- Operational costs including utilities, telephone, waste management, and the proportional allocation of overall building operations costs to the service provided

Section 3 is the calculations and summary section, which draws on the data input into each of the direct and indirect cost pages and presents them graphically. This allows the user to see a useful analysis of the data at a glance.

To make data collection as easy and user friendly as possible, development of the tool tried to include as much data "pre-loaded" into each Excel worksheet as possible. As far as possible, for each service area, common equipment, supplies, and personnel, as well as their costs, were input into the tool prior to data collection. While this was found to be effective with regard to personnel, where deployment and salaries were largely standard across facilities, and with the majority of equipment, it was less successful for supplies, where the costs varied markedly across facilities. As supplies are procured locally, rather than centrally, and suppliers may change once a contract has come to term, prices for supplies could not be standardized. Therefore, many of the supplies and their costs had to be manually input into the Excel worksheet.

The tool was able to facilitate data collection by organizing the data required into direct and indirect costs for each non-clinical service in the study. The tool provided a standardized method of capturing the data needed for the study across all of the selected facilities. Each member of the data collection team had tools loaded onto a laptop computer that they would copy for each facility visited. A limitation of the application of the tool was that, for some sections (e.g., equipment and consumables for catering), the amount of data required proved to be a labor- and time-intensive exercise for the hospital informants. As an easier method, these long lists of equipment and consumables were often lifted from the data collection forms and printed onto separate sheets that were then distributed to informants to apportion the overall data collection load between them. These sheets were left with staff, to enable them to quantify all necessary items, individually or in teams, while data collectors followed up other data sources. The sheets were then gathered by the data collectors and for entry into the Excel data collection tool at a later time.

2.3.2 Selection of Data Collectors

The data were collected by two teams, each with two data collectors. The in-country technical contributor supervised the teams. Data collectors were selected based on past participation in research studies conducted by government agencies, independent research firms, or the University of Botswana. Interviews for the data collector positions were conducted over the last two weeks in

[2] This was inserted into the tool to cater to the possibility that the health facility might have contracted in laborers to perform specific tasks or events, rather than using permanent staff, or to fill a short-term human resource gap. This can take the form of day-labor or staff contracted through an external agency. This situation was not observed in any of the hospitals in the study.

July 2014. As mentioned in Table 1, the data collectors received a three-part training. The separate training events were conducted with the data collectors:

- ***August 4, 2014*** – a one-day introductory meeting to provide an overview and brief of the assignment, to present the study and its methodology, and to provide context in terms of the ongoing health sector reform agenda.
- ***October 2-3, 2014*** – a two-day session that briefly reviewed the training session held in August, and then took the data collectors through all the various sections of the data collection tool, its lay-out, and data requirements. They were provided with "dummy" data to input into the tool to understand how the tool reacted when filled in. The data collectors also had to work with modifying the Excel workbooks to function appropriately in the previous version of Excel that they were all using.
- ***October 6-10, 2014*** – the piloting process of the data collection tool at Athlone Hospital in Lobatse. Over the course of the week, the data collectors sharpened their data collection skills, interacted with health facility personnel from all relevant departments in order to get the required data, and benefited from the introductions made by the in-country technical contributor, in which the project and tool was explained to hospital management.

Data collection teams were assigned specific facilities in which to collect data. Including the piloting of the data collection tool, field data collection took place between October 6 and October 24, 2014. Each team was provided with a vehicle and spent five days per facility. Field work locations by data collection team are summarized in Table 4.

Table 4: Field Work Locations by Data Collection Team

Team 1	Goodhope Primary Hospital
	Gumare Primary Hospital
Team 2	Deborah Retief Memorial Hospital
	Mahalapye Hospital

*The fifth facility, Athlone Hospital, had served as the pilot facility for the testing of the data collection tools.

2.3.3 Sources of Data

Data were collected from various sources. Table 5 summarizes the most important data sources for the various components of the costing study.

Table 5: Summary of Data Sources

Type of Data	Source of Data
Human resource costs (personnel salary and benefits; time)	The personnel costs were obtained by reviewing MOH staffing structures and salary ranges for each cadre and rank involved in the delivery or management of non-clinical services. External or contracted staff costs were not applicable to this study as we were only concerned with MOH costs and not a comparative cost analysis. Personnel costs also included the total number of days staff worked per year, and the percentage of work time each cadre devoted to each non-clinical service. The time devoted to the delivery or management of each non-clinical service was obtained through key informant interviews with staff to arrive at the cost for human resource inputs. Full-time equivalents were also calculated for human resource inputs to non-clinical services.

Type of Data	Source of Data
Consumables	The cost data and quantities used per month of consumables for each non-clinical service were obtained from facility supply personnel. These records were generally well kept as procurement is handled locally and on a rolling basis with local businesses that have been awarded a tender to supply the health facility. Where some quantities consumed per month were not clear, were missing, or could not be estimated, consumption volumes were estimated using the same from equivalent facilities.
Equipment	The inventory and cost data of both capital and non-capital equipment, vehicles, and other assets were to be obtained through facility personnel and records at the Supplies Department. However, inventories for non-clinical services were rarely kept, requiring on-site inspection and cataloguing of equipment. Additionally, records of equipment purchases at Supplies Departments were rare, making it difficult to determine age. In some cases, equipment was moved around from facility to facility, while others were quite old and records at the facility could not be found. In many instances, facility personnel indicated that purchases of such equipment was done at the MOH level. This required follow-up with the MOH department in charge of procurement, which was also a challenge, because many records of specific equipment at specific facilities could not be located. As a result, it was agreed with the Office of Strategy Management that commercial equivalent costs for equipment would have to be used. These were sourced via the Internet through suppliers either in South Africa or the United States. These nominal costs were then applied to equipment inventoried on site. Where equipment may have been shared between non-clinical or other services, costs were apportioned based on the total time the equipment was used for the non-clinical service for which data were being collected.
Utilities and other services	Cost data for utilities for each non-clinical service were captured by totaling all consumption over the period of a month. To estimate the approximate cost of the monthly utility consumption, the total was calculated based on the standard unit price (e.g., per KwH, or per Kiloliter). Telephone usage was estimated based on the number of telephone lines either wholly or partially dedicated to each non-clinical service as a proportion of the total number of phone lines for the facility and hence, the cost per service was to be calculated as a proportion of the total bill. Similarly, costs for waste management were estimated based on the total kilograms of waste removed for each service as a proportion of the total cost for waste removed for the entire facility.
Facility data	Data including annual inpatient and outpatient numbers, facility size, hours of operation, and number of consulting rooms/offices were captured from hospital records, or through interviews with key staff. Only one facility (Mahalapye Hospital, due to its being rather new) was able to produce total facility size. Where facilities did not have any estimate, follow-up was done at town/district council planning offices where site plans were supposed to be stored. No site plan for any hospital was located at these offices, however.
Training	Information on the number and duration of the trainings carried out over the 12 months prior to the study, who was trained, the skills trained for, and the person responsible for delivering the training was all obtained through interviews with relevant administrative staff at each facility. Since all trainings were conducted in the facilities, the cost per training is calculated based on the human resource time invested either through participation or through facilitation. This might be a slight underestimation because this cost does not include any meals (which may have been provided through the catering services) or training materials.

2.3.4 Data Capture and Management

Each team of two data collectors divided themselves so that each person could cover two non-clinical services over the course of the week at each of the facilities selected for the study. Each member of a data collection team had a laptop computer with the data collection tool pre-loaded. To create a tool for a specific facility, the data collectors copied the original data collection tool and renamed it according to the facility. Based on lessons learned during the piloting of the data collection tools, the data collectors were also in possession of notebooks; printed lists of, specifically, the catering equipment and supplies/consumables; and letters introducing the data collectors and the data collection exercise that were issued through the Office of Strategy Management at the MOH.

Data capture began with health facility administration to capture overall facility data. The data collectors were then introduced to the various key informants for each of the non-clinical services. Data collection was largely paper based as it was easier in most instances to be mobile and collecting data using the notebooks than setting up the computers. Generally, data collected during the day were transposed and input into the data collection tool at night. Data entry was updated every day.

Once field data collection was complete, the data collection teams spent a week in Gaborone working through further data entry, cleaning, validation, and verification. Some areas of the data collection tools remained largely unpopulated due to the data constraints discussed above (see also Section 2.4, Study Limitations). While continuing to work with each of the facilities to locate the data needed to fill in the data collection tools, the data collectors also created a missing-data list, which represented the specific data gaps by facility. This list was shared with the Office of Strategy Management, which approached various central-level departments about the missing data. Unfortunately, the office had little success in finding the data, and the in-country technical contributor had to seek out additional information, source commercial equivalent costs, and make assumptions based on the data the study was able to derive.

2.3.5 Cost Analysis

An *ingredients approach* was used for the costing analysis whereby all the inputs, direct and indirect, were identified, quantified, their monetary values determined, and their contribution to the overall cost tallied. The analysis was undertaken from the public sector perspective, specifically looking at what it costs the public sector health system, both at MOH and facility levels, to provide non-clinical services.

2.3.5.1 Direct Costs

Direct costs for the study were among the easiest to capture and to calculate in terms of their contribution to the delivery of non-clinical services.

Personnel. As mentioned above, average annual personnel costs for public sector non-clinical service staff were calculated based on salary and benefits ranges for the different cadres that currently work in non-clinical service delivery. As one of the input variables, the data collection tool asked for informants to estimate the percentage of the overall work time they devoted to the delivery or management of non-clinical services. These estimates were then cross-checked with other personnel to arrive at an estimate of actual time taken per task.

Consumables. were recorded as they were entered on facility supplies department records. Total estimated monthly cost per item was calculated based on the item's unit price multiplied by the amount consumed every month. These monthly costs were then annualized to determine the cost per year for each item. Because supplies are locally procured and provided through private sector tender to the public service facilities, it was assumed that delivery, or supply chain costs, were already integrated into the unit price.

Equipment. Cost contributions of equipment were slightly more problematic. As inventories of equipment were generally not readily available at the facilities, these had to be undertaken within the scope of data collection. Similarly, supplies departments for each facility tended not to have records of equipment purchases, unless fairly recent. Some of the larger, more costly machines might have come from different facilities at different times and might have been centrally procured. However, records of purchases made centrally and where an item was ultimately sent was not easy to determine. It was therefore difficult to establish the item's purchase price and age. In addition, highly mobile staff meant that personnel usually were unable to estimate equipment age as they were not working at the facility when the item arrived.

These challenges with regard to equipment prices and ages demanded an alternative approach to obtaining the necessary data from facility or MOH HQ records. It was agreed with the Office of Strategy Management that commercial equivalent prices would be used for those items where no data were available. This required making a detailed search for comparable equipment being sold by commercial outlets either in South Africa, Europe, or the United States, as most items were not available locally. As no record could be found that would establish the ages of each piece of equipment, these costs could not be appropriately adjusted to the value of the currency at the time of purchase or for inflation. Thus the data input into the tool represented the nominal value of machinery as if it were purchased today.

For those equipment items where the ages were known, a straight-line depreciation rate (purchase value ÷ the number of years of useful life) was used to estimate the annual value of equipment for the 12 months prior to the study. In instances where the equipment had outlived its useful lifespan, but was still being used at the facility, the item's residual or scrap value (taken as 10% of the item's purchase price) was used to establish the equipment's current value so that the data collection tool would not have to factor negative values in cost calculations.

Maintenance costs were not calculated as part of the equipment cost, as these were to be factored into the facility operational costs.

2.3.5.2 Indirect Costs

The indirect cost contributions to non-clinical service delivery are made up of training, vehicles, facility operational costs (which include utilities and building operations), and management.

Training. The study took into account all training that was carried out for staff of any of the non-clinical services, in any of the facilities, for the 12 months prior to the study. As all trainings were conducted in house, the only cost calculated was based on the salaries of participants and facilitators broken down into daily rates (trainings are generally 1-2 days in duration). Meals oftentimes were not provided as part of the training exercise and, where they were, they were not added in the cost calculations contained here although they may constitute a very marginal increase to overall training costs.

Vehicles. It is generally the case that no one vehicle is assigned on a permanent basis for any of the non-clinical services, meaning that any time a vehicle is used, it would represent only a proportion of that vehicle's total annual use. At the district level, allocation and use of vehicles is managed either by the health facility or, in some cases, by the district council. When a vehicle is required for any purpose (waste removal, collections, deliveries, personnel transport, etc.), provision is based on availability at the time of request. This means that the use of vehicles is never consistent or predictable, and any service may be given a vehicle of any type, size, model, or age. When asked, informants did narrow the range of possibilities by indicating a type of vehicle most often used (truck, minivan, etc.). Given this high degree of variability in vehicle use, depreciation could not be calculated, and a standard annual value for vehicle operational costs was assumed. This standard

value was taken from a formula used by the Automotive Association of South Africa in which the annual operating cost was 4.6%[3] for the vehicle price or value. Thus, a vehicle priced at approximately US$50,000 had an annual estimated operational cost of approximately US$2,300 (BWP 21,413).[4]

Facility operational costs. The study was designed to apply annual facility operating costs (maintenance, service, and system replacements) to non-clinical services. This was to produce a comparatively realistic estimate of the costs to non-clinical services as a proportion of the overall costs of running the facility. Annual operating costs were estimated using a cost of 1.5% of the total value of the building.[5] Estimates of construction costs were provided by the government of Botswana's Department of Building and Engineering Services (DBES). A district hospital is estimated to cost around BWP 415,000,000 (US$44,575,725.036) to construct. In addition to the construction value, DBES indicated that they add a percentage of the total building value based on where the facility is located. Urban areas carry no additional increase, while those in peri-urban areas attract an additional 10%, and rural areas 15%. These additional percentages were estimated by DBES to account for distance, availability of goods and services, and accessibility.

Once the annual operational cost for the entire facility was determined, a rough estimation of cost per square meter could be derived from the total area of the facility. With the total area occupied by each non-clinical service known, an estimation of annual building operational costs per service could be calculated. It is unfortunate, however, that only one facility out of the five contained in the study was able to come up with an estimate of entire facility size. Thus, building operation costs as a component of total indirect costs for non-clinical service provision could not be calculated for comparison across facilities.

Utilities. Costs for utilities were assessed as an individual input rather than being subsumed into facility operating costs. It was considered important to determine what percentage utilities assumed relative to total indirect costs for non-clinical service delivery and, more broadly, what proportion they accounted for in the context of total annual costs. The utilities included in the study were electricity, water, fuel, telephone service, and waste management. Electricity and water costs per non-clinical service were captured by first identifying all the specific equipment and functions that used either power or water and calculating their overall consumption based on the number of hours and the number of days the equipment was used or the function was performed per month and per year. This was then assessed against the total estimated facility cost for each utility to come up with the proportional contribution of each non-clinical service. Each utility (electricity and water) had a monthly fixed cost that was included in each bill. This was added to the monthly cost estimate in the data collection form so that it was included in the average annual cost calculation. An estimate of average monthly fuel costs was made based on previous bills received at the facility. Allocating various cost percentages to the different non-clinical services was based on best estimates of consumption. Telephone service costs were based on a simple calculation in which the total average telephone bill for the facility was divided by the total number of phone lines at the facility, giving a monthly cost per phone line.[7] The cost for each non-clinical service was then based on the number of phone lines dedicated to that service. Where a service shared a phone line with other facility

[3] This percentage is a standard operational cost proportion based on a South African rand (ZAR) 400,000 (approximately US$ 50,000) vehicle used by the Automobile Association of South Africa.
[4] US$ 50,000 x .046 = US$ 2,300 x 9.31 (rate of exchange as of Oct. 6, 2014) = BWP 21,413.
[5] This percentage was derived using expert opinion regarding operational costs in Botswana for commercial properties and was used in previous costing studies in Botswana (see Stegman, 2013).
[6] Using the rate of exchange of US$ 1 = BWP 9.31 (as of Oct. 6, 2014).
[7] Data management at facility level lacked the granularity necessary to identify the actual number of calls made/received and then attributing a number of these calls to any one non-clinical service. Thus, a general cost per line approach was taken for ease of calculation.

functions, a proportional estimate was used to apportion cost. Similar estimates were made for the average amount of waste that was removed from the facility every month. This was further divided based on informant estimates of the proportion of waste contributed by each service, which differed by facility. The proportion of total waste was equal to the proportion of the total waste management bill for the facility.

Management costs were calculated by identifying and listing all the facility personnel involved in managing each of the non-clinical services. Average annual salary and benefits for these staff cadres were obtained from MOH records and, based on the percentage of time that these staff devoted to management functions of non-clinical services, an estimated monetary value was assigned. These values were then aggregated to indicate the total monthly and annual estimated cost of management for non-clinical services in each facility. By aggregating all management costs across facilities, the total monthly and annual cost estimates for management of non-clinical services was estimated.

Missing data. When data were missing and follow-up calls with respondents at facilities could not produce an adequate response, cost estimates for similar items and sites were used as a proxy for the missing data. When, for a given facility, there was no information on capital and recurrent items for the facility, the cost of the missing category of resource was extrapolated from the average cost of that category from the other facilities.

2.4 Study Limitations

The primary limitation was unavailability of data, especially indirect cost data. For example, utility data were not easily accessible – bills might be received and paid for at the facility level or at MOH HQ. Even when it was determined that a facility received the bills, the facility often had only a few of the year's monthly bills and so annual averages had to be estimated.

Accurate estimates for the cost of equipment required making assumptions based on commercial equivalent prices gathered from numerous on-line equipment sales outlets either in South Africa or the United States. Dates of purchase and, hence, the age of the equipment in most facilities was not readily known, making it difficult to calculate an appropriately discounted value. Often records of purchase could not be traced either at the facility or through central purchasing at the MOH. There were cases, as well, where a new health facility was fitted out with equipment borrowed from other facilities, making availability of records even more problematic. While commercial equivalents provide a rough estimate of equipment cost, they are nominal in nature and represent current value rather than value when purchased. This was a limitation in that it created the potential to drive equipment costs up beyond their present value.

In the case of vehicles, it was rare that any of the non-clinical services in the study had or used a vehicle devoted to service delivery. If a vehicle was used, it was generally one taken from a pool of vehicles at the facility, or was borrowed from local authorities such as the town or village council. Thus, there was not a specific cost that could be derived and attributed to any non-clinical service that used a vehicle. Assumptions about vehicle costs had to be made based on the make of vehicle, annual operational charges, and percentage of time allocated to the service using the vehicle.

Further refinement of data collection instruments and methodology, for capturing both facility size and utility data, was made in order to have a better idea of these costs to non-clinical service delivery. Data management within each non-clinical service was also a challenge. Supplies departments generally had fairly detailed records of the supplies and consumables purchased for each of the non-clinical services being reviewed. However, as has been mentioned, there was far less data available for capital equipment purchases. Also, inventories of non-capital equipment were generally limited or non-existent. Practices for managing inventories of non-capital seemed inconsistent, making it difficult to get an adequate estimation of equipment costs.

3. RESULTS OF THE COSTING STUDY

3.1 Costs and Cost Drivers of Non-clinical Service Provision

Table 6 presents the data for the total annual direct and indirect costs for all non-clinical services across all facilities in both local currency (BWP) and in U.S. dollars (US$). The highest total cost for non-clinical service delivery in the facilities reviewed for this study is for Mahalapye Hospital. This is understandable, given that it is the largest health facility in the study. The lowest cost is at Gumare Primary Hospital. The other facilities are rather closely ranged between these two extremes. It is clear from the data that direct costs (personnel, supplies, and equipment) are by far the most expensive inputs into non-clinical service delivery. In each facility, direct costs amount to more than double the cost of indirect inputs (training, vehicles, management, and operational costs).

Figure 1 presents these data graphically. This difference between direct and indirect costs is most immediately apparent at Mahalapye Hospital, again the largest health facility in the study. Here, direct costs amount to more than BWP 13.5m (US$1.45m), with indirect costs amounting to just under BWP .9m (approximately US$94,000). One reason for this huge difference in input cost is the lower cost of indirect inputs due to effects of scale. Larger facilities, in terms of number of beds and annual inpatient/outpatient volumes, generally enjoy lower average management and operational costs across different services and functions than would smaller facilities. However, the opposite would appear to hold with regard to management costs for both Goodhope and Gumare, two roughly comparable facilities. Each facility has management costs slightly less than BWP 1m (BWP .99m /US$107,000 for Goodhope and BWP .83m /US$89,000 for Gumare), just shy of double the facility with the third highest management costs, Deborah Retief. While effects of scale can marginally bring down the cost of indirect inputs, there is a positive, almost exaggerated correlation between the size of the facility and the amount of direct inputs required for service delivery in any area (see Table 7). Large patient volumes increase the need for personnel, supplies, and equipment in order to meet service demand, as is evidenced by the high direct input costs for Mahalapye Hospital.

Figure 1: Total Annual Direct and Indirect Costs across Facilities

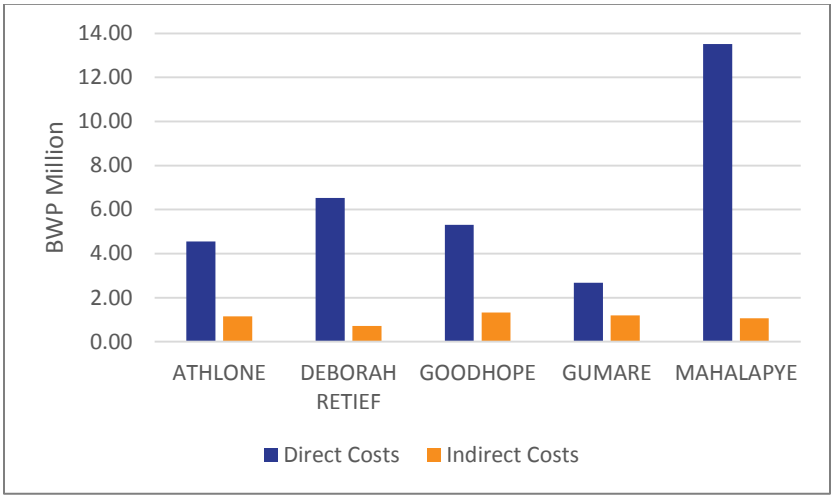


Table 6: Total Annual Direct and Indirect Costs across Facilities for all Non-clinical Services

		Athlone		Deb. Retief		Goodhope		Gumare		Mahalapye	
		BWP	US$	BWP	US$	BWP	US$	BWP	US$	BWP	US$
Direct Costs	Personnel	1,679,913.60	180,441.85	1,932,879.60	207,613.28	724,074.00	77,773.79	622,146.00	66,825.56	2,204,035.20	236,738.47
	Supplies	2,159,634.60	231,969.34	4,304,380.80	462,339.51	3,995,394.24	429,150.83	1,628,847.84	174,956.80	9,638,296.20	1,035,262.75
	Equipment	717,573.26	77,075.54	294,617.36	31,645.26	585,306.65	62,868.60	420,817.19	45,200.56	1,676,706.30	180,097.35
	TOTAL	**4,557,121.46**	**489,486.73**	**6,531,877.76**	**701,598.04**	**5,304,774.89**	**569,793.22**	**2,671,811.03**	**286,982.93**	**13,519,037.70**	**1,452,098.57**
Indirect Costs	Training	2,029.23	217.96	18,667.40	2,005.09	592.38	63.63	1,109.46	119.17	20,757.57	2,229.60
	Vehicles	32,850.00	3,528.46	-	-	47,416.67	5,093.09	130,775.00	14,046.72	-	-
	Management	271,492.68	29,161.40	476,383.56	51,169.02	998,766.00	107,278.84	829,470.60	89,094.59	357,900.24	38,442.56
	Operational	839,179.86	90,137.47	220,878.00	23,724.81	276,106.73	29,657.01	228,136.93	24,504.50	689,717.72	74,083.54
	TOTAL	**1,145,551.77**	**123,045.30**	**715,928.96**	**76,898.92**	**1,322,881.77**	**142,092.56**	**1,189,491.99**	**127,764.98**	**1,068,375.53**	**114,755.70**
TOTALS		***5,702,673.23***	***612,532.03***	***7,247,806.72***	***778,496.96***	***6,627,656.66***	***711,885.79***	***3,861,303.02***	***414,747.91***	***14,587,413.23***	***1,566,854.27***

Table 7: Direct and Indirect Costs per Size of Facility

Facility	Number of Beds	Inpatients (Annually)	Outpatients (Annually)	Direct Costs (US$)	Indirect Costs (US$)
Mahalapye Dist. Hospital	260	8,178	97,595	1,452,098.57	114,755.70
Deborah Retief Memorial Hosp.	240	4,493	79,604	701,598.04	76,898.92
Athlone District Hospital	177	4,973	64,104	489,486.73	123,045.30
Goodhope Primary Hospital	34	1,958	14,789	569,793.22	142,092.56
Gumare Primary Hospital	34	2,489	-*	286,982.93	127,764.98

*Gumare Hospital did not have and adequate information system or staff capacity and was not able to supply the average annual outpatient numbers.

In general, personnel costs are fairly consistent across facilities depending on size (US$66,825.56 to US$236,738.47), with the two smaller hospitals, Goodhope and Gumare, have slightly lower amounts, US$77,773.79 and US$66,825.56, respectively. Supply costs do vary significantly (US$174,956.80 to US$1,035,262.75), which are caused primarily by the size of the facility, but may also be due to local procurement practices where suppliers may pass handling and transport costs onto the end user thus inflating supply costs slightly. Equipment costs also demonstrate marked variation across facilities (US$31,645.26 to US$180,097.35) due to a number of observed factors such as the age and type of equipment, as well as the different volumes of equipment used at each facility. Again, larger facilities will require more equipment to deliver services.

Indirect costs in the facilities in the study present even greater variability than do direct costs. Training costs, for example, are dependent on whether in the 12 months prior to the study any training had been done for non-clinical service delivery personnel. Over a longer period of time, these variations may have largely disappeared, as training for the same staff cadres is not generally conducted on an annual basis for any public sector facility. Input costs for vehicle use were highly variable in that many of the non-clinical services across facilities did not use a vehicle for any purpose. There were exceptions, as shown in Table 6 above. However, where a vehicle is included in the cost of service delivery, it has a significant impact on the annual total cost. As has been indicated, management costs are variable, which can be due to the numbers of staff involved in management functions, as well as the level of cadre. Finally, operational costs (i.e., utilities) do vary from facility to facility, although perhaps less so than other indirect inputs. Consumption is the main factor in price variation.

Figures 2 and 3 break down total annual direct and indirect costs for Athlone Hospital. Supplies consume nearly half (47%) of all that is spent on direct inputs into non-clinical services. Personnel account for approximately 37% of direct costs, with equipment making up around 16% of the direct cost total. Indirect costs are dominated by operational costs, which amount to over 73% of the total expenditure on indirect inputs. It appears that catering services consume the greatest amounts of both water and power in exercising its functions, not only for Athlone Hospital itself, but also for providing catering services for other smaller health facilities that do not have catering capability. This is also the reason that a vehicle is used for the catering service at Athlone, one of the few instances where a vehicle is actually used consistently for a non-clinical service, which increases considerably the overall cost of indirect inputs. Training adds only marginally to the overall cost.

Figure 2: Total Annual Direct Costs: Athlone

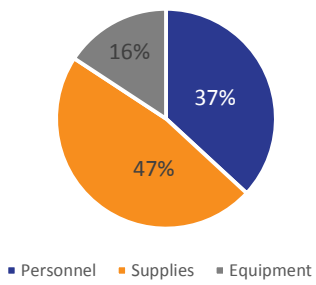
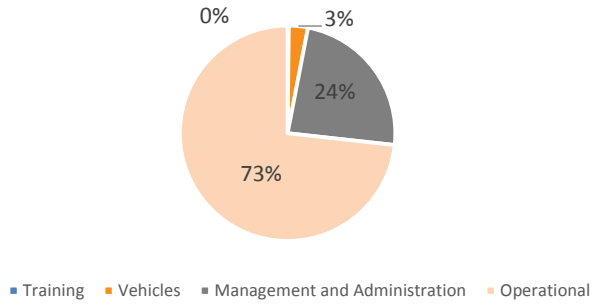


Figure 3: Total Annual Indirect Costs: Athlone



The 0% value for the Training cost category represents a monetary amount of US$217.96.

Figures 4 and 5 present direct and indirect cost data from Deborah Retief Hospital. Supplies accounts for the largest proportion of direct costs. At 66%, is an even greater proportion than Athlone Hospital's 47%. This may be due to the fact that, unlike Athlone, Deborah Retief has not yet begun the process of outsourcing and they perform all non-clinical functions, requiring greater inputs. Personnel accounts for roughly 30% of direct costs for non-clinical service delivery, and equipment make up the

remainder, about 4%. Interestingly, indirect costs are dominated by management inputs, which account for over 66%. It must be noted, however, that Deborah Retief's indirect costs for non-clinical service provision are the lowest of the facilities reviewed, at just over BWP 700,000 (US$77,000). While management costs represent the greatest proportion of facility costs, in absolute terms, the expenditure is in line with the other facilities. Operational costs make up 31% of all indirect costs and this, again, is likely due to Deborah Retief not having outsourced any non-clinical service and is therefore performing all functions at the hospital. Training accounts for some 3% of indirect costs, and there was no vehicle used for non-clinical services at Deborah Retief.

Figure 4: Total Annual Direct Costs: Deborah Retief

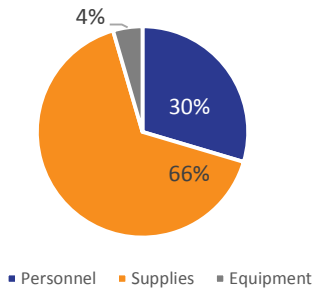
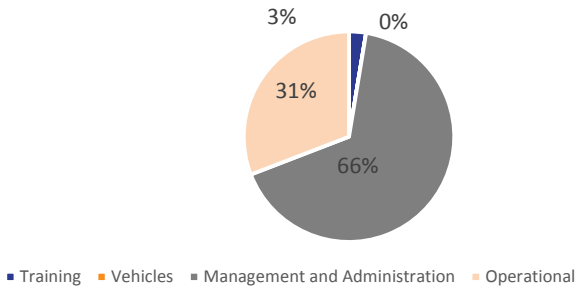


Figure 5: Total Annual Indirect Costs: Deborah Retief



The 0% value for the Vehicles cost category represents a monetary amount of US$0 as there were no vehicles used.

Figures 6 and 7 present the proportional breakdowns of direct and indirect costs for Goodhope Hospital. Again, supplies are the overwhelming cost center in terms of direct costs, here accounting for 75% of total direct costs. This is followed by fairly modest proportions for personnel at 14% and equipment at 11%. Similar to Deborah Retief above, management costs account for a considerable 75% of all indirect costs. This represents both the highest proportion of indirect costs, and the highest absolute value for management of any facility under review. This might be explained by the number of personnel involved in management functions, their level in terms of staff hierarchy, and the fact that, instead of spending a portion of their time managing non-clinical functions, these personnel appear to be 100% dedicated to this function, thereby increasing the overall cost of management. Operational costs account for around 21% of indirect costs and vehicle costs 4%. There was little training undertaken for any one of the non-clinical services at Goodhope amount to a cost of only BWP 592.38 (US $63.63).

Figure 6: Total Annual Direct Costs: Goodhope

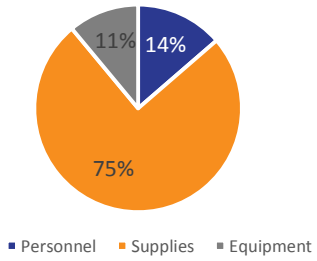
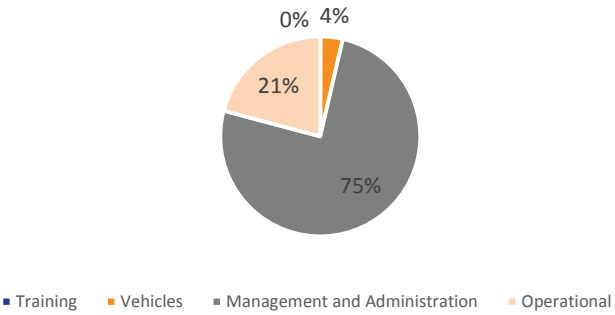


Figure 7: Total Annual Indirect Costs: Goodhope



The 0% value for the Training cost category represents a monetary amount of US$63.63.

Figures 8 and 9 present the breakdown of direct and indirect costs for Gumare Primary Hospital. Consistent with all previous facilities, supplies consume the greatest proportion of direct costs, 61%.

Personnel accounts for around 23% of direct costs, and equipment costs makes up 16% of total annual direct costs. Management makes up the largest proportion of indirect costs at Gumare (70% of the total cost), as at Deborah Retief and Goodhope. This is followed by operational costs, which constitute 19% of the total. Laundry services at Gumare have 50% time allocated for the use of a minivan. Thus, vehicle costs, including maintenance and running charges, make up 11% of the total annual indirect costs. There was no training conducted for any of the non-clinical service personnel for the 12 months prior to the benchmark costing exercise. Therefore, training does not feature in the cost breakdown.

Figure 8: Total Annual Direct Costs: Gumare

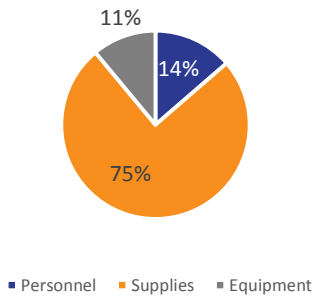
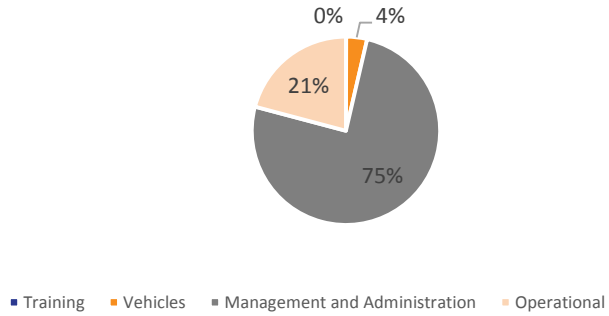


Figure 9: Total Annual Indirect Costs: Gumare



The 0% value for the Training cost category represents a monetary amount of US$119.73.

Figures 10 and 11 present the total annual direct and indirect costs for non-clinical services at Mahalapye Hospital. As with all other facilities, supplies represent the major proportion (71%) of direct costs for non-clinical services. This is followed by more modest proportions for personnel, at 16%, and equipment, at 13%. Operational costs constitute the greatest proportion of indirect costs for non-clinical services at Mahalapye Hospital, 65%. This may seem significant, but it must be pointed out that Mahalapye Hospital has only the second highest proportion of indirect costs overall of the facilities reviewed (Figure 1, above). In addition, the high proportion that the operational costs represent at the facility can partly be explained by the otherwise relatively low indirect costs overall. Management makes up 33% of indirect costs and training represents 2% for the year preceding the cost benchmarking exercise. None of the non-clinical services at Mahalapye Hospital use a vehicle, so there are no associated costs in the breakdown.

Figure 10: Total Annual Direct Costs: Mahalapye

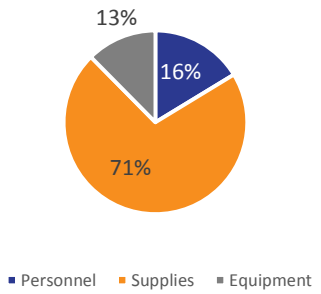
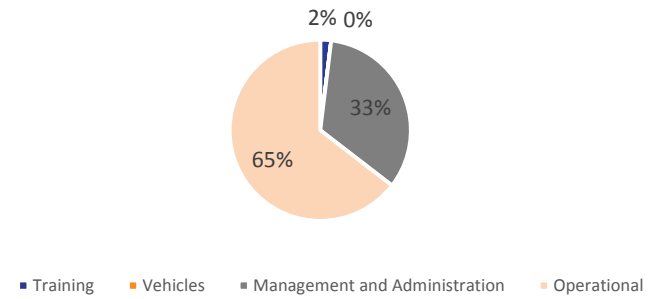


Figure 11: Total Annual Indirect Costs: Mahalapye



The 0% value for the Training cost category represents a monetary amount of US$119.73.

Table 8 presents the direct and indirect costs for cleaning services across all facilities. Cleaning services cost the most at Mahalapye Hospital, where total annual costs amount to nearly BWP 5m (around US$530,000). This is not unexpected as it is the largest facility in this study. This is followed by Goodhope Primary Hospital, where the total (direct and indirect) cost is BWP 3.7m (US$404,596).

Deborah Retief and Athlone hospitals follow with totals of BWP 2.8m (US$301,869) and BWP 2.5m (US$272,438), respectively. The lowest cost for cleaning services is at Gumare Primary Hospital, where the total cost for cleaning is BWP 1m (US$113,249). At all hospitals, direct costs exceed indirect ones, by three to 18 times.

Figure 12 presents the breakdown of annual direct and indirect costs for cleaning services at Athlone Hospital. At BWP 1.2m (US$133,242), personnel costs account for the greatest proportion of total cost at 49%, and 57% of direct costs. This may be partly explained by the fact that Athlone has a large complement of cleaning staff, numbering close to 80 individuals, representing different staff cadres and different levels of cleaning responsibility. The next largest component of cleaning costs is supplies, at BWP 766,108 (US$82,289) accounting for 30% of total annual costs, and 35% of direct costs. This is followed by operational costs constituting 13% of total annual costs and, at BWP 317,675 (US$34,122) more than 84% of indirect costs. Smaller contributors include equipment, which is 6% of the total annual cost (7% of direct costs), and management, accounting for 2% of total annual costs and 15% of indirect costs. There was no training conducted for cleaning staff over the 12 months prior to the benchmarking exercise, and cleaning services at Athlone Hospital do not use a vehicle, so there are no costs included.

The breakdown of the total annual direct and indirect costs for cleaning services at Deborah Retief Memorial Hospital is presented in Figure 13. Here it is supplies that account for the greatest proportion of total cost, at BWP 1.46m (US$157,230) or 52%, and near 55% of the direct costs. While the same supplies are generally procured at each facility, it appears that consumption patterns may be slightly different at Deborah Retief. Personnel costs, at nearly BWP 1,15m (US$123,143), constitute 41% of the total annual cost for cleaning services, and 43% of direct costs amounting. Accounting for the remainder of total costs are management, at 4% (72% of indirect costs), and equipment and operational costs constituting 2% and 1% of total annual costs respectively.

Figure 12: Total Annual Cost for Cleaning Services: Athlone

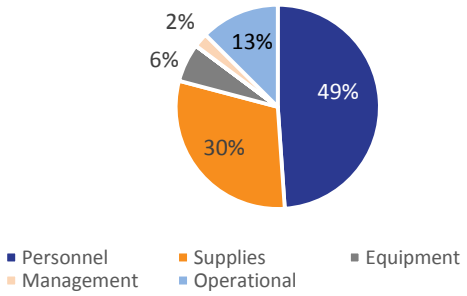
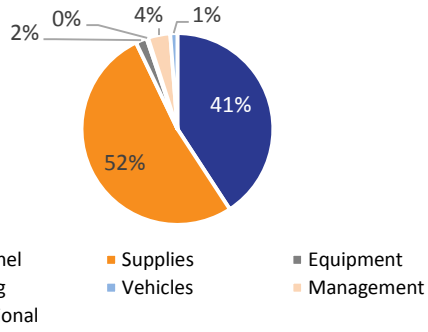


Figure 13: Total Annual Cost for Cleaning Services: Deborah Retief



The 0% values for the Training and Vehicles cost categories represent a monetary amount of US$775.

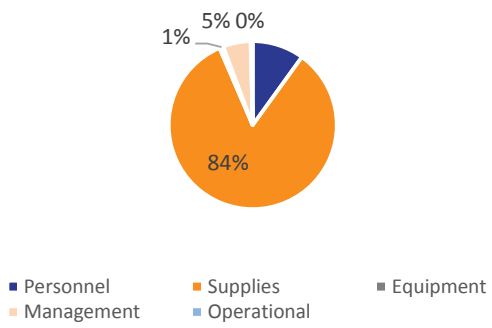
Table 8: Total Annual Direct and Indirect Costs Across All Facilities for Cleaning Services

		Athlone		Deb. Retief		Goodhope		Gumare		Mahalapye	
		BWP	US$	BWP	US$	BWP	US$	BWP	US$	BWP	US$
Direct Costs	Personnel	1,240,479.60	133,241.63	1,146,465.60	123,143.45	375,426.00	40,325.03	373,770.00	40,147.15	1,319,965.20	141,779.29
	Supplies	766,108.80	82,288.81	1,463,808.00	157,229.65	3,147,595.08	338,087.55	366,872.64	39,406.30	2,562,555.00	275,247.58
	Equipment	154,752.39	16,622.17	53,231.54	5,610.26	28,600.63	3,072.03	47,119.57	5,061.18	769,687.26	82,673.18
	TOTAL	**2,161,340.79**	**232,152.61**	**2,663,505.14**	**286,090.78**	**3,551,621.71**	**381,484.61**	**787,762.21**	**84,614.63**	**4,652,207.46**	**499,700.05**
Indirect Costs	Training	-	-	7,222.72	775.80	-	-	-	-	18,514.24	1,988.64
	Vehicles	-	-	-	-	-	-	-	-	-	-
	Management	57,386.34	6,163.95	105,781.02	11,362.09	199,986.00	21,480.77	253,092.60	27,185.03	93,370.86	10,029.09
	Operational	317,675.10	34,121.92	33,894.52	3,640.66	15,181.06	1,630.62	13,493.16	1,449.32	172,708.67	18,550.88
	TOTAL	**375,061.44**	**40,285.87**	**146,898.26**	**15,778.55**	**215,167.06**	**23,111.39**	**266,585.76**	**28,634.35**	**284,593.77**	**30,568.61**
TOTALS		***2,536,402.23***	***272,438.48***	***2,810,403.41***	***301,869.32***	***3,766,788.76***	***404,596.00***	***1,054,347.97***	***113,248.98***	***4,936,801.22***	***530,268.66***

Figure 14 breaks down the total cost for cleaning services at Goodhope Primary Hospital. Cleaning costs are overwhelmingly dominated by supply costs. At BWP 3.14m (US$338,088), supplies represent 84% of the total cost and nearly 87% of direct costs. As the supplies used at Goodhope Hospital are the same used elsewhere, it seems that consumption patterns may be influencing the cost. Personnel costs (BWP 375,426 or US$40,325) account for 10% of the overall cost and about 10% of direct costs as well. Management costs constitute 5% of the total annual cost, while equipment and operational costs make up 1% and less than 1%, respectively.

The total annual cost for cleaning services at Gumare Primary Hospital is broken down in Figure 15. As a smaller (34-bed) hospital, one would expect its cleaning costs to be lower, and this is the case. It also appears to have more balanced costs, with personnel and supplies each accounting for 35% of the total. At BWP 373,770 (US$40,147), personnel costs account for 47% of direct costs, and at BWP 366,872 (US$39,406), supplies account for 46%. (Given that Goodhope Hospital is equivalent in size to Gumare, the difference in their cleaning supply costs requires further investigation and clarification.) Management costs constitute 24% of the total annual cost at Gumare, and 95% of its indirect costs. Equipment constitutes 5% of the total cost, and operational costs 1%. There was no training of cleaning personnel, and no vehicles were used for cleaning at Gumare so there were no costs in these categories.

Figure 14: Total Annual Cost for Cleaning Services: Goodhope



The 0% value for the Operational cost category represents a monetary amount of US$1,630.62.

Figure 15: Total Annual Cost for Cleaning Services: Gumare

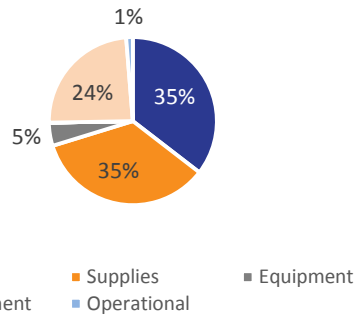
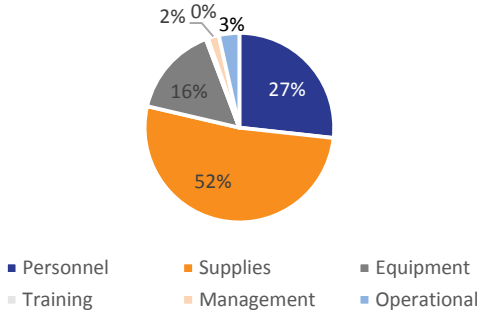


Figure 16: Total Annual Cost for Cleaning Services: Mahalapye



The 0% value for the Operational cost category represents a monetary amount of US$1,988.64.

Figure 16 represents the total annual cost of cleaning services in Mahalapye, the largest facility reviewed. Perhaps not surprisingly, supplies, at BWP 2.5m (US$275,248), comprise the greatest proportion (52%) of total costs and 55% of direct costs. Personnel costs consume 27% of total cost and, at BWP 1.3m (US$141,779), 28% of direct costs. This is followed by equipment: at a value of BWP 769,687 (US$82,673), equipment accounts for 16% of total cost and just over 16% of direct costs. Largely due to the effects of scale in so large a facility, indirect costs make up a considerably smaller proportion of total annual cost, with operational costs accounting for 3% and management just 2%. Although there was training done at Mahalapye, its overall impact on total cost was insignificant, less than 1%.

Table 9 looks at the unit cost for cleaning based on output, that is, cost per square meter cleaned at each facility. Athlone Hospital and Deborah Retief Memorial Hospital were not able to supply measurements of facility size. Based on data from the three remaining hospitals, it is difficult to draw a reasonable benchmark for cleaning services due to the extreme variation in unit cost, ranging from a low of US$18.63 at Mahalapye Hospital, the largest and most expensive in terms of cleaning services, to a high of US$144.76 at Goodhope Hospital, which, at 34 beds, is one of the smallest facilities in the study.

Table 9: Annual Estimated Cleaning Unit Costs per Square Meter by Hospital

	Athlone	Deborah Retief	Goodhope	Gumare	Mahalapye
Total cost for cleaning	**BWP 2,536,402.23** (US $272,438.48)	**BWP 2,810,403.41** (US $301,869.32)	**BWP 3,766,788.76** (US $404,596.00)	**BWP 1,054,347.97** (US $113,248.98)	**BWP 4,936,801.22** (US $530,268.66)
Total facility size (m2)			2,794.95	2,308.11	28,460.96
Unit cost by output			**BWP 1,347.71** (US $144.76)	**BWP 456.80** (US $49.07)	**BWP 173.46** (US $18.63)

*Athlone Hospital and Deborah Retief Memorial Hospital were unable to provide estimates of facility size. Neither hospital had an existing site plan. In addition, time and personnel constraints prohibited physical measurements being taken during the course of the study.

Table 10 presents the direct and indirect costs for laundry services across all facilities. Mahalapye Hospital has the highest total cost for laundry services, BWP 1.27m (US$136,605) and Goodhope Primary Hospital has the lowest, just under BWP 750,000 (US$79,773). In between these are Deborah Retief Memorial Hospital, at around BWP .95m (US$102,064), and Gumare Primary Hospital, at around BWP .86m (US$92,807).

The total annual cost for laundry services at Deborah Retief Memorial Hospital is broken down in Figure 17. The overall cost for laundry is largely driven by direct costs, with supplies accounting for 44% of total cost, and 59% of direct costs, topping out at BWP 418,893 (US$44,994) a year, and costs for personnel making another significant contribution of BWP 222,318 (US$23,879) annually, or 23% of total cost and 31% of direct costs. Operational costs and management costs, BWP 131,071 (US$14,079) and BWP 105,781 (US$11,362), respectively, account for 14% and 11% of total cost and 54% and 44% of total indirect costs. Training costs contributed 1% to overall costs. No vehicle was used for laundry at Deborah Retief.

Figure 18 displays the breakdown of total annual costs for laundry services at Goodhope Primary Hospital. Goodhope's costs for laundry services are significantly less than those of the other facilities. Of course, Goodhope Primary runs a much smaller laundry than do Mahalapye or Deborah Retief, so this is to be expected. Indirect costs are the primary driver, with management costs at BWP 280,770.00 (US$30,158), accounting for 38% of overall cost, and 59% of indirect costs. Operational costs (BWP 145,716 or US$15,652) contribute another 20% to the total annual cost, and nearly 31% of indirect costs. Also important are personnel costs (BWP 143,070 / US$15,367) at 19% of total cost, and 53% of direct costs. Less important but still significant are equipment costs at 9% of total costs, supplies at 8%, and the use of a vehicle at 6%.

Figure 17: Total Annual Cost for Laundry Services: Deborah Retief

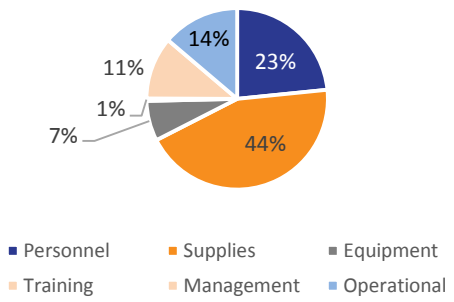


Figure 18: Total Annual Cost for Laundry Services: Goodhope

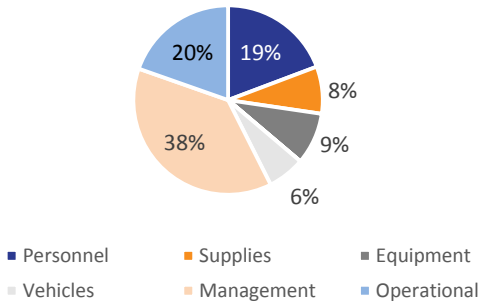


Table 10: Total Annual Direct and Indirect Costs Across All Facilities for Laundry Services

		Athlone		Deb. Retief		Goodhope		Gumare		Mahalapye	
		BWP	US$	BWP	US$	BWP	US$	BWP	US$	BWP	US$
Direct Costs	Personnel	-	-	222,318.00	23,879.48	143,070.00	15,367.34	96,930.00	10,411.39	313,860.00	33,712.14
	Supplies	-	-	418,893.00	44,993.88	59,865.00	6,430.18	61,584.00	6,614.82	321,540.00	34,537.06
	Equipment	-	-	68,027.50	7,306.93	65,850.89	7,073.14	226,216.80	24,298.26	320,998.39	34,478.88
	TOTAL	**-**	**-**	**709,238.50**	**76,180.29**	**268,785.89**	**28,870.66**	**384,730.80**	**41,324.47**	**956,398.39**	**102,728.08**
Indirect Costs	Training	-	-	4,120.74	442.61	-	-	-	-	-	-
	Vehicles	-	-	-	-	47,416.67	5,093.09	89,083.33	9,568.56	-	-
	Management	-	-	105,781.02	11,362.08	280,770.00	30,157.89	239,628.00	25,738.78	93,370.86	10,029.09
	Operational	-	-	131,071.72	14,078.60	145,716.57	15,651.62	150,593.80	16,175.48	222,027.21	23,848.25
	TOTAL	**-**	**-**	**240,973.48**	**25,883.30**	**473,903.23**	**50,902.60**	**479,305.14**	**51,482.83**	**315,398.07**	**33,877.34**
TOTALS		**-**	**-**	***950,211.98***	***102,063.59***	***742,689.12***	***79,773.27***	***864,035.93***	***92,807.21***	***1,271,796.46***	***136,605.42***

* Aside from data for Athlone (see note below), empty cells indicate that there was no entry (i.e., no training was conducted in the 12 months prior to the study, and no vehicle was used for the particular service).

** Laundry services had been outsourced at Athlone Hospital for more than 24 months preceding the study, and it was decided that any residual costs for laundry (e.g., for remaining equipment) would not be included in the analysis.

Figure 19 looks at the total laundry costs at Gumare Primary Hospital. Here, as at Goodhope, indirect costs are also the main drivers (55%) of total cost. At BWP 239,628 (US$25,739), management costs seem to lead in importance, contributing nearly 28% of total cost. Interestingly, equipment costs (BWP 226,216 or US$24,298) come in a close second contributing 26% of total cost. At BWP 150,593 (US$16,175), operational costs contribute 18% of the total cost and over 31% of total indirect costs. Other important drivers are personnel costs of BWP 96,930 (US$10,411), contributing 11% of total cost, the use of a vehicle at BWP 89,083 (US$9,569), contributing 10%, and supply costs at BWP 61,584 (US$6,614), contributing 7%.

Total annual laundry costs for Mahalapye Hospital are presented in Figure 20. Laundry services were only recently outsourced at Mahalapye, so the hospital has some records of the previous in-house costs. The study, therefore, costed laundry services at Mahalapye as if the hospital were still providing them. The high costs for laundry at Mahalapye are largely due to direct costs amounting to 75% of total annual cost. Personnel, supplies, and equipment at the hospital each account for roughly one-third of total direct costs for laundry, costing BWP 313,860 (US$33,712), BWP 321,540 (US$34,537), and BWP 320,998 (US$34,479) respectively. Only two indirect costs contribute to the total annual cost for laundry: operational costs, at BWP 222,027 (US$23,848) and constituting 18% of total cost and 70% of indirect costs; and management costs, at BWP 93,370 (US$10,029) and constituting 7% of total cost.

Figure 19: Total Annual Cost for Laundry Services: Gumare

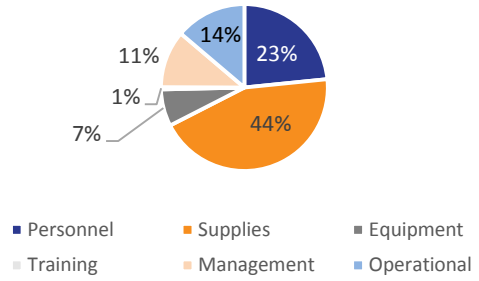


Figure 20: Total Annual Cost for Laundry Services: Mahalapye

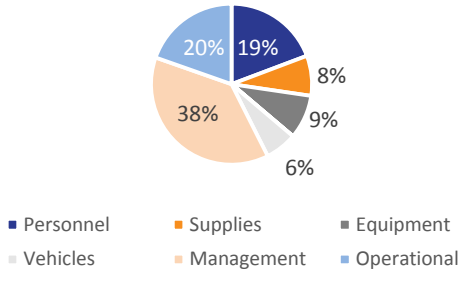


Table 11 presents the average unit cost for laundry in terms of the volume of laundry, in kilograms, done each year. They range from a low of BWP 1.68 (US$0.18) per kilo at Mahalapye, to a high of BWP 14.24 (US$1.53) at Deborah Retief Memorial Hospital. Goodhope and Gumare Hospitals fall in between with an average unit cost per kilo of laundry of BWP 6.98 (US$0.75) and BWP 5.68 (US$0.61) respectively.

Table 11: Annual Estimated Laundry Unit Costs per Kilogram of Laundry by Hospital

	Athlone	Deborah Retief	Goodhope	Gumare	Mahalapye
Total cost for laundry	-	**BWP 950,211.98** (US $102,063.59)	**BWP 742,689.12** (US $79,773.27)	**BWP 864,035.93** (US $92,807.21)	**BWP 1,271,796.46** (US $136,605.42)
Total kilos annually	-	66,600	106,800	151,200	772,200
Unit cost by output	-	**BWP 14.27** (US $1.53)	**BWP 6.95** (US $0.75)	**BWP 5.71** (US $0.61)	**BWP 1.65** (US $0.18)

*Per note in Table 9, Athlone Hospital was excluded from this analysis because it had been outsourcing laundry services for 24 months preceding this study.

Table 12 sets out the direct and indirect costs for the provision of catering services across all facilities in the costing exercise. By far, catering services represents the most substantial investment the MOH has made in providing non-clinical services to its clientele. Because of this, it is also the most problematic and challenging in terms of appropriately outsourcing. Within the scope of the cost benchmarking exercise, the most expensive catering service is provided by Mahalapye Hospital, at nearly BWP 8.1m (US$868,475) a year. Deborah Retief Memorial Hospital's catering service costs an estimated BWP 3.27m (US$351,444) a year. This is followed by Athlone Hospital, where catering services cost BWP 2.44m (US$261,818) per annum. With less heavy patient volumes every year, Goodhope and Gumare's catering services cost BWP 1.63m (US$175,555) and BWP 1.60m (US$171,592), respectively.

The breakdown of direct and indirect costs for catering services at Athlone Hospital appear in Figure 21. The key drivers are direct costs, which collectively claim 77% of the entire cost of catering. The cost of supplies contributes the greatest proportion of total annual costs. Amounting to BWP 1.3m (US$142,778), supplies account for 55% of total cost and 71% of total direct costs. Operational costs of catering are BWP 428,580 (US$46,034), 18% of the total cost. Personnel costs, at around BWP 300,876 (US$32,317), contribute 12% to total cost. This is followed by equipment at 10%, and management costs at 4%. The use of a vehicle for catering services contributes around 1% to total cost.

Table 12: Total Annual Direct and Indirect Costs Across All Facilities for Catering Services

		Athlone		Deb. Retief		Goodhope		Gumare		Mahalapye	
		BWP	US$	BWP	US$	BWP	US$	BWP	US$	BWP	US$
Direct Costs	Personnel	300,876.00	32,317.51	516,036.00	55,428.14	125,478.00	13,477.77	112,356.00	12,068.31	412,404.00	44,296.89
	Supplies	1,329,272.40	142,778.99	2,366,935.80	254,235.85	780,367.32	83,820.34	1,195,639.20	128,425.26	6,753,445.20	725,396.91
	Equipment	234,871.09	25,227.83	168,691.78	18,119.42	480,391.29	51,599.49	144,123.84	15,480.54	499,976.68	53,703.19
	TOTAL	**1,865,019.49**	**200,324.33**	**3,051,663.58**	**327,783.41**	**1,386,236.61**	**148,897.60**	**1,452,119.04**	**155,974.12**	**7,665,825.88**	**823,396.98**
Indirect Costs	Training	2,029.23	217.96	5,327.74	572.26	592.38	63.63	1,109.46	119.17	911.64	97.92
	Vehicles	32,850.00	3,528.46	-	-	-	-	-	-	-	-
	Management	109,044.00	11,712.57	159,040.50	17,082.76	135,174.00	14,519.23	109,044.00	11,712.57	135,174.00	14,519.23
	Operational	428,580.99	46,034.48	55,911.76	6,005.56	112,416.47	12,074.81	35,249.96	3,786.25	283,589.57	30,460.75
	TOTAL	**572,504.22**	**61,493.47**	**220,280.00**	**23,660.58**	**248,182.85**	**26,657.66**	**145,403.42**	**15,617.98**	**419,675.21**	**45,077.90**
TOTALS		***2,437,523.71***	***261,817.80***	***3,271,943.58***	***351,443.99***	***1,634,419.46***	***175,555.26***	***1,597,522.46***	***171,592.10***	***8,085,501.09***	***868,474.88***

Figure 22 presents the breakdown of annual catering costs for Deborah Retief Memorial Hospital, which has the second most expensive catering service. Here, the dominant cost driver is supplies: They cost more than BWP 2.3m (US$254,235) and account for 72% of the total catering cost and more than 77% of direct costs. The next most important cost driver is personnel, which, at BWP 516,036 (US$55,428), accounts for 16% of the total cost and nearly 17% of direct costs. The remainder of the total cost comprises equipment costs (5%), management costs (5%), and operational costs (2%).

Figure 21: Total Annual Cost for Catering Services: Athlone

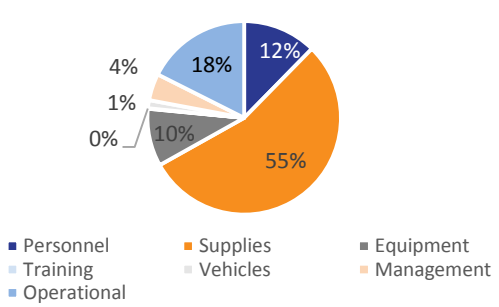
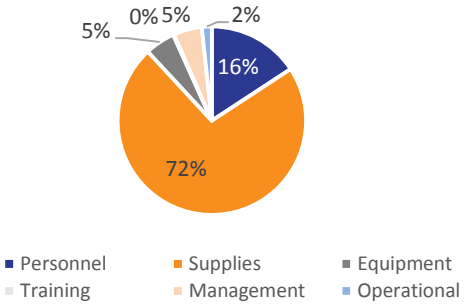


Figure 22: Total Annual Cost for Catering Services: Deborah Retief



The total annual costs for catering services at Goodhope Primary Hospital are presented in Figure 23. Goodhope has one of the less expensive catering services among the five hospitals. As with the other facilities, direct costs are the dominant cost driver here. Supplies consume BWP 780,367 (US$83,820), 48% of the total cost and 56% of total direct costs. Interestingly, and unlike many of the other facilities, equipment costs at Goodhope represent 29% of the total cost of catering services. The data show that the equipment at Goodhope is relatively new, with most items around 2–4 years old, translating into a higher current value than much of the older equipment in other facilities. This may at least partially explain the higher than average cost at Goodhope. Personnel and management costs each account for 8% of the total annual cost of catering services, while operational costs constitute 7%.

Figure 24 breaks down the total annual cost of catering services at Gumare Primary Hospital. One of the smaller hospitals in the study, Gumare has the least expensive catering service (BWP 1.2m or US$128,425) of the five hospitals. Still, as elsewhere, supplies account for an overwhelming (75%) share of the total cost, and more than 82% of direct costs. Other catering costs at Gumare are relatively modest compared with the other facilities. Equipment costs, the next most important cost driver, are a moderately low BWP 144,123 (US$15,480), accounting for 9% of the total cost, and just 9% of total direct costs. Other cost components include personnel costs (7%) and management costs (7%).

Figure 23: Total Annual Cost for Catering Services: Goodhope

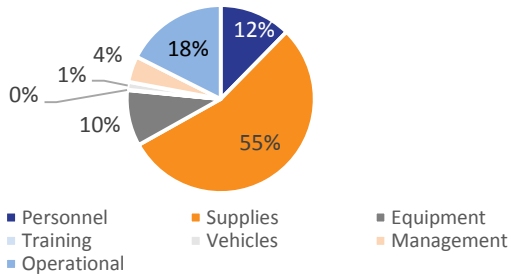


Figure 24: Total Annual Cost for Catering Services: Gumare

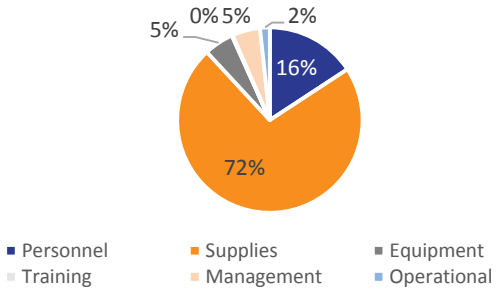


Figure 25: Total Annual Costs for Catering Services: Mahalapye

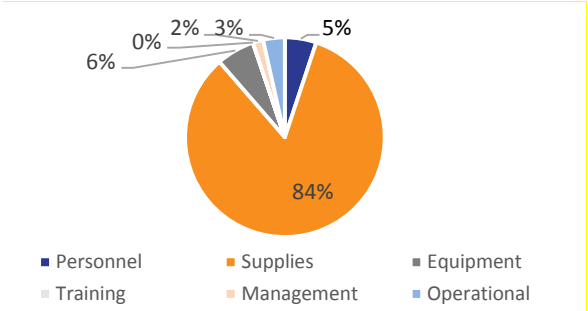


Figure 25 presents the total annual cost of catering services at Mahalapye Hospital. As with all other facilities, supply costs are the single most important cost driver, accounting for 84% of the total cost. Providing catering services for such a large facility is an enormous investment, amounting to BWP 6.75m (US$725,396) per year in supplies alone. Additional costs make only minor contributions to the total cost: Equipment, at just under BWP .5m (US$53,703), represents 6% of the total cost, while personnel at BWP 412,404 (US$44,296) accounts for 5%.

Table 13 presents the average annual unit costs for catering services per inpatient client. These costs range from a low of BWP 490.17 (US$52.65) at Athlone Hospital, to a high of BWP 988.72 (US$106.20) at Mahalapye Hospital. The other facilities in the study are BWP 641.83 (US$68.94) for Gumare Hospital, BWP 728.23 (US$78.22) for Deborah Retief Memorial Hospital, and BWP 925.51 (US$99.41) for Goodhope Hospital.

Table 13: Annual Estimated Catering Unit Costs per Inpatient Volume by Hospital

	Athlone	Deborah Retief	Goodhope	Gumare	Mahalapye
Total cost for catering	**BWP 2,437,523.71** (US $261,817.80)	**BWP 3,271,943.58** (US $351,443.99)	**BWP 1,634,419.46** (US $175,555.26)	**BWP 1,597,522.46** (US $171,592.10)	**BWP 8,085,501.09** (US $868,474.88)
Total inpatients annually	4,973	4,493	1,766	2,489	8,178
Unit cost by output	**BWP 490.15** (US $52.65)	**BWP 728.23** (US $78.22)	**BWP 925.49** (US $99.41)	**BWP 641.83** (US $68.94)	**BWP 988.69** (US $106.20)

Table 14 shows the breakdown of annual direct and indirect costs for grounds maintenance services across the five hospitals studied. Grounds maintenance is the least expensive service, with all the hospitals paying less than BWP .5m (US$53,705.69) per year. The service generally has few staff (and most often a low-level cadre), little equipment, and no office or facility as do catering or laundry services. Goodhope Primary Hospital pays the most for grounds maintenance, over BWP .48m (US$52,025). Athlone Hospital is next, at BWP .38m (US$40,743), followed closely by Gumare Primary Hospital, at about BWP .35 (US$37,099). Mahalapye and Deborah Retief hospitals spend the least, around BWP .29m (US$31,505) and BWP .22m and (US$23,120), respectively.

Figure 26 breaks down direct and indirect costs for grounds maintenance at Athlone Hospital. Personnel, with seven people employed, costs around BWP .14m (US$14,882) and accounts for the largest proportion of the total cost, around 36%. Management, at BWP .11 (US$11,284), makes up the second largest share of the total cost, about 28%. Interestingly, operational costs, at about BWP 74,989 (US$8100), constitute about 20% of total cost per year. This is testimony to the limited overall allocations made to grounds maintenance that so small a sum can appear to have so great an impact on overall costs. Supply costs are the fourth most important driver of cost for grounds maintenance at Athlone. At BWP 53,614 (US$5,758), supplies account for about 14% of the total annual cost.

Costs for grounds maintenance at Deborah Retief Hospital are broken down in Figure 27. Management consumes the largest proportion of total annual costs, about BWP 105,781 (US$11,362), or around 48% of the total. Supply costs account for the second largest cost component (28%) and cost around BWP 54,744 (US$5,880). While not a great amount in absolute terms, its proportion gives it an exaggerated impact. This is followed by personnel costs assuming around 22% of the overall annual cost of grounds maintenance at Deborah Retief.

Figure 26: Total Annual Cost for Grounds Maintenance Services: Athlone

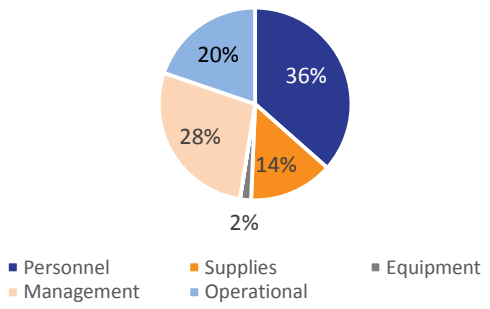
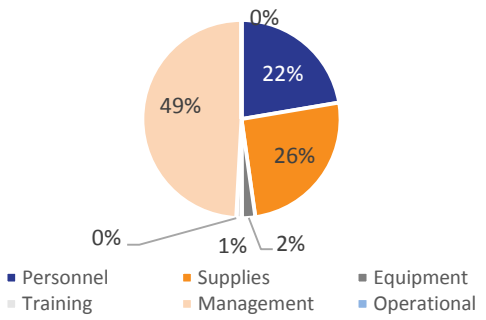


Figure 27: Total Annual Cost for Grounds Maintenance Services: Deborah Retief



The 0% value for the Training cost category represents a monetary amount of US$214.41.

Table 14: Total Annual Direct and Indirect Costs Across All Facilities for Grounds Maintenance Services

		Athlone		Deb. Retief		Goodhope		Gumare		Mahalapye	
		BWP	US$	BWP	US$	BWP	US$	BWP	US$	BWP	US$
Direct Costs	Personnel	138,558.00	14,882.71	48,060.00	5,162.19	80,100.00	8,603.65	39,090.00	4,198.71	157,806.00	16,950.16
	Supplies	53,614.80	5,758.84	54,744.00	5,880.13	7,566.84	812.76	4,752.00	510.42	756.00	81.20
	Equipment	7,100.46	762.67	4,666.53	$501.24	10,463.85	1,123.94	3,356.99	360.58	86,043.97	9,242.10
	TOTAL	**199,273.26**	**21,404.22**	**107,470.53**	**11,543.56**	**98,130.69**	**10,540.35**	**47,198.99**	**5,069.71**	**244,605.97**	**26,273.47**
Indirect Costs	Training	-	-	1,996.20	214.41	-	-	-	-	1,331.69	143.04
	Vehicles	-	-	-	-	-	-	41,691.67	4,478.16	-	-
	Management	105,062.34	11,284.89	105,781.02	11,362.09	382,836.00	41,120.95	227,706.00	24,458.22	35,984.52	3,865.15
	Operational	74,989.37	8,054.71	-	-	3,392.63	364.41	28,800.00	3,093.45	11,392.28	1,223.66
	TOTAL	**180,051.71**	**19,339.60**	**107,777.22**	**11,576.50**	**386,228.63**	**41,485.35**	**298,197.67**	**32,029.82**	**48,708.49**	**5,231.85**
TOTALS		***379,324.97***	***40,743.82***	***215,247.75***	***23,120.06***	***484,359.32***	***52,025.71***	***345,396.66***	***37,099.53***	***293,314.47***	***31,505.31***

Figures 28 and 29 show the breakdown of direct and indirect costs for grounds maintenance at Goodhope Primary Hospital and Gumare Primary Hospital. These two hospitals have a similar breakdown. Management costs are clearly the most important cost driver for both facilities; they account for 79% of the total cost at Goodhope, 66% at Gumare. Personnel costs also feature as a cost driver for grounds maintenance in both facilities, accounting for 16% at Goodhope and 11% at Gumare. There are no other really meaningful cost drivers at Goodhope; equipment, supplies, and operations each contribute between 1% and 2% to the total cost. In Gumare, however, because grounds maintenance uses a vehicle, this is an important cost driver, accounting for 12% of total cost. Operational costs make up 23% of indirect costs and 3.9% of total cost, while supplies and equipment contribute around 2% and 1%, respectively, to total annual grounds maintenance costs at Gumare.

Figure 28: Total Annual Cost for Grounds Maintenance Services: Goodhope

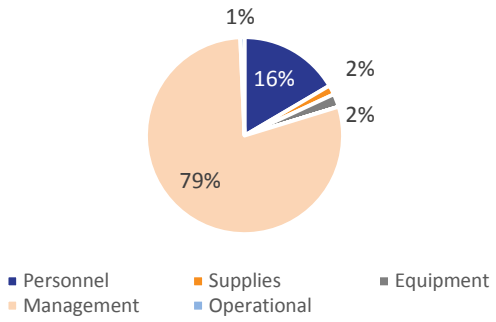
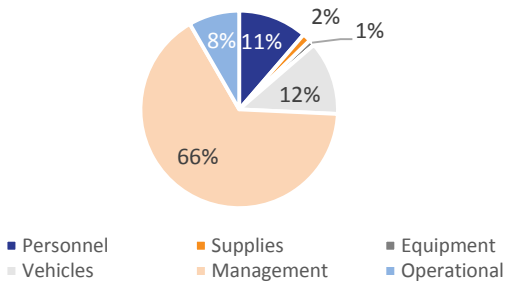
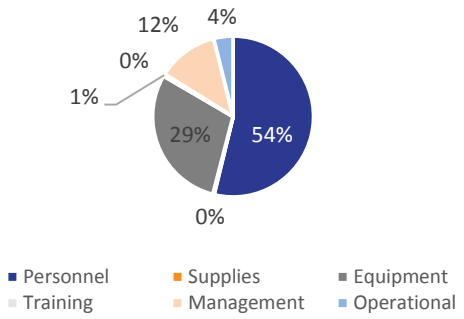


Figure 29: Total Annual Cost for Grounds Maintenance Services: Gumare



The 0% value for the Training cost category represents a monetary amount of US$0.

Figure 30: Total Annual Costs for Grounds Maintenance Services: Mahalapye



The 0% value for the Training cost category represents a monetary amount of US$143.04.

Finally, Figure 30 provides a view of the direct and indirect costs of grounds maintenance services at Mahalapye Hospital. As with facilities like Athlone and to a lesser extent Deborah Retief, personnel costs are an important driver of overall costs. At Mahalapye, which employs eight grounds maintenance staff, these costs constitute 54% of the overall cost. Another important cost driver is equipment, around 29% of the total cost of grounds maintenance. Since Mahalapye is a relatively new hospital, grounds maintenance staff probably have a more extensive set of tools and equipment than do more established facilities. Management costs contribute about 12% of overall costs. However, with only one manager to manage the groundskeepers, the impact on overall cost can be deceiving.

Table 15 presents the average annual unit cost for grounds maintenance per square meter of hospital grounds. These costs range from a low of US$0.92 (BWP 8.57) at Gumare Hospital to a high of US$2.95 (BWP 27.46) at Goodhope Hospital. For Mahalapye Hospital, the only other facility that was able to provide measurement of the hospital grounds, the unit cost per output was US$1.02 (9.50).

Table 15: Annual Estimated Grounds Maintenance Unit Costs per Square Meter by Hospital

	Athlone	Deborah Retief	Goodhope	Gumare	Mahalapye
Total cost for grounds	**BWP 379,324.97** (US $40,743.82)	**BWP 215,247.75** (US $23,120.06)	**BWP 484,359.32** (US $52,025.71)	**BWP 345,396.66** (US $37,099.53)	**BWP 293,314.47** (US $31,505.31)
Total grounds size (m^2)			17,658.51	40,238	31,000
Unit cost by output			**BWP 27.43** (US $2.95)	**BWP 8.58** (US $0.92)	**BWP 9.46** (US $1.02)

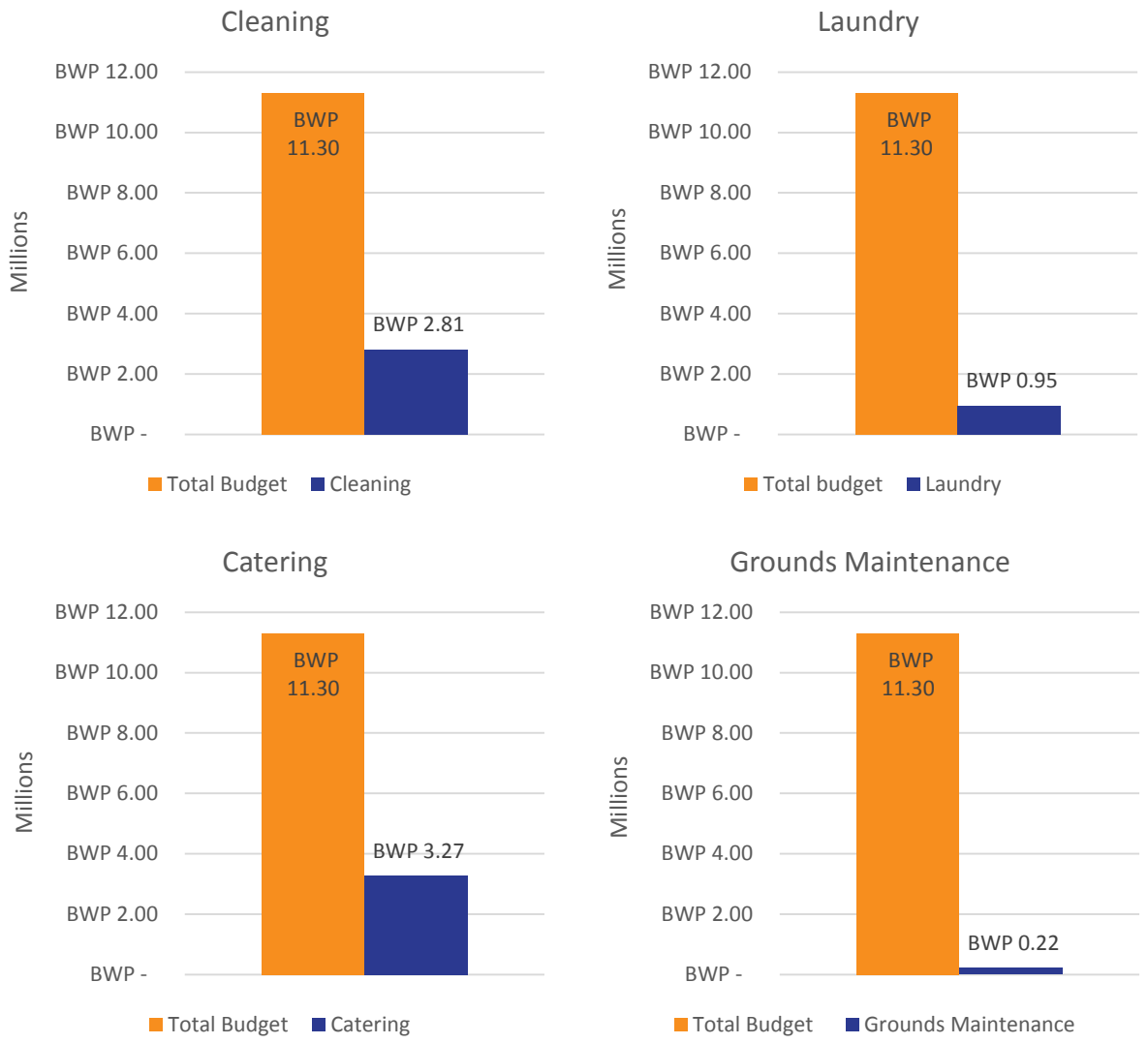
4. COSTS OF NON-CLINICAL SERVICES AS A PROPORTION OF OVERALL FACILITY BUDGET

This chapter looks at the costs of non-clinical services as a proportion of the overall facility budget. Figure 31 presents non-clinical services as a proportion of the budget at Athlone Hospital. There, cleaning, which costs BWP 2.54m (US$272,438.48) is the non-clinical service that consumes the largest share of the total facility budget, about 7.5%. This is followed closely by catering services, which cost BWP 2.44m (US$ 261,817), 7.2% of the budget. Grounds maintenance costs much less, BWP .38m (US$40,816.33), and represents a considerably lesser share of the budget, 1.1%. Athlone has outsourced laundry services and keeps only few staff, but because it maintains the laundry machines, laundry services still claim 1% of the facility budget.

Figure 31: Cost of Non-clinical Services as Proportion of Total Facility Budget: Athlone

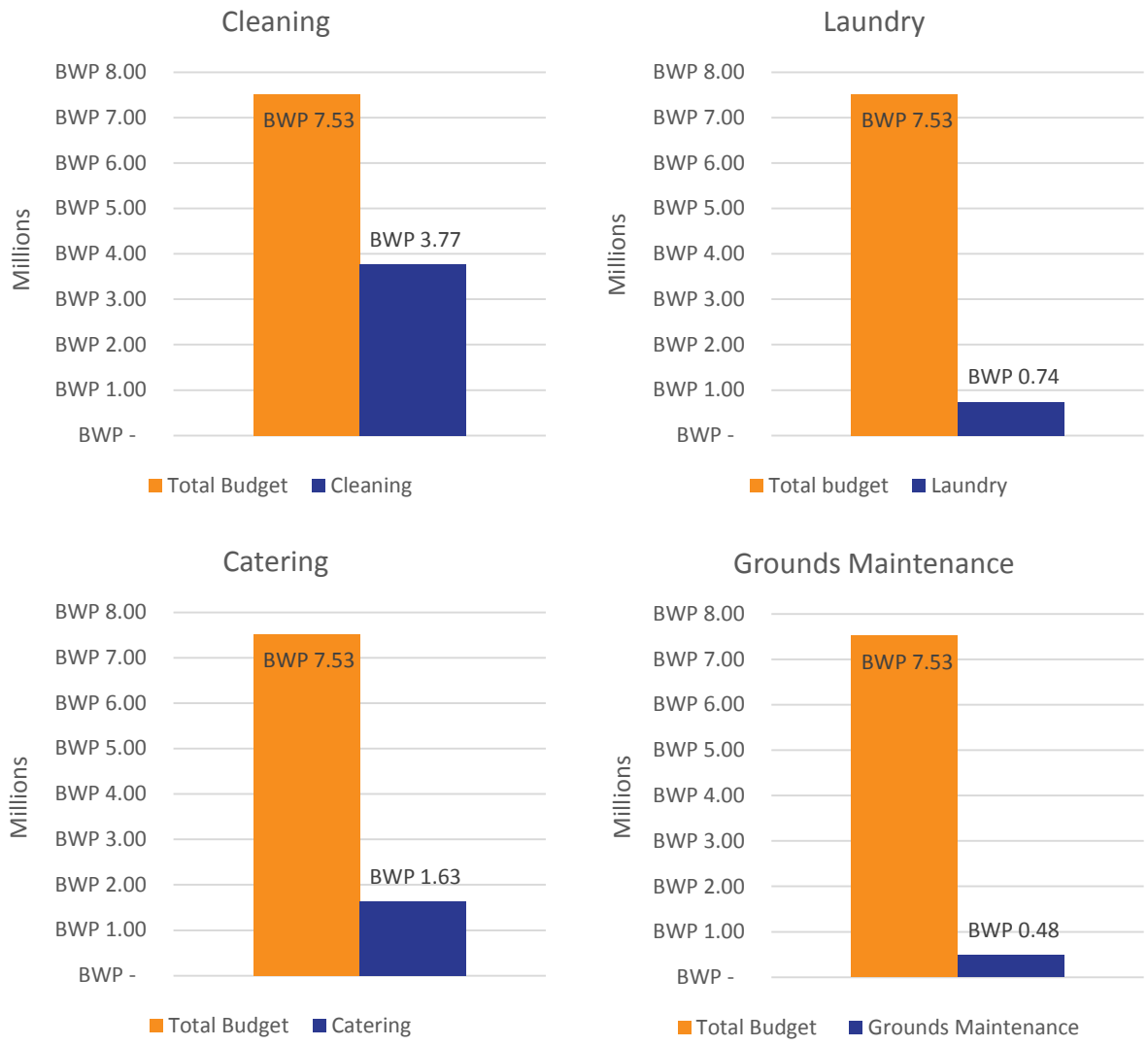
Figure 32 presents non-clinical services as a proportion of the budget at Deborah Retief Memorial Hospital. The cost of catering services, around BWP 3.27m (US$351,443.99), commands the largest proportion of the overall facility budget, nearly 29%. Costs for cleaning services (BWP 2.81m or US$301,869.32) are not far behind, absorbing nearly 25% of the overall facility budget annually. The cost of laundry services, BWP .95m (US$102,063.59), claims the second largest share of the hospital's overall budget, nearly 8.5%. Providing only limited grounds maintenance services costs around BWP .22m (US$23,120.06), a very small proportion (2%) of the budget. Deborah Retief Hospital's overall budget is the lowest of the facilities reviewed. Thus, even the small sums spent on each of the non-clinical services have a noticeable impact on financial management and the resources available for other, greater needs.

Figure 32: Cost of Non-clinical Services as Proportion of Total Facility Budget: Deborah Retief



Goodhope Primary Hospital's small budget, like that of Deborah Retief, means that the proportion of the budget consumed by non-clinical services is quite significant. For example, the costs of cleaning services, about BWP 3.77m (US$404,596.00), absorb nearly 50% of the budget. Similarly, its costs for catering services, approximately BWP 1.63m (US$175,555.26), consume around 21% of the budget. While the costs for laundry services and grounds maintenance are more limited, they can still produce financial constraints. Laundry costs, about BWP .74m (US$79,773.27), represent about 10% of the budget, which is significant. Even the limited grounds maintenance absorbs around 6%. While the actual dynamics and trade-offs between health facility budgets and both clinical and non-clinical services need to be better understood, it is clear that support and auxiliary services like those reviewed above can have a serious impact on health financing at both national and local levels.

Figure 33: Cost of Non-clinical Services as Proportion of Total Facility Budget: Goodhope



Gumare Hospital's budget is nearly double its nearest equivalent hospital in the study, Goodhope. Both have a 34-bed capacity, although Gumare sees slightly more inpatients a year, 2,489. Its costs for non-clinical services, however, appear to be more in line with what one would expect than are Goodhope's. For example, catering services, which is Gumare's most expensive non-clinical service at BWP 1.60m (US$171,592.10), represent only about 11.3% of the budget. Cleaning and laundry represent 7.4% and 6.1%, respectively. The least expensive non-clinical service, grounds maintenance, at BWP .35m (US$37,099.53) per year, represents approximately 2.5% of the budget. In total, non-clinical services consume just over 27% of Gumare's annual budget.

Figure 34: Cost of Non-clinical Services as Proportion of Total Facility Budget: Gumare

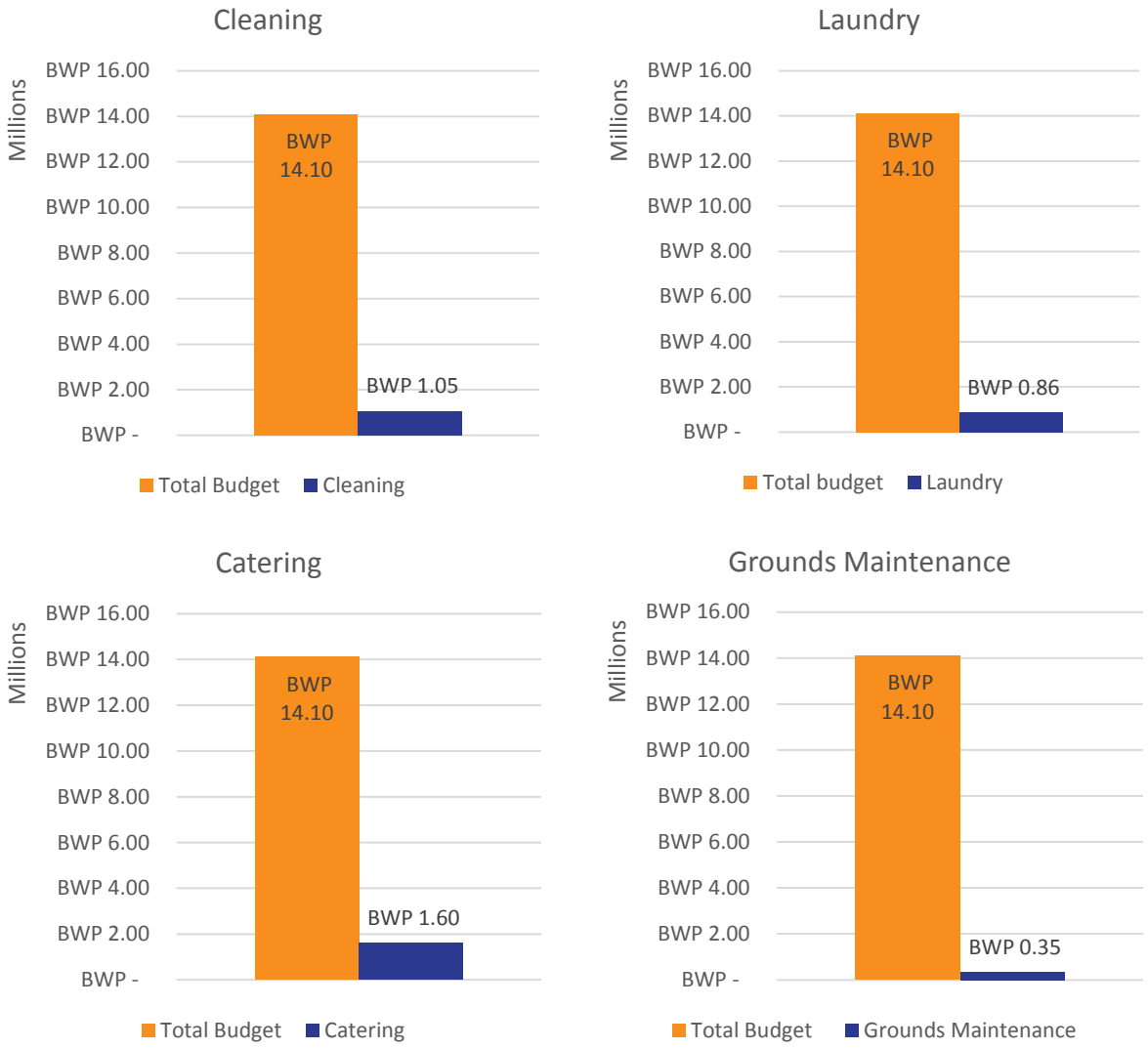
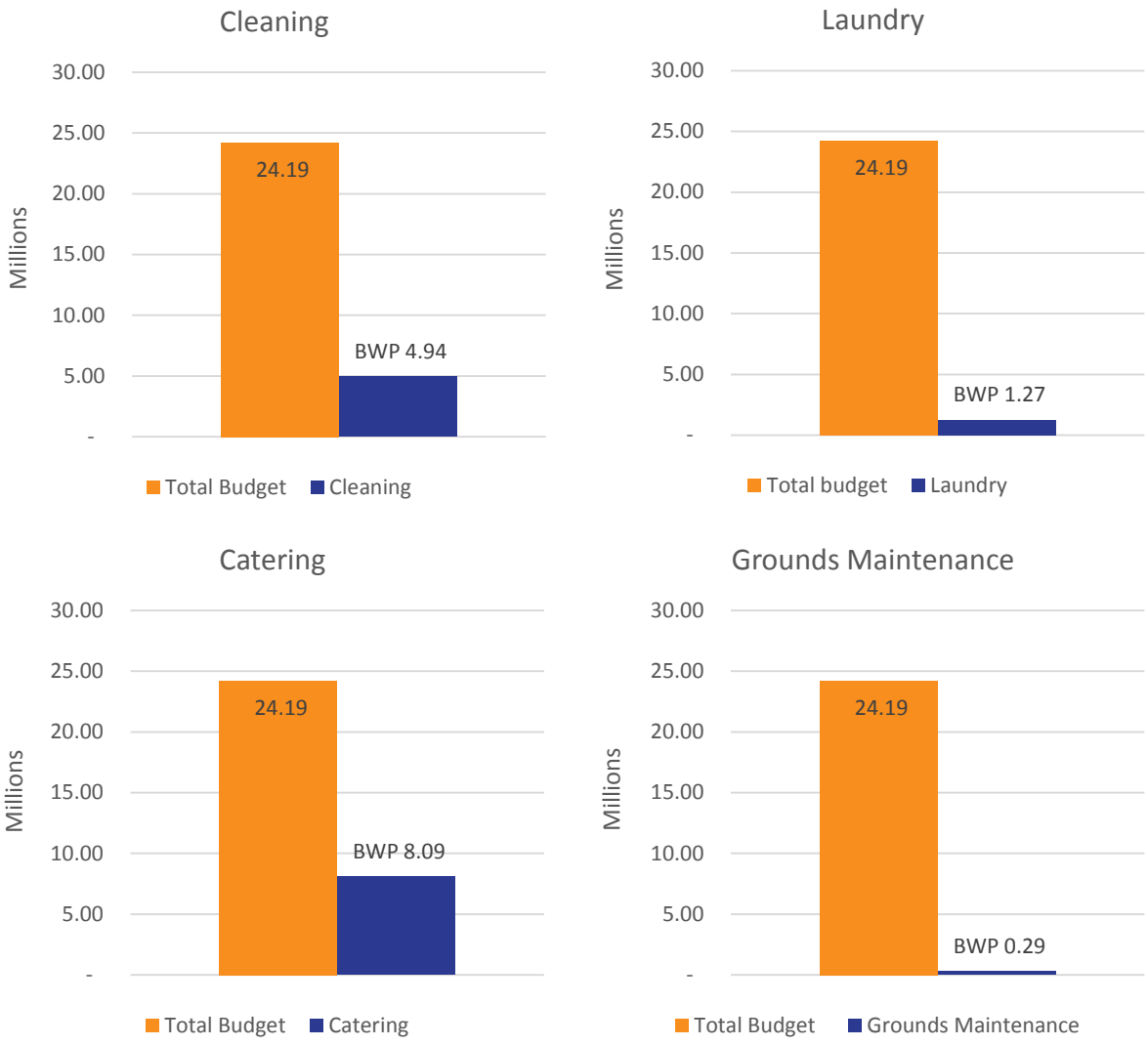


Figure 35 presents non-clinical services as a proportion of the annual budget at Mahalapye Hospital. Costs for catering services, an extensive and expensive service estimated to be around BWP 8.09m (US$868,474.88), has the potential to absorb 33% of the total facility budget. The costs for catering supplies alone, at BWP 6.75m (US$725,396.91) (see Table 11) can swallow 28% of the budget. Cleaning services also have extensive costs, currently estimated at BWP 4.94m (US$530,268.66), more than 20% of the budget. Laundry services follow at a cost of BWP 1.27m(US$136,605.42), more than 5% of the budget. Finally, grounds maintenance, BWP .29m (US $31,505.31), claim over 1%.

Figure 35: Cost of Non-clinical Services as Proportion of Total Facility Budget: Mahalapye



5. ESTIMATED UNIT COSTS OF NON-CLINICAL SERVICES BY FACILITY

Table 16 presents the estimated unit costs of non-clinical services at Athlone Hospital, which had 4,973 inpatient visits and 64,104 outpatient visits over the 12 months preceding the study. The costs range from a low of BWP 5.06 (US$ 0.54) for grounds maintenance based on all patients (inpatients and outpatients), to a high of BWP 510 (US$54.78) for cleaning services based on the number of inpatients.

Table 16: Estimated Annual Unit Costs per Non-clinical Service at Athlone Hospital

	Number of Patients	Per Patient Unit Cost	
		BWP	US $
Cleaning service delivery			
In-Patients	4,973	510.03	54.78
Out-Patients	64,104	39.57	4.25
All Patients	69,077	36.72	3.94
Laundry service delivery			
In-Patients	4,973	70.26	7.55
Out-Patients	64,104	5.45	0.59
All Patients	69,077	5.06	0.54
Catering service delivery			
In-Patients	4,973	490.15	52.65
Out-Patients	64,104	38.02	4.08
All Patients	69,077	35.29	3.79
Grounds maintenance service delivery			
In-Patients	4,973	76.28	8.19
Out-Patients	64,104	5.92	0.64
All Patients	69,077	5.49	0.59

Table 17 presents estimated unit costs for non-clinical service delivery at Deborah Retief Memorial Hospital, which had 4,493 inpatient visits and 79,604 outpatient visits in the 12 months preceding the study. Unit costs range from a low of BWP 2.56 (US$0.27) for grounds maintenance based on all patients (inpatients and outpatients) to a high of BSP728.23 (US$78.22) for catering services based on inpatients only.

Table 17: Estimated Annual Unit Costs per Non-clinical Service at Deborah Retief Hospital

	Number of Patients	Per Patient Unit Cost	
		BWP	US $
Cleaning service delivery			
In-Patients	4,493	625.51	67.19
Out-Patients	79,604	35.30	3.79
All Patients	84,097	33.42	3.59
Laundry service delivery			
In-Patients	4,493	211.49	22.72
Out-Patients	79,604	11.94	1.28

	Number of Patients	Per Patient Unit Cost	
		BWP	US $
All Patients	84,097	11.30	1.21
Catering service delivery			
In-Patients	4,493	728.23	78.22
Out-Patients	79,604	41.10	4.41
All Patients	84,097	38.91	4.18
Grounds maintenance service delivery			
In-Patients	4,493	47.91	5.15
Out-Patients	79,604	2.70	0.29
All Patients	84,097	2.56	0.27

Table 18 presents the same estimates for non-clinical services at Goodhope Primary Hospital, which had 1,958 inpatient visits and 14,789 outpatient visits in the 12 months preceding the study. Unit costs range from BWP 28.92 (US$3.11) for grounds maintenance based on all patients to BWP 834.74 (US$89.66) for catering services per inpatient client.

Table 18: Estimated Annual Unit Costs per Non-clinical Service at Goodhope Hospital

	Number of Patients	Per Patient Unit Cost	
		BWP	US $
Cleaning service delivery			
In-Patients	1,958	1,923.79	206.64
Out-Patients	14,789	254.70	27.36
All Patients	16,747	224.92	24.16
Laundry service delivery			
In-Patients	1,958	379.31	40.74
Out-Patients	14,789	50.22	5.39
All Patients	16,747	44.35	4.76
Catering service delivery			
In-Patients	1,958	834.74	89.66
Out-Patients			
All Patients			
Grounds maintenance service delivery			
In-Patients	1,958	247.37	26.57
Out-Patients	14,789	32.75	3.52
All Patients	16,747	28.92	3.11

Table 19 presents the same estimates for non-clinical services at Gumare Primary Hospital, which had 2,489 inpatient visits. The facility was not able to confirm the number of outpatient visits in the 12 months preceding the study.

Table 19: Estimated Annual Unit Costs per Non-clinical Service at Gumare Hospital

	Number of Patients	Per Patient Unit Cost	
		BWP	US $
Cleaning service delivery			
In-Patients	2,489	423.60	45.50
Out-Patients			
All Patients			
Laundry service delivery			
In-Patients	2,489	347.14	37.29
Out-Patients			
All Patients			
Catering service delivery			
In-Patients	2,489	641.83	68.94
Out-Patients			
All Patients			
Grounds maintenance service delivery			
In-Patients	2,489	138.77	14.91
Out-Patients			
All Patients			

Table 20 presents estimated unit costs for non-clinical service delivery at Mahalapye Hospital, which had 8,178 inpatient visits and 97,595 outpatient visits in the 12 months preceding the study. Estimates of unit costs range from a low of BWP 2.77 (US$0.30) for grounds maintenance based on all patients (inpatients and outpatients) to a high for catering, based on inpatients only, BWP 988.69 (US$106.20).

Table 20: Estimated Annual Unit Costs per Non-clinical Service at Mahalapye Hospital

	Number of Patients	Per Patient Unit Cost	
		BWP	US $
Cleaning service delivery			
In-Patients	8,178	603.67	64.84
Out-Patients	97,595	50.58	5.43
All Patients	105,773	46.67	5.01
Laundry service delivery			
In-Patients	8,178	155.51	16.70
Out-Patients	97,595	13.03	1.40
All Patients	105,773	12.02	1.29
Catering service delivery			
In-Patients	8,178	988.69	106.20
Out-Patients	97,595	82.85	8.90
All Patients	105,773	76.44	8.21
Grounds maintenance service delivery			
In-Patients	8,178	35.87	3.85
Out-Patients	97,595	3.01	0.32
All Patients	105,773	2.77	0.30

6. DISCUSSION AND CONCLUSIONS

This study provides a benchmark of public sector costs for delivery of non-clinical services in five different hospitals in Botswana. This is the first study of its kind in the country and was aimed at expanding the MOH's understanding of the costs and cost drivers of providing cleaning, laundry, catering, and grounds maintenance services at the hospital level. This study will support the ministry's continuing efforts to pursue and expand both its strategies to outsource more of its non-core functions to private sector providers, and to devolve more responsibilities for planning, budgeting, management, and supervision to the district level. With a better grasp of what they can expect in terms of the type, quantity, and quality of service or product they are purchasing, both hospital and central-level managers will be in a better position to negotiate contracts with private sector service providers, and will assist the MOH in moving toward greater efficiency and cost savings in service delivery while ensuring the highest quality and standards possible.

To assist with the collection, categorization, and determination of costs for non-clinical services (i.e., cleaning, laundry, catering, and grounds maintenance), the HFG Auxiliary Services Costing Tool was developed and employed in all the study hospitals. The tool was useful in being able to systematically capture the relevant data and organize the data for analysis. The development and refinement of the tool was undertaken with the aim of having a comprehensive and user-friendly tool that can be used by hospital administrators, as well as MOH headquarters management, to gain insight into the costs of non-clinical service delivery through either the public or private sector. The tool will requires further use and, perhaps, the development of a simple manual to enable end users to understand how to populate the tool's different sections and to explore the data.

The study revealed that, overall, direct costs represent the greatest proportion of costs for the delivery of non-clinical services, accounting for, on average, over 80% (69%–93%) of total cost across facilities. Indirect costs make up just under 18% (7%–31%). The primary cost driver is supplies, averaging about 64% (47%–75%) of all direct costs and 53% (38%–66%) of total costs. This is followed by human resource costs, which average around 24% (14%–37%) of direct costs and just under 20% (11%–29%) of total costs. The last direct cost category, equipment, averages 9% (1.4%–16%) of all direct costs and 9.5% (4%–12.5%) of total costs. Of the indirect costs, management and operational costs are the most important drivers. Management costs average about 54% (24%–75%) of all indirect costs and 9% (2.5%–21%) of total costs. Operational costs account for on average about 42% (19%–73%) of indirect costs and 7% (3%–15%) of total costs.

The most costly non-clinical service to deliver is catering, costing on average just under US$366,000 (BWP 3.4m). Catering costs the most at Mahalapye Hospital with an annual cost of around US$870,000 (about BWP 8.1m). Mahalapye Hospital is the largest hospital included in the study, with a 260-bed capacity and an annual outpatient volume of 8,178 clients. This means that, annually, catering services spend approximately US$106 on each inpatient client. The next largest hospital, Deborah Retief Memorial spends about US$350,000 (approximately BWP 3.25m) a year on catering services. With an annual inpatient client volume of 4,493, Deborah Retief spends just over US$78.00 (BWP 726) per patient per year. The other facilities, Athlone, with 177 beds, and Goodhope and Gumare, each with 34 beds, spend US$52.65 (BWP 490.17), US$99.41 (BWP 925.51), and US$68.94 (BWP 641.83), respectively, on catering per inpatient per year. The high costs of catering are due primarily to equipment costs and the annual amount that is spent on food and other consumables. Local

procurement practices can produce a significant impact in terms of variation in the costs of some consumables per facility of between 0% and 205% depending on the good.

The least expensive non-clinical service is grounds maintenance. Of the three facilities that were able to provide data regarding the measurements of maintained grounds, Gumare Hospital spends only US$0.92 (BWP 8.57) per square meter of hospital grounds. The highest annual unit cost was found at Goodhope Hospital, which spends US$2.95 (BWP 27.46) a year for grounds maintenance. Finally, Mahalapye Hospital spends an average of US$1.02 (9.50) per unit of output. The staff for grounds maintenance are often very few and they tend not to be very well equipped. However, the highest individual cost inputs generally tend to be personnel and management costs. In addition, provision of grounds maintenance services does not generally make much of an impact on utilities and building operational costs with only marginal usage across facilities.

At service level, costs vary significantly from facility to facility. For the provision of cleaning services, the two most important cost drivers are personnel and supplies across all facilities. Personnel costs as a percentage of overall cost range from a low of 10% at Goodhope to a high of 49% at Athlone. The other facilities, Deborah Retief, Gumare, and Mahalapye, spend 41%, 35%, and 27% of total cost on personnel, respectively. This variance is maintained when considering supply costs. Both Mahalapye and Deborah Retief spend 52% of their overall cleaning costs on supplies, while Gumare and Athlone spend 35% and 30%, respectively. However, Goodhope spends 84% of its overall cleaning costs on supplies. Being a small hospital similar to Gumare (both 34-bed capacity), and having fewer cleaning staff, the difference in costs requires some further analysis.

The variation in laundry costs is less stark. Costs appear fairly well distributed across input categories and facilities. Personnel costs account for 10% of overall laundry costs in Gumare, while in Mahalapye they contribute 25%. Supplies assume the greatest proportion at Deborah Retief at 44%, and the least at Gumare 7%. Management costs do vary somewhat, with Goodhope and Gumare having a greater proportion of their costs going toward management, 38% and 28%, respectively, while at Deborah Retief and Mahalapye, management only contributes 11% and 7%, respectively. This suggests, perhaps, that management at smaller facilities consumes a greater proportion of overall resources. Equipment ranges from a high of 26% in Gumare to a low of 7% at Deborah Retief. The difference in equipment costs is due in large part to the number and age of the machines.

While costs for laundry at Athlone Hospital were not included in the analysis due to the service already having been outsourced, the study did raise an interesting issue with regard to the equipment that the MOH had purchased to provide laundry at these hospitals. It is important to note that equipment cost still accrues to the MOH annually. So, while the laundry machines at Athlone are no longer used, they represent a significant economic cost for the MOH that is not being defrayed either through the selling off of these assets or through these machines being put to some productive use. As part of the outsourcing strategy, plans need to be made to either reduce the financial burden on the MOH that these residual assets represent, or to develop strategies that would put them to some productive use.

Catering costs, as would be expected, are dominated by supplies, with its percentage contribution ranging from 48% in Goodhope to 84% in Mahalapye. Being the largest facility in the study, it is understandable that supplying catering services that feed well over 8,000 patients annually would consume a large proportion of resources. This is also true of Deborah Retief and Athlone. The difference in supply costs between Goodhope and Gumare is greater than one would expect given that they are both relatively the same size. Supplies represent 48% of total cost at Goodhope and 75% at Gumare. Gumare does see 21% more inpatients per year than Goodhope, but this would not seem to account for the extra cost. There is also a 34% difference in commodity prices between Goodhope and Gumare, which seems to indicate the impact of local tenders for supply of foodstuffs.

The distributions of costs across facilities for grounds maintenance is fairly consistent. Here, management costs assume a greater proportion, with a high of 79% at Goodhope, followed closely by Gumare at 66%, Deborah Retief at 49%, Athlone at 28%, and a low of 12% at Mahalapye. These figures seem to bear out the observation that with smaller facilities and fewer personnel involved in service delivery, the proportion of overall costs management assumes is greater. Despite their relatively small absolute numbers, personnel still make up a fairly large percentage of overall costs due to their combined annual salaries being, on average, far higher than most other inputs. The percentage personnel costs contribute to overall costs of grounds maintenance ranges from 11% in Gumare to a high of 54% in Mahalapye. In between is Athlone at 36%, Deborah Retief at 22%, and Goodhope at 16%. The difference observed is due to the numbers of personnel employed at each facility, with larger facilities, like Mahalapye, Athlone, and Deborah Retief employing more, and the smaller facilities, Goodhope and Gumare employing less.

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