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DEVELOPING A FRAMEWORK FOR SETTING HEALTH SERVICE TARIFFS IN BOTSWANA: FINAL REPORT

September 2018

This report was prepared by Jose Carlos Gutierrez and Ric Marshall on behalf of the Health Finance and Governance project.

The Health Finance and Governance Project

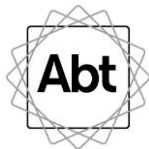
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ACRONYMS

A-DRG	Adjacent diagnostic-related groups
AR-DRG	Australian diagnostic-related groups
ART	antiretroviral therapy
CEAWG	Clinical expert advisory working group
DRG	diagnostic-related group
FFS	Fee for service
G-DRG	Ghana diagnostic-related groups
GOB	Government of Botswana
HFG	Health Finance and Governance
ICD	International Classification of Disease
IPMS	Integrated Patient Management System
MAS	Medical Aid Scheme
MOHW	Ministry of Health and Wellness
NHIS	National Health Insurance Scheme
P4P	Pay for performance
PoC	Proof of Concept
TA	Technical assistance
USAID	United States Agency for International Development

I. INTRODUCTION

I.1 Objectives

As a continuation of the Health Finance and Governance (HFG) project and United States Agency for International Development (USAID) support to the Ministry of Health and Wellness (MOHW) in developing Botswana's Health Financing Strategy, HFG is providing technical assistance to the MOHW to develop a framework for setting reference tariffs for health services. As the final deliverable for the activity, the purpose of this report is to present the proposed tariff-setting framework. Specifically, the report describes the current tariff-setting landscape in Botswana, presents the findings of HFG's proof-of-concept tariff-setting exercise, and outlines the proposed tariff-setting framework. The purpose of the proof-of-concept exercise and tariff-setting framework is to provide a set of recommendations for strengthening the ministry's capability to develop tariffs based on cost and activity data and to propose a framework for developing an annual cycle for setting reference tariffs.

I.2 Project Background

The HFG project provides technical assistance to the MOHW in pursuit of Botswana's health financing objectives. Since 2016, HFG has facilitated Botswana's Health Financing Technical Working Group consultation meetings in order to design and advance Botswana's National Health Financing Strategy¹ (MOHW and HFG 2016). As a continuation of that process, the MOHW and USAID Botswana mission have asked HFG to support the MOHW and Health Financing Technical Working Group in the development of a new tariff-setting framework for health services.

I.3 Health Sector Context

Botswana is upper-middle-income country with a population of about 2.25 million and Gross Domestic Product per capita of US\$6,924 in 2016, or \$16,957 in 2016 international dollars adjusting for purchasing power parity (World Bank 2018). Since achieving independence in 1966, Botswana has steadily expanded access to health services, which are provided free of charge in MOHW facilities. The Government of Botswana (GOB) gives high priority to health, as illustrated in Botswana's National Health Policy 2011, which envisions 'an enabling environment whereby all people living in Botswana have the opportunity to achieve and maintain the highest level of health and well-being' (MOHW 2011). Today, thanks to continuous investment and political will, 95 percent of Botswana live within 8 km of a health facility (WHO 2017) and more than 95 percent of deliveries occur in facilities with a skilled birth attendant (Statistics Botswana 2017a).

Botswana's rapid response to stem the tide of the HIV/AIDS epidemic further illustrates the GOB's commitment to health. At the peak of the epidemic in 2002, 18,000 Botswana lost their lives to AIDS,

¹ Other technical assistance activities completed to date include a health financing landscape analysis (Cali and Avila 2016), support to conduct a national Health Accounts exercise (Cogswell et al. 2016), policy briefs and reports reviewing efficiency and the potential for health insurance reform (Nakhimovsky et al. 2016; Gutierrez and Avila 2016; Gutierrez et al. 2018), the redesign of Botswana's health benefit package (MOHW and HFG 2017), an actuarial costing of the new package (Kelley 2017), and a fiscal space analysis (Jefferis 2018).

but with the advent of effective antiretroviral drugs, Botswana rapidly expanded access to treatment with the launch of Botswana's national antiretroviral therapy (ART) program in 2002. Thanks to the investment of the GOB and its partners, Botswana has been able to halt and reverse the epidemic, reducing not only AIDS-related deaths but also the number of new infections. Between 2002 and 2016, annual AIDS-related deaths decreased from 18,000 to 3,900. Further, Botswana continues to innovate and aims high in the efforts to reach the Joint United Nations Programme on HIV/AIDS' 90-90-90 targets. In 2016, Botswana adopted the 'Treat All' strategy, committing to initiate ART treatment for all HIV-positive individuals, regardless of CD4 count.

These results have come at a cost. Between 1995 and 2015, general government expenditures on health increased at an average annual rate of 8.6 percent; in this 20-year period, general government expenditures on health grew from 5.5 percent to 8.8 percent (WHO 2017). In real terms, health expenditure has far outpaced population and economic growth (WHO 2017). While budgetary increases signal the GOB's robust commitment to health, the GOB and MOHW are facing increased pressure to contain costs and ensure value for money in health care in an environment of declining national economic growth rates and donor financing.

While Botswana's economy recovered from a 2015 slump caused by a drop in diamond sales and achieved growth of 4.3 percent in 2016 (IMF 2017), projected growth is still far lower than the spectacular double-digit rates of previous decades that facilitated Botswana's rapid growth in social spending. Though projected annual growth of 4–5 percent is relatively high by international standards, the gap between health expenditure growth and economic growth is not sustainable in the long term. As the MOHW faces rising expenditures associated with non-communicable diseases and the Treat-All Strategy, it is becoming ever more urgent to not only raise more resources for health, but also to improve efficiency in resource allocation and service provision.

1.3.1 Public health sector background

Health care services are predominantly publicly financed and provided free of charge² at publicly owned health facilities, which serve the 83 percent of the population not covered by Medical Aid Schemes (MAS). For its population size, Botswana has a well-structured, developing health care system that includes 3 referral hospitals, 15 district hospitals, and 17 primary hospitals in the public sector, as well as 8 hospitals in the private sector (Callahan 2014). Overall, there are 101 clinics with beds, 171 clinics without beds, 338 health posts, and 844 mobile stops distributed among 27 health districts (MOHW 2018). Because there is no separation between purchasing and provision, MOHW functions as both provider and purchaser of health services.

The majority of the population (82 percent) is not covered by Medical Aid and typically accesses services at public facilities free of charge, although some also use private services despite not having Medical Aid coverage and having to pay out of pocket. In addition, MOHW referral hospitals refer patients to hospitals in Botswana and other countries (mainly South Africa) when they are over capacity or lack the capability to treat specific cases or conduct certain highly specialized surgeries and procedures. About 8 percent of the ministry's annual budget (or 10 percent of the Department of Clinical Services, which oversees service provision) is devoted to referrals to the private health sector.

² There is a nominal patient copayment of 5 Pula; however, this is rarely collected.

1.3.2 Private health sector background

The private health sector plays an important role in Botswana's health system. Higher income individuals and formal-sector workers often seek care in the private sector to enable them to choose their own provider, avoid long wait times, and, in many cases, because of a perceived lack of quality or availability of MOHW services.

Approximately 17 percent of the population is enrolled in a private MAS – the equivalent of private health insurance. Many MAS enrollees participate in employer-sponsored plans where employers partner with a MAS and pay for a portion of employee premiums. There are nine MAS throughout the country, and the Botswana Public Officers' Medical Aid Scheme is the largest, with 174,001 covered members in 2017 (BPOMAS 2017). The GOB participates in the scheme as a sponsor, providing 50 percent of employee premium contributions. The scheme is not mandatory, and about half of government employees choose not to enroll (Gutierrez et al. 2018).

Botswana also has a robust and growing market in the provision of health services. There are 8 private hospitals (and several more under construction), and there are 354 private clinics and 106 private pharmacies throughout the country (Callahan et al. 2014).

Despite the crucial role of private payers and providers, the private sector is underregulated, generating serious concerns related to consumer protection. In 2017, for example, four schemes were temporarily closed by the Non-Bank Financial Institutions Regulatory Authority, which is charged with regulating the sector. As of 2018, one scheme is under curatorship due to poor financial management. On the provider side, the MOHW conducts limited regulatory activities related to clinical quality and patient safety.

The public and private sectors interact at multiple levels of the health system. The GOB is a purchaser of private health services, not only indirectly through its sponsorship of the Botswana Public Officers' Medical Aid Scheme premiums, but also directly through the MOHW, which often refers patients to private health facilities—not only in Botswana but also to providers in South Africa, India, and other countries. In addition, MAS enrollees sometimes seek care in the public sector when they have exhausted their annual MAS benefits for a particular type of service or in order to avoid the typical 10 or 20 percent coinsurance and 12.5 percent VAT that are charged when accessing private sector health services. MOHW is not reimbursed from MAS for providing this care, however, raising concerns among policy makers.

1.3.3 Health financing challenges

Broadly speaking, Botswana's main challenges in the area of health financing revolve around improving efficiency and ensuring long-term financial sustainability of the health system. The Health Financing Strategy (MOHW and HFG 2018) and especially HFG's health financing landscape analysis (Cali and Avila 2016), outline these challenges in detail. Similarly, the Health Insurance Blueprint (Gutierrez et al. 2018) and Strategic Purchasing report (Strizrep 2018) discuss how reforms such as national health insurance and capitation for primary health care could contribute to tackling these challenges. Nakhimovsky et al. (2016) focus specifically on efficiency.

A key challenge is the need to develop and strengthen 'strategic' purchasing arrangements. All health systems engage in some sort of purchasing for health services, the process of allocating resources in order to purchase or produce health services. In Botswana's case, MOHW resources are allocated to public facilities via historical line item budgets. This is a 'passive' approach to purchasing since budgets are not linked to results, and there are few mechanisms and incentives for providers to improve performance and quality (Kutzin 2012). The lack of flexibility in line-item budgets limits managers' ability

to reorganize inputs (such as staff, equipment, etc.) in such a way that improves efficiency—producing more output for the same set of inputs or producing the same output with fewer inputs.

An important step in transitioning from passive purchasing to strategic purchasing is creating explicit purchasing mechanisms; this requires defined units of service that can be assigned a cost and value. Understanding how much it costs to produce or provide a unit of service allows the purchaser to pay for measurable units of service, rather than simply allocating resources with no link to results related to the quantity or quality of services provided. A context of explicit purchasing, where there is separation between the purchaser and provider (as between MAS and providers), requires a price system. In Botswana, the fees and prices for health care services are referred to as ‘tariffs’. Developing reference tariffs, which are based on the average cost of providing a unit of service, is one approach to creating a level playing field between providers and purchasers so that providers can compete on the basis of quality and standard definitions of units of service.

1.4 Rationale for Standard Reference Tariffs

Unique characteristics of the health sector result in markets for health services that are in many ways different from markets in other sectors, especially regarding the role of competition in determining prices for health services. As described by Arrow as early as 1963, features such as the uncertainty of demand for medical services and the physician’s role as an agent for the patient, as well as provider of services, complicate the assumptions required for medical care markets to reach competitive equilibrium (Arrow 1963). In this section we briefly review how the market for health services complicates the determination of prices, setting the stage for government intervention in regulating prices and tariffs. Then we present an overview of how reference tariffs can help policy makers realign incentives in a way that enhances efficiency, quality, and accountability.

1.4.1 Characteristics of markets in the health sector: information asymmetries, principal-agent relationships, and market concentration

Health care is a market characterized by information asymmetries. Payers do not have access to information on how healthy or sick a potential enrollee might be at the time of enrolling, and patients have limited access to information to participate in making medical decisions. Patients therefore usually have to rely on their physicians’ advice, and both payers and patients have difficulty observing and assessing the quality of the health services that are purchased (Dranove 2011).

Tracking quality and effectiveness of care is challenging, partly because physician services such as a consultation are consumed in the moment they are produced, and partly because providers and payers often lack clear quality metrics. Such information asymmetries complicate the price-setting process. For example, what is the value of a service from one physician who spends 10 minutes with a patient as compared to a physician who spends 20 minutes? If one physician has 20 more years of experience, does that make his or her care of higher quality or value? These types of questions make it difficult for payers and providers to determine a fair price for the care of a particular case that represents real value and satisfies all parties.

In the absence of clear information on the product or service being provided—and on the quality of such services—price determination by market forces alone leads to a classic problem that has been a subject of concern in Botswana for the past decade. Payers naturally want to keep prices as low as possible, and providers want to raise prices as much as possible. As long as price is the only dimension on which the negotiation takes place, we are at an impasse. By introducing clear guidelines as to the

services being provided—for example through clinical guidelines and standardized protocols—and by specifying minimum quality metrics, stakeholders can shift to negotiating on the quality and value dimensions of the available care options rather than negotiating solely on existing prices and annual increases.

Further, by specifying standard quality requirements and basing prices on actual normative costs, payers, providers, and patients can mitigate the risk of adverse effects on quality that can arise when providers compete on price to the detriment of quality—for example, offering or agreeing to a lower price but providing a substandard or poor-quality service. The development of a national reference tariff system, where cost data are used to inform reference tariffs and these are in turn used to inform negotiations, provides an effective contribution to reducing these information asymmetries.

The variability between providers and payers in the cost and contents of the services is an important source of information for consumers and payers in making their utilization choices. Mechanisms that make this more transparent therefore enable:

- Greater real competition in the payer and provider sectors
- Better informed choice by consumers

The above peculiarities of the health care market structure are also the context for the potential benefit for government regulatory intervention in the tariff-setting process in order to achieve socially optimum outcomes. In general, market concentration leads to high prices as consumers choose among a limited set of options.

1.4.2 Botswana's market for health services

In Botswana, this market structure and regulatory framework operate at both the payer level and the provider level; both the payers and providers are highly concentrated. As of 2018, there are only nine MAS, and there are only eight private hospitals throughout the country. Gaborone and Francistown each has two private hospitals, although there is a third under construction in each city. The high concentration of hospitals in a given market means that hospitals typically have greater negotiating power. In theory, prices should decrease as competition increases; however, this is not always borne out in practice. As new hospitals enter the market in 2018 and 2019, it is unclear how the increased competition may affect prices and costs. On one hand, prices may go down because of increased competition; on the other, prices may remain stable if the new hospital services address unsatisfied demand. More complicated still, prices may remain stable or even increase if physicians and health workers are able to induce demand. Because patient utilization is heavily influenced by physician recommendation, and physicians often have a financial incentive to provide more services, suppliers of health services can also *induce* demand, for example, by ordering more tests and procedures. Among hospitals, increased competition may actually *increase* costs if hospitals respond to competition by investing—sometimes excessively—in costly new technology, a dynamic described as a ‘medical arms race’ (Dranove 2011).

These are relevant risks in Botswana, where the current fee-for-service (FFS) payment structure incentivizes providers to maximize volume, not value, and this can lend itself to supplier-induced demand. Developing a new framework for setting reference tariffs can mitigate this by adopting a new case-based or episode-based payment model, such as paying for diagnostic-related groups (DRGs). Adopting a DRG payment system where tariffs are set for a bundled episode of care (rather than for aggregate individual services and inputs through FFS) can incentivize providers to use fewer inputs in the provision of care to provide services more efficiently.

The adoption of clinically meaningful diagnostic groups and the systematic collection of cost data related to each category can allow providers, payers, and regulators to establish benchmarks for what a particular type of service (clearly delineated with clinical guidelines and standard protocols) should cost. Ultimately, the information generated through the adoption of DRGs would contribute to the overall goals of the tariff-setting system—facilitating a transparent mechanism for assessing the value of services and pricing them appropriately.

The proposal to develop reference tariffs to ensure fair and transparent competition and accountability in a sector characterized by choice limitations and information asymmetries is fully consistent with Botswana's competition policy. Upholding healthy competition in economic markets is a critical objective of Botswana's economic policy; when suppliers of goods and services compete, consumers benefit from lower prices and higher quality. However, as explained above, when quality is difficult to observe, competition on price may lead to a reduction in quality, thus achieving suboptimal and inefficient outcomes. Because population health and consumer protection are also high priorities for the GOB, implementing a tariff-setting system that facilitates competition based on quality rather than price is fully in line with the country's competition policy. It is important to note that the proposed tariff-setting system does not entail fixing tariffs or prices. Rather, the reference tariff represents the average cost (plus a reasonable profit margin for efficient providers) of providing specified services, and it is accompanied by clear definitions and standards detailing the procedures that are included in the tariff.

1.4.3 Tariffs as a tool for realigning incentives

Reference tariffs provide a powerful tool for policy makers seeking to realign the incentives of providers and payers to improve accountability for efficiency and quality and to ensure a level playing field for payer and provider competition.

When structured in a standard way, reference tariffs require the product to which the schedule is attached to be precisely specified. This in turn enables and generates demand for systematic monitoring for compliance to high-quality and efficient costs of provision. The existence of a national reference tariff enables an informed negotiation between payers and providers about reasons for variation from the tariff in terms of specific product variations, local cost constraints, and benchmarked efficiency and value (adjusting appropriately for product variation and local market factors).

By developing a standard definition of services, reference tariffs also help ensure a level playing field for competition among payers and providers. The data and costs collected to calculate and set standard tariffs provide a base for providers and payers to benchmark the costs and quality levels of services provided or purchased. This capability gives an incentive and a framework for providers and payers to measure the value in terms of cost, quality, and effectiveness of the services their patients receive against best practices and norms for the sector. They can use these performance results as a key part of their marketing and competition strategy. Once calibrated, the measuring framework can provide peer norms for purchaser provider cohorts according to scale, local economic constraints, and utilization patterns for fair and meaningful comparison of quality, value, and efficiency performance.

1.4.4 Reference tariffs in high-income countries

Pricing or tariff setting is a core component of health financing arrangements in all countries with highly developed health systems. This applies whether the sector is a payer-provider system of predominantly public providers and payers such as the United Kingdom, or whether it is composed predominately of private or not-for-profit providers and payers such as Germany. Tariff setting or pricing is also central to mixed public-private systems such as Australia and the United States. These different types of systems have evolved toward a rigorously regulated tariff-setting framework that provides public transparency

and maximum competition both for price efficiency, product and service quality, and system sustainability.

It is important to note that while tariffs and prices are often used interchangeably, in this report we attempt to distinguish between price (the amount providers charge and consumers pay) and reference tariffs (an amount that provides a reference point in relation to prices for payers, providers, and other actors).

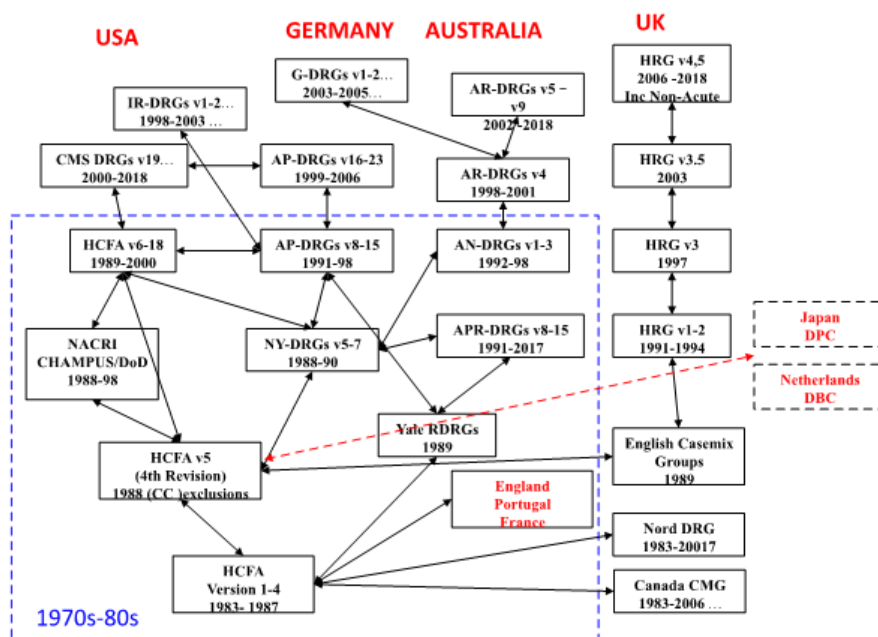
In some countries, tariff schedules may take the form of a schedule of benefits that a single or dominant national insurer or funder is willing to pay together with the conditions that apply to their payment. One of the conditions for payment of these benefits may be that the provider does not make any except agreed, standard additional charges to the patient for the services. Tariff schedules may otherwise take the form of a published set of reference tariffs that form part of a regulatory framework to assure the quality and most effective availability and use of the country's limited health resources in a highly imperfect market for those who need them.

In the 1980s, the framework and mechanisms of 'case payment' or 'casemix funding' was initiated following developments in the United States. Because of their capability to quantify both technical and allocative efficiency, these case payment mechanisms were quickly taken up in reforming the funding systems in high, middle, and lower income countries alike, internationally. The central mechanism of this approach was the concept of the episode of care and the classification framework of the DRG (Annear and Huntington 2015).

Variants of this mechanism have been introduced to underpin tariff setting in most of the developed national health systems. The DRG concept and their use in funding mechanisms have evolved through many local variants and names. It has also been adapted to widely different healthcare delivery models and strategic programs.

A schema of the most widely used DRG variants and their starting points is shown in the Figure I.1 below.

Figure I: Evolution of DRG systems from the original U.S. versions



Source: Adapted from Fetter 1999.

1.4.5 Reference tariffs in the sub-Saharan Africa region³

There is limited experience with tariff setting throughout the region; however, several examples hold important lessons learned for the design of the tariff-setting framework in Botswana. South Africa and Namibia have similar market structures to Botswana's (with close to 20% enrolled in MAS in each country), although South Africa's market is significantly larger, with about 80 schemes and about 300 private hospitals. Ghana's experience illustrates a different health system context, since Ghana's National Health Insurance Scheme (NHIS) is the dominant insurer in the Ghanaian health insurance setting.

In both South Africa and Namibia, issues related to tariff setting have resulted in litigation involving payers, providers, and the Competition Authority; however, this is largely based in conflicts over the legitimacy of the proposed tariffs. In South Africa, attempts at developing reference tariffs have typically been characterized by unilateral approaches undertaken by payers, providers, or regulators. Similarly, in Namibia 'benchmark' tariffs are set by the Namibian Association of Medical Aid Funds. In South Africa, recent efforts at setting reference tariffs were ultimately thwarted by the Courts, which found that the National Department of Health had failed to follow the correct procedures in producing the tariffs. In Namibia, on the other hand, the Courts ruled that the Namibian Association of Medical Aid Funds could continue to publish the reference tariffs. It may be easier said than done, but Botswana should seek to avoid conflict and litigation among payers, providers, and other stakeholders. The process for designing the framework should continue to include broad stakeholder participation, and there needs to be strong technical specifications to underpin the data collection and tariff calculation processes.

Ghana has introduced various payment reforms over the years to address the rapid cost escalation faced by the NHIS. Notably, Ghana introduced a variant of DRGs, the G-DRGs, in 2008. Since then, the latest revision the G-DRGs includes 611 groupings. While transitioning to DRGs is a positive development, several challenges related to how the system is designed and how tariffs are calculated have muted the payment reforms' potential for cost containment and efficiency. First, the G-DRG system does not apply a base rate or relative cost weights to the groupings, which would allow the calculation of budget-neutral tariffs. Thus, while the arrangement is still an improvement from itemized FFS, G-DRGs essentially function like a bundled FFS mechanism (Ghana Ministry of Health 2015; Wang et al. 2017). Second, there is not an agreed-upon framework for the frequency and calculation methodology for tariff rate increases. Tariffs have been revised upward on several occasions (2011, 2013, 2016, 2017) although not every year, which periodically leads to tension between providers and NHIS. Other than the Milliman costing analysis in 2012–2013, tariff rate increases have typically been based on preceding charges rather than costed estimates (Agyepong et al. 2014). Ghana's experience holds several lessons for Botswana, namely the need for an annual tariff adjustment cycle rather than an ad hoc approach, as well as the need for applying relative cost weights and other adjusters to promote efficiency.

1.5 Overview of Tariff-setting Challenges in Botswana

1.5.1 Tariff-setting challenges in the public sector

At present, MOHW does not have a standard tariff list or schedule for use in public health facilities. While price lists are currently used for purchasing of inputs, they are generally imported from South Africa and indexed to Botswana values by a conversion factor. FFS payment mechanisms are the usual

³ For additional detail on each country, refer to the Inception Report (Marshall and Gutierrez 2018).

basis for billing and payments for services provided, and this also has the potential for providing data on utilization at the episode level as a basis for major procedure coding for DRG assignment. For a functional national tariff system, the reporting of complete episodes of care such as the full admission–discharge record for inpatient care needs to be used as the basis for the tariff calculation.

The MOHW's Integrated Patient Management System (IPMS) provides a solid basis for collecting these data. In addition, a solid foundation for episode-level discharge abstract reporting has been established. This provides a viable starting point for initiating a well-designed tariff-setting cycle for Botswana that has the potential to become a regional best practice tariff-setting practice based on calculating the actual average cost of each episode (e.g., DRG) type.

For best results, this can and should start immediately, using existing data with a phased improvement program going forward focused on supporting efficiency and quality-of-care improvement objectives.

To achieve the optional level of precision, as presented in further detail in the section describing the proof-of-concept exercise, some current serious weaknesses will need to be remedied in the detail going forward. These mainly involve improving the quality, consistency, and completeness of existing data being reported by hospitals to the IPMS. For example, activity data for most hospitals have very limited diagnoses coding and no major procedure-coding present. Improved coding and combined with more effective use of the IPMS performance monitoring capabilities will greatly strengthen efficiency and quality assurance functions in Botswana's hospitals and other health care facilities.

A similar systematic improvement in the use of cost and financial accounts data will support these efficiency and quality-of-care improvements. Both of these improvement areas are fundamental underpinnings of the establishing the discipline of a national tariff-setting cycle.

High-value opportunities for these improvements are outlined in the following sections of this report.

1.5.2 Tariff-setting challenges in the private sector

The processes by which MAS and providers set tariffs has been a salient policy issue for the past decade. Cost accounting practices are not standardized in either the public or private health sector, and providers often collect few and poor-quality cost data, which hinders the development of transparent prices for health services.

In the past, MAS negotiated tariff rates and increases with the various professional groups; however, the practice came to an end in 2012 when providers filed a complaint with the then newly minted Competition Authority, which enforces competition policy and guards against anticompetitive practices such as collusion and abuse of dominance. As a result, MAS now negotiate tariffs exclusively with hospitals or large provider groups. For the vast majority of providers, MAS set their tariff (a maximum allowable amount that they will pay), and providers set their own tariff (a minimum amount that they will accept to provide the care), which may be higher than the MAS tariff. When providers bill the patient for the amount above the MAS tariff, this is referred to as 'balance billing'.

In recent years, balance billing has increased as the schemes apply only modest annual rate increases while providers charge patients what they wish. This is clearly a suboptimal arrangement for enrollees, as they are faced with higher out-of-pocket payments, and it goes against the financial protection principles of health insurance and medical aid. Further, balance billing beyond the typical 10 or 20 percent coinsurance and in addition to the 12.5 percent VAT surcharge incurred by the patient sometimes leads MAS members to seek health care services in the public sector free of charge rather than face high out-of-pocket payments. This places greater pressures on the already-strained public facilities, and policy makers have expressed interest in billing MAS for services provided to MAS enrollees, as well as in charging patients visiting from other countries.

As payers face higher costs due to rising prices and patients face greater out-of-pocket payments, the current practices related to tariff setting and provider payment pose significant financial risk for the solvency of the payers, as well as for the member population. In Section 2, we discuss these issues further, and in Section 5, we present how a new framework for setting reference tariffs can improve transparency and quality monitoring so as to facilitate the negotiation of fair prices and tariffs.

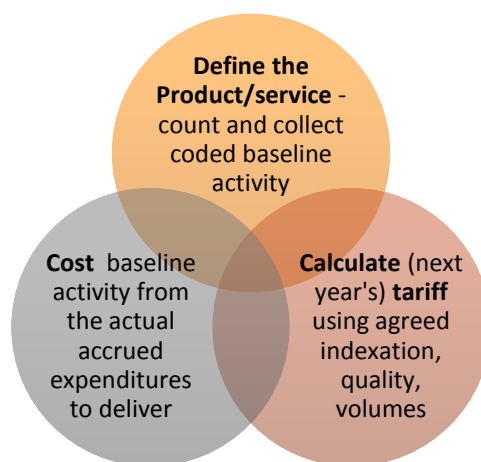
1.6 Tariff-setting Building Blocks

This section outlines the components and steps that are required to come up with a basic tariff list. Figure 1 shows the three key building blocks that must be established and maintained to support an effective tariff-setting cycle.

The central feature of this mechanism defines all health care within the scope of a particular provider system or payment arrangement—or even the whole health care sector—in terms of a schedule or **classification** of discrete case types to which prices can be attached. These case types exhaustively cover all the care provided, and the categories are mutually exclusive. The question that this function serves to answer is **what is the product that we are pricing?** Concretely, this entails developing or adopting a standard coding and classification system for the set of data items that describe the episode of care. Some common examples include standard procedure codes for major interventions provided, the International Classification of Disease (ICD) diagnosis codes for both principle and additional diagnoses, and a count of the hours of Intensive Care Unit therapy provided for the episode.

A second critical element of successful tariff-setting programs is a clear and published analytical study of the **costs of providing the care** for which the tariff is set. These costs must be able to be reconciled with the audited expenditure of the providers who provided all the health care episodes received by the patients in the previous year or financial period referenced by the cost study. These costs and the resource utilization they represent must be able to be aligned and benchmarked by providers with costs for equivalent services across the industry and across time periods. The question that this function serves to answer is **what is the basis for the tariff calculation?**

Figure 2: Key tariff-setting building blocks



Source: Authors.

The third set of considerations in the tariff-setting process involves arriving at the agreed parameters for calculating the price arrived at in setting the tariff. The question: ***how are the tariff calculation factors applied?*** These calculation factors are generally of four categories:

1. Indexation is applied to adjust the cost study results by the inflation rate between the cost study data period and the current financial period.
2. Efficiency or productivity adjusters may be applied generally across the complete tariff base and/or to particular items in the tariff.
3. Weightings may be developed to adjust for different cost structures across regions or provider types.
4. Adjustments may be made for planned changes in the composition, scale, or distribution of the provider system, for example, to account for major infrastructure investment plans.

Points 2, 3, and 4 of these adjuster groups are most usefully considered and calibrated in the context of the budget or sustainability envelope available for the services covered by the tariff schedule. A potential fifth category of adjusters relates to incentives for performance against improvement goals. These may be added to particular tariff items for desired innovation or quality features of the services provided. They are sometimes referred to as payment for performance (P4P).

2. PROOF-OF-CONCEPT FINDINGS

2.1 Proof-of-Concept Analysis: Purpose and Methodology

The purpose of the tariff-setting proof-of-concept exercise was to examine and test the availability of the key building block inputs into the tariff calculation as described above⁴. This includes:

- **Activity data** presented in the form of coded representation of each episode of care for which the tariffs are being set (in this case hospital inpatient services). The activity data provide a weighted count of the number of units (episodes of care) provided or the denominator of the cost per unit calculation.
- **Annual financial expenditure data** that reconcile to the actual costs of running the provider services in the year for which the activity outputs were delivered. This provides a reconcilable component of the cost of running the services that were used to deliver to inpatient cases and represents the numerator of the cost-per-unit calculation.

These elements of the tariff calculation are the fundamentals that are needed to underpin the proposed annual tariff-setting cycle in Botswana. This proof-of-concept analysis was carried out based on a simplified top-down cost analysis of hospital inpatient episodes and provided a test of the feasibility of extracting the required data from existing sources and using them to simulate a simplified tariff-setting exercise.

2.1.1 Aims

The specific aims of the exercise were:

- To assess the availability and fitness for purpose of activity and financial data for tariff setting, using a sample of three hospitals (Princess Marina Referral Hospital, Scottish Livingstone Hospital, and Deborah Retief Memorial Hospital)
- To assemble the following from existing records
 - Activity data to populate unit of activity outputs (from IPMS)
 - Financial expenditure data to populate costing of trial units of activity (from headquarters financial accounts, human resources data)
 - The average cost per inpatient case at each hospital
- To simulate a standard tariff-setting calculation to demonstrate the core steps and approach and identify where material gaps are present or refinements are needed to enable rigorous, standardized tariff calculation

⁴ For this exercise, no indexation adjustment was applied to the cost per unit calculated. In effect, each of the indexation factors that may be applied in calculating the tariff from the cost per unit was set to one for this demonstration.

2.1.2 Methodology

Sample

A convenience sample of three hospitals was chosen due to time and travel constraints. The three hospitals that participated include Princess Marina Referral Hospital in Gaborone, Scottish Livingstone Hospital in Molepolole, and Deborah Retief Memorial Hospital in Mochudi. Notably, all three are MOHW-run public hospitals⁵ accessible from Gaborone; both Molepolole and Mochudi are about 50km away from Gaborone.

Data

Data were obtained at the patient-level episode detail. This enabled an evidence-based count to be made of the total number of episodes and a general description of their type, using ward name as a proxy for the clinical care provided. However, details in the records at this stage were sufficient for counts of episodes at the admission totals level only. Data used include:

- IPMS records of inpatient episodes of care by admission for the fiscal year 2017–18
- Expenditure for the fiscal year 2017–18 extracted from MOHW headquarters financial accounts⁶
- HR staffing lists and salary grade information

Methods

The analysis aimed to establish an average cost per case for each hospital. IPMS inpatient records supplied the denominator (activity data), while annual expenditure data supplied the numerator (costs). In the absence of sufficient coded diagnoses and major procedures in the IPMS records, established Australia DRG distribution data were used to impute a typical distribution of DRG types to the total number of episodes in the Botswana three-hospital sample.

Because of the way the MOHW's line item budget is structured, several cost components of the hospitals' clinical services are not included in the financial accounts for the hospitals. Human resource expenditure, for example, is accounted for in a separate central line item, and this is the largest cost component of patient care. Thus, hospital-specific salary costs were estimated using the hospitals' staffing lists and salary grade information. Occupied position staff numbers for each grade were multiplied by the mid-point salary scale value for the grade to derive an estimate of the costs for each hospital.

Other resource cost not included in the hospitals accounts includes a large proportion of pharmaceutical and medical supplies that are accessed by hospitals from the central purchasing system. It was estimated that these components may constitute up to 10 percent of the full cost of the care episodes. However, in the time available, it was not possible to complete an allocation to the sample hospitals of these costs. This is a recommended refinement for the next iteration of the proof-of-concept activity.

⁵ Two private sector hospitals were invited to participate but did not submit the activity and expenditure data required for the analysis.

⁶ The Corporate Services Department's Finance Unit supplied the hospital expenditure from the Clinical Services Department.

Inpatient fraction

Estimating the average cost per inpatient case requires allocating a portion of a hospital's total cost to inpatient care. However, because of the way MOHW expenditure is accounted for, it is not straightforward to calculate exactly how much of a hospital's costs are attributable to inpatient care versus other activities such as outpatient care or Emergency Department. Thus, to estimate the inpatient cost, the hospital's total cost was multiplied by 0.7, assuming that 70 percent of the cost of running the hospital is attributable to inpatient care. This is a commonly used estimate of the inpatient fraction. For example, this has been validated based on observed trends in Australia (AIHW 2016). For Botswana, these estimates could usefully be reconciled with the salary-accounting estimates for each hospital as an additional check. This step should be added to the method on future runs of the tariff calculation.

Case-type (DRG) distribution ratios

Because of inadequate ICD-10 coding data in IPMS, it is not presently possible to group the inpatient cases into DRGs. Thus, the distribution of case types estimated for Botswana is estimated using distribution ratios from Australia. These ratios were derived from Australian (AR-DRG) cost study data converted from the detailed AR-DRGv8 level (807 categories) to the more aggregated 'Adjacent' A-DRG level (406 categories). The full list of 406 A-DRGs used and estimated volumes for Botswana are provided in the table at Annex I.

Case cost weights

Similarly, because Botswana lacks bottom-up costing data, the estimated cost for a particular case type is estimated (based on the average cost per inpatient case in Botswana) using a distribution of cost weights. These cost weights reflect the relative cost of a particular case type or DRG group to the average cost across all case types or DRGs. Cost weights used were extracted from the published Round 19 Australian V8.0 Public Sector national hospital cost data collection inpatients cost weight table (IHPA 2017) and converted to the 406 summary A-DRG categories⁷ used in this initial simulation.

Other Assumptions

The availability of data availability and choice of methods, including imputation, necessarily implies a set of assumptions. The following are assumptions of the model:

- Hospital staff at a particular grade, on average, receive the mid-point salary for that grade.
- Seventy percent of each hospital's costs are attributable to inpatient care.
- The distribution of case types in Botswana follows generally the average distribution of case types of hospitals in Australia
- The ratios between the costs of different case types (cost weights) in Botswana follow generally the distribution of cost weights in Australia.

⁷ The summary level used was the "Adjacent" DRGs, which comprise one of the three useable levels of the standard DRG categories: 1) the Main Disease Categories (MDCs) which include 23 categories or blocks; 2) the "Adjacent" DRGs (A-DRGs), which include 408 categories; and 3) the Complexity-refined DRGs (AR-DRGs), which include 807 categories. The level (2) used in this proof of concept is mostly used for utilization analysis. It is more common to use (3) for payment applications (where complexity level splits are introduced into about 50% of the summary DRGs for more precise resource/complexity groups). For an initial analysis, level 2 is easier to understand and the higher level of detail can be added later when the input data are accurate enough to support the more complex grouping algorithm.

2.1.3 Results and observations

Activity data from the three sample hospitals

Activity data for inpatients from three hospitals were available for patients admitted in fiscal year 2017–18. As shown in Table 2.1, the case numbers and coded data appear to be incomplete and should be reconciled with the hospitals' admission counts. For example, data received for Hospital 3 was for only a one-month sample. This can be projected to a 12-month total of 18,576 estimated cases. However, such a projection carries a substantial risk of over- or under-estimation due to seasonal variation. It also varies significantly from the hospital's own reported total of 10,468 admissions in its 2017 Annual Report. Therefore, two estimates were done for Hospital 3. In estimate 1 we use the 10,468 admissions reported in the Annual Report. In Estimate 2 we use the average of the 12-month projection and the Annual Report, which results in an estimated 14,522 admissions. These estimates are shown in the column 'H3 projection' in Table 2.1.

On the other hand, the data from Hospital 3 were found to contain a much higher percentage of ICD-10 completed coding for the principle diagnosis: (H3 80%, H1 and H2 <1%). This indicates that while two of the hospitals in the sample have serious coding gaps, Hospital 3 is nearing complete coding of Principal Diagnosis, which is a core enabler for DRG assignment.

Coding of diagnoses and major procedures in greater detail will need to be completed moving forward to allow a specific DRG to be assigned to each case and actual case. This is an important enabler for more precise case-type ratios to be observable rather than estimated. However, the imputed approach used in this methodology is a useful starting point, particularly when combined, going forward, with adjustment based on expert clinical advice and known case-type proxy indicators such as specialty and ward type, which are generally included in the data.

Admissions during a particular time period are the current standard approach to counting inpatient activity in Botswana. Cases discharged are generally considered a better way to select cases to be included in the time window for tariff setting because this means that only cases completed are included. However, the activity still has to be adjusted for incomplete episodes that were carried over from the previous year and therefore incurred costs outside the costing period.

Table 2.1. Counts of cases and selected data items in the activity datasets

	H1	H2	H3	H3 projection
#Cases Total	4,848	19,270	1,548	14,522 ⁸
Last Admission Date	20/06/18	30/04/18	30/04/18	
Last Discharge Date	19/06/18	19/06/18	15/06/18	
#Cases Admitted 2017–18	3,829	17,859	0	14,522
# ICD-10 Codes used	15	12	169	

⁸ Hospital 3 provided its annual report for 2017, which reported a total of 10,468 admissions in the year. The 12-month projection of the one-month admission sample dataset implies a 12-month admissions level of 18,576. The average of these two sources (14,522) was used in the cost per unit estimate #2.

	H1	H2	H3	H3 projection
% of usual range of #ICD-10 Codes ⁹	0.13%	0.10%	1.41%	
#Cases with any ICD-10 diagnosis	15	16	1,235	11,586
% Cases with ICD-10 diagnosis	0.39%	0.09%	79.78%	
Cases with Ward Location Names	3,829	17,859	1,548	14,522
#Ward Location Names	8	20	14	
Average length of stay	9.29	14.89	5.67	
Minimum length of stay	0	0	0	
#Cases Minimum (zero) LOS	151	235	384	
Maximum length of stay range	>100<372	>100<347	>30<56	
#Cases within Max LOS range	8	118	300	
%cases in high LOS outlier range	0.17%	0.61%	1.61%	

Source: Authors, with data from MOHW IPMS data.

Staffing and public expenditure financial accounts data

These data were available for the sample hospitals from a mixture of sources but were able to be collated. Priority improvements that will add most value to the costing tariff-setting building block include:

- The tariff calculation numerator expenditure must be reconciled to total health expenditure in a standardized way. This is discussed further in the tariff-setting framework section.
- A standard method needs to be adopted or developed to disaggregate overhead and indirect costs to each of the case groups concerned. For example, an index of 70 percent was used to estimate the inpatient proportion of the each line item cost. The precision of this disaggregation can be improved by using utilization statistics or service weights to match the utilization intensity of case types or individual patients as the costing methodology is refined.
- Utilization data need to be extracted for each case, which should be easy, using the existing claims data module of the IPMS. This will allow allocation of an accurate share of expenditure to each case to cover inputs to care from all sources.
- Revenue data should also be extracted for performance management and to cross-validate the expenditure estimates.

With these data, it was possible to calculate the average cost per case type by using a top-down approach and imputing an average cost to each case according to its DRG weight from an existing international costing study (IHPA 2017). Thus, the financial available data received for the proof-of-concept exercise provided a viable starting point for development of national reference tariff.

⁹ Usually about 12,000 ICD-10 diagnosis codes are used in activity statistics on a regular basis. While the percent of codes used is low, this is to be expected due to current coding practices and the size of the dataset. We would expect to find about 5,000 different codes in a 1-year hospital dataset of 20,000 cases. This level of detail and comprehensive description is typically achieved after 3 to 5 years of active use of coded diagnoses for hospital performance monitoring and performance improvement.

The top-down reconcilable average cost for inpatient episodes

The top-down reconcilable average cost for inpatient episodes was calculated twice, using separate estimates of the admissions for Hospital 3 as described in section 2.1.1.3, because only one month of admission records for Hospital 3 were available in the time of this proof-of-concept calculation. These are shown in Tables 2.2 and 2.3.

Table 2.2 shows the calculated average cost per case varies significantly between Hospitals 1 and 2, and Hospital 3. Such variation is not unusual between hospital of different structures and roles. However, because the estimate used for Hospital 3 for 2017–18 admissions was obtained from a different source, a revised estimate was used in Table 2.3, which produced an estimate of total number of inpatient cases that is more consistent with the size of the hospital. Both calculations are included to demonstrate the importance of valid estimates of activity.

As seen in Table 2.2, the average cost per case (when using estimate 1 for Hospital 3's activity data) is 10,329 BWP. However, once we incorporate a different estimate of Hospital 3's activity data, the average cost per case is more similar across the three hospitals, and results in an average of 9,173 BWP per case. In Table 2.3, the hospitals' measured operating costs per inpatient are 8,262 BWP, 8,990 BWP, and 9,638 BWP. This variation is well within the normal cost variation between hospitals of different functions and scale¹⁰. As described in the next section, this estimated average cost per inpatient case (9,173 BWP) was then used to estimate the case-specific average cost per case for different AR-DRG case-types using an imputation model.

Table 2.2 Top-down Average Cost-per-case Result 1

Hospital	Total Inpatient Cost (BWP)	Total # of Inpatient Cases	Cost Per Case (BWP)	Cost Per Case (USD)
H1	31,634,813	3,829	8,262	804
H2	160,554,207	17,859	8,990	874
H3 (Admissions estimate 1)	139,955,982	10,468*	13,370	1,300
Total	332,145,002	32,156	10,329	1,005

* Note: As described above this figure was sourced from the hospital's 2017 Annual Report, as opposed to the IPMS System.

Source: Authors, with MOHW IPMS data.

Table 2.3 Top-down Average Cost-per-case Result 2

Hospital	Total Inpatient Cost (BWP)	Total # of Inpatient Cases	Cost Per Case (BWP)	Cost Per Case (USD)
H1	31,634,813	3,829	8,262	804
H2	160,554,207	17,859	8,990	874
H3 (Admissions estimate #2)	139,955,982	14,522*	9,638	937
Total	332,145,002	36,210	9,173	892

* Note: As described above this figure was estimated from the 1 month of IPMS data available and the hospital's 2017 Annual Report.

Source: Authors, with MOHW IPMS data.

¹⁰ For further illustration, see Figure 4.2 in Chapter 4.

Modeled imputation of typical case types and frequencies to the Botswana 3 hospital sample inpatient data

Imputed case-type frequencies and relative tariff levels were produced by combining the average cost per case estimated above¹¹ with Australian published DRG categories, cost weights, and volume ratios. These are listed in Annex I for the full set of 406 DRG categories used. The following tables illustrate the potential for highlighting the highest volume case types (DRGs) (Table 2.4) or the most cost-intensive DRGs (Table 2.5).

Table 2.4 is the sorted extract of the highest volume case types, with L61 Haemodialysis being the most common case type with 7164 projected admissions and an imputed base tariff of BWP 957 per case. However, because it has a low-cost weight, haemodialysis cases cost less in total (as seen in the simulated payment column) than the vaginal delivery total cases (with 975 admissions estimated) and an imputed base tariff of BWP 9937.

Table 2.4. Highest 15 Case-types by Volume

ADRG	Description NHDC Acute Cost weights (Actual)	NORMS	ALL HOSPITALS IN SAMPLE					
	AR-DRG V8 condensed to 450 categories	C Weight	ALL HOSP Cost per case	BASE TARIFF BWP	US\$ conversn 0.09784	ALL SAMPLE case volume	ALL Projected admissions	SIMULATED PAYMENT
A06	Tracheostomy and/or Ventilation >=96hours	21.97		201,548	19,718		51	10,352,985
O60	Vaginal Delivery	1.08		9,937	972		975	9,683,804
O01	Caesarean Delivery	2.2		20,144	1,971		426	8,576,556
U61	Schizophrenia Disorders	4.83		44,274	4,332		176	7,795,777
L61	Haemodialysis	0.1		957	94		7164	6,858,133
E62	Respiratory Infections and Inflammations	1.36		12,500	1,223		496	6,200,122
U63	Major Affective Disorders	3.84		35,241	3,448		138	4,869,343
G02	Major Small and Large Bowel Procedures	5.42		49,684	4,861		81	4,039,464
I03	Hip Replacement	4.28		39,279	3,843		103	4,026,471
G70	Other Digestive System Disorders	0.68		6,233	610		605	3,773,549
E65	Chronic Obstructive Airways Disease	1.28		11,723	1,147		321	3,762,573
B02	Cranial Procedures	6.49		59,563	5,827		63	3,757,492
R63	Chemotherapy	0.33		2,988	292		1239	3,700,859
J64	Cellulitis	0.96		8,848	866		413	3,652,170
T60	Septicaemia	2.39		21,911	2,144		162	3,557,196
	TOTAL		9,173			36,210	36,210	332,145,002

Source: Authors.

Table 2.5 provides a sorted selection of the most expensive case types where only 51 projected admissions for prolonged ICU ventilation cost BWP 10.4million compared to the BWP9.7 million for 974 admissions for vaginal delivery, the next most expensive case type, and BWP8.6 million for 426 admissions for Caesarean section deliveries. From this it can be quickly observed that since the costs per case of C-section delivery are about twice that of normal delivery and the number of cases is about half; therefore, the total cost of C-section is about the same as normal delivery in total.

These are typical distributions in a developed hospital system. In future iterations of the tariff modelling activity, the DRG distributions would need to be adjusted to better match the actual distributions in Botswana. This is initially approached by expert informed estimates from the expert working groups and from use of proxies for diagnoses such as ward location until more complete and precise coded data are available. For example, this imputation may include case types for procedures that are not presently done in Botswana, such as liver transplants. Input from the expert working groups is crucial to ensure

¹¹ Table 2.4 and 2.5 use admissions estimate 2 from table 2.3 above for the average cost per case, 9,173 BWP.

that these Botswana-specific contextual factors are considered in the modelling in order to better match the distribution of case types in Botswana.

Table 2.5. Highest 15 Case-types by Cost

ADRG	Description NHCD Acute Cost weights (Actual) AR-DRG V8 condensed to 450 categories	NORMS	ALL HOSPITALS IN SAMPLE					
		C Weight	ALL HOSP Cost per case	BASE TARIFF BWP	US\$ conversn	ALL SAMPLE case volume	ALL Projected	SIMULATED PAYMENT
A06	Tracheostomy and/or Ventilation >=96hours	21.97		201,548	19,718		51	10,352,985
O60	Vaginal Delivery	1.08		9,937	972		975	9,683,804
O01	Caesarean Delivery	2.2		20,144	1,971		426	8,576,556
U61	Schizophrenia Disorders	4.83		44,274	4,332		176	7,795,777
L61	Haemodialysis	0.1		957	94		7164	6,858,133
E62	Respiratory Infections and Inflammations	1.36		12,500	1,223		496	6,200,122
U63	Major Affective Disorders	3.84		35,241	3,448		138	4,869,343
G02	Major Small and Large Bowel Procedures	5.42		49,684	4,861		81	4,039,464
I03	Hip Replacement	4.28		39,279	3,843		103	4,026,471
G70	Other Digestive System Disorders	0.68		6,233	610		605	3,773,549
E65	Chronic Obstructive Airways Disease	1.28		11,723	1,147		321	3,762,573
B02	Cranial Procedures	6.49		59,563	5,827		63	3,757,492
R63	Chemotherapy	0.33		2,988	292		1239	3,700,859
J64	Cellulitis	0.96		8,848	866		413	3,652,170
T60	Septicaemia	2.39		21,911	2,144		162	3,557,196
TOTAL			9,173			36,210	36,210	332,145,002

Source: Authors.

2.2 Data Required for a Full Simulation of a Tariff-setting Calculation

Table 2.6 summarizes the key priorities for data improvement going forward for improving the precision of the tariff calculation. This improvement in tariff setting rigor is not the most important reason for making these improvements to these monitoring data. Rather, these improvements to data quality and coding are actually critical for improving the performance of the health system in Botswana by enabling performance monitoring and benchmarking in effective management information applications.

Table 2.6 Availability of required data for full annual tariff setting cycle process

Required	Availability	Whether Obtained	Comments
Activity Data	Yes	Yes; extracted from central IPMS dataset	<ul style="list-style-type: none"> Currently coding one diagnosis (DX) only and no procedure (PX) Need multiple DX and at least one PX Newborn records are compiled separately from other inpatients and their status as inpatients needs to be clarified.
Utilization data by patient mapped to standard cost categories	Partly	No; used imputation instead	<ul style="list-style-type: none"> There is more data available in clinical records and claims data A starting point for systematic costing is available in existing processes and systems
Corresponding expenditure data and reconciliations	Partly	Partly; data was sourced from line item budgets and expenditure reconciliations	<ul style="list-style-type: none"> Compilation from multiple sources was required; process could be systematized

Source: Authors.

2.3 Next Steps for Proof-of-Concept Exercise

This proof-of-concept analysis illustrates that while there are gaps in data availability and coding, the existing infrastructure is sufficient to begin developing a national tariff-setting system as described throughout the report. Box 2.1 contains recommended next steps for refining the proof-of-concept analysis and expanding the exercise in preparation for implementing an annual tariff-setting system. These steps will make use of the work done to date and provide a useful portfolio of immediate development activities for the proposed permanent tariff-setting team.

Box 2.1. Next Steps for the short-term progress of the Proof-of-Concept Exercise

1. Review and refine data and calculations for the initial three-hospital sample. This should include:
 - Adjusting the numerator expenditure allocations by including a proportion of drug and other centrally supplied stores to the hospitals
 - Adjusting the denominator case counts by including the newborn episodes where the infant is not admitted as a patient in her or his own right
2. Conduct another round of data collection focused on improved precision and usability:
 - Particular focus on readiness should be given to data completeness and accuracy for DRG assignment to cases.
 - Assess completeness of the records submitted to the IPMS for inpatient admissions.
 - The cases in the database need to be reconciled with the hospital's admission counts.
 - Ways to estimate retrospectively correct numbers and expected case-type patterns should be identified.
 - Prioritized approach to the identified gaps such as improving data completeness, timeliness, and accuracy should be specified and planned.
 - Coding quality baseline should be established with regular counts of completeness indicators such as:
 - Number of diagnoses coded
 - Number of major procedures coded
 - Other key DRG data items coded and completed, for example:
 - Days in ICU and/or hours of mechanical ventilation
 - Birth weight of newborns
 - Diagnosis not present on admission
 - Introduce increasing Botswana-specific detail into the simulation model as the data quality and completeness improve. This applies particularly to the calculation of Botswana-specific DRG cost weights. The goal, after about three years of data improvement, is for the international input cost weights and (service level) cost relativities to become a useful validation and benchmarking resource rather than an integral source of proxy relativities.
3. The proof-of-concept data collection, data quality and completeness assessment, and cost imputation calculations should be extended across all hospitals.
4. Expand proof-of-concept data collection and analysis to include monthly activity data extraction. This involves compiling an abstract summary from each patient's case data as they are discharged from the hospital and would require monthly extracts from IPMS.
 - Expand this monthly discharge abstract data collection to a larger sample of hospitals to establish a demonstration of best practice.
 - Publish outputs for comment and feedback on data quality and variability review.
5. Model and assess impacts of activity-based funding to all hospitals using proof-of-concept data and repeat the analyses annually ahead of a program of phased implementation of activity-based payment.

Source: Authors.

3. TARIFF-SETTING FRAMEWORK FOR BOTSWANA

3.1 Objectives of the Tariff-setting Framework

In summary, the reasons tariff-setting arrangements are put in place in most jurisdictions, where they exist, are based on four general principles that often guide or underpin national and/or community health status performance improvement goals:

- Good health: outcomes
- Good care: quality of care
- Good value: efficiency
- Good capabilities: responsive and competent

The objectives associated with these goals or principles should be based on the strategic objectives in the Health Financing Strategy. The main general performance improvement mechanisms that form the core purpose of most tariff-setting programs are:

- Efficiency measurement and incentives
- Performance monitoring and incentives—often specifically in relation to safety and quality of care
- Accountability of both payers and providers for the results achieved from year to year

For example, by enabling providers to benchmark their cost per unit of output or quality indicators against the sector norms and selected peers, they are able to focus their improvement efforts and set targets to underpin effective competition.

3.2 Reference Tariffs' Purposes

In relation to the above general-sector goals and the strategic objectives of the Health Financing Strategy, the implementation of an effective reference tariff-setting cycle delivers the following functions in the health sector performance framework. The reference tariff:

- Defines and quantifies, based on routine standard records, the health care products that are being purchased and provided
- Systematically measures and monitors the standard cost per unit of efficient delivery
- Enables systematic observations of the quality and variation in the health care products in the country
- Is calculated in a systematic and transparent way and published on an annual basis to support the budgeting and purchasing timeframes
- Provides evidence-based reference points for product quality and value for use both in planning and in purchasing negotiation between payers and providers

These characteristics and functions of reference tariffs can be maximized by a well-designed tariff-setting framework. The measurement framework and the monitoring activities that this sets up can also inform

the negotiation and review of prices, which nevertheless continue to be set voluntarily between purchasers and providers according to the requirements of the particular contracting situation.

3.3 Proposed Components of Tariff-setting Framework: Overview

The framework of the recommended tariff-setting cycle consists of four components outlined in Box 3.1 and then described in further detail.

Box 3.1 Key components of the tariff-setting framework

1. National Reference Tariffs publication program
2. Episode-of-care (e.g., DRG) counting, coding, costing, and tariffing
3. Annual tariff-setting cycle
4. A tariff-setting program development roadmap

1. *National Reference Tariff Publication Program*

Botswana should adopt the publication of National Reference Tariffs for a comprehensive range of clearly defined episode-of-care based health care products (beginning with DRG-defined episodes for hospital inpatient services). Each tariff calculation would consist of an expenditure-based calculation of the average expenditure across all providers in the system per unit of output. This must reconcile to the actual expenditures incurred in delivering the full range of required health care products in the previous accounting year. It may then be adjusted by expert advice and, where fair and appropriate, for changes from the costing year to the purchasing year in factors such as:

- Monetary inflation
- Efficiency improvement expectations—based, for example, on a reasonable trajectory towards the most efficient provider quartile cost
- Input cost market factors
- Provider scale of operation and technology capability costs
- Evidence-based product technical and allocative improvements

All these calculation inputs and adjustment factors must be explained in the tariff schedule documentation and the sources for the adjustment factors referenced so that the calculation is replicable by all interested parties. This principle is often referred to as ‘transparency.’

2. *Episode-of-care (e.g., DRG for inpatient admissions) counting, coding, costing, and tariffing*

Botswana should adopt episode-of-care (initially DRG-based for inpatients) counting, coding, costing, and tariffing. This means that a patient episode should be the unit of counting and coding, that the patient episode is essentially the ‘product’ being ‘purchased.’ Further, each patient episode case type should include clear definitions that allow like-with-like comparisons of quality and efficiency between episodes within a category. Similarly, providers’ performance in terms of efficiency and quality should be able to be measured and compared to industry norms and to peers of each case type. For this reason, it is important that the set of episodes used to describe the activities be comprehensive so that it describes the complete set of inpatient services offered in the system. For example, DRGs have been

designed so that every acute inpatient case that has been satisfactorily recorded in the clinical record can be assigned to one and only one DRG.

Tariffing by episode of care entails bundling a set of services by episode (admission to discharge, in inpatient setting). The rationale behind DRGs as the unit of analysis for tariff-setting is to incentivize efficiency at the episode level and enable benchmarking of performance by provider management and the clinical team members. Further, the alternative approach of developing reference tariffs for inputs rather than DRGs would entail limited value-add for the health sector since it would merely communicate the average price of inputs rather than incentivizing efficiency or benchmarking performance.

3. Annual tariff-setting cycle

Botswana should implement an annual tariff-setting cycle to ensure that tariffs are adjusted appropriately to reflect providers' evolving cost structures. Establishing an annual cycle contributes to continuous improvement and capacity building, while also enhancing the legitimacy of the tariffs, since they reflect the most recent data available.

The tariff cycle would match the budget or contracting year and would include expert advisory working group advice and comment on both the clinical and technical aspects of the tariff-setting methodology and tariff calculation and adjustment factors. The cycle should also include a structured consultation program with the key stakeholders and community of interested parties.

4. Tariff-setting program development roadmap

Botswana should develop a tariff-setting roadmap that assists the MOHW and its partners in progressively refining and maintaining these framework components. Such a roadmap outlining phased implementation provides a useful planning and program management aid. The roadmap would usefully include:

- a. Extending the proof of concept described in Chapter 2 across all hospitals and progressively replicating, reviewing, and refining its accuracy and validity. This would include formal reviews, audits, and responses to questions and feedback from stakeholders.
- b. Designing and then implementing a partial activity-based funding payment model, such that a portion¹² of provider reimbursement (or budgets, in the case of the MOHW's clinical services) is determined by the reference tariff. This is important to provide a concrete exposure to activity payment while managing risks of data errors and omissions that need to be resolved before full episode-based payment is introduced. It is also important to avoid sudden changes in revenue in early phases of implementation, and it is critical that a robust impact assessment simulation accompanies the introduction of the partial activity-based funding payment model. This allows both payers and providers to consider and respond to the new payment model's simulated distribution of payments across providers. For this to be constructive, time must be allowed for providers to prepare by either correcting the data if there are gaps or inconsistencies, or, for example, by identifying and rectifying efficiency shortcomings through adjusting length of stay to best practice standards or introducing an improved evidence-based diagnostic protocol. Because of their operating scale, providers' adjustments in response to the modified payments quantified by the impact assessment generally take at least a 12-month period to put in place.

¹² This portion may be as small as 5 percent of payment in order to usefully incentivize behaviour change among providers while not introducing undue risk.

- c. Expanding tariff setting and activity to include inpatient-interfacing care segments. These would include:
 - Inpatient services
 - Emergency department
 - Community-based and ambulatory specialist care
 - Primary care
 - Preventive care
 - Health promotion

3.4 Best Practice Tariff-setting: Evaluating Progress

In some of the discussions during this current tariff-setting framework design project, the useful question was asked: ‘what will we see in 3 to 5 years if we are successful in reaping the benefits of a well-developed tariff-setting framework’? This is a useful question because the answer identifies some of the more important characteristics of a successfully implemented tariff-setting system. They may therefore be used in evaluating effectiveness and progress. Thus, successful tariff-setting systems typically exhibit the following characteristics:

- Hospital and health care management are primary users of their own coded activity, utilization, and cost data as key management information system components. This is achieved by the following iterative refinements to the tariff-setting framework and processes:
 - Progressive introduction of a performance incentives dimension into the tariff-setting formula
 - Progressive recalibration of the performance incentives to ensure they are realistic targets: ideally close to, but slightly higher than, those being achieved by the best performing quartile of providers for each product
- Activity data provide the primary reference point for hospitals in performance management by enabling and rewarding benchmarking and improvement feedback and recognition. The product classification and coding of the episodes should contain sufficient detail and precision to measure efficiency, quality, and outcome indicators.
- The ongoing multiple-hospital cost study draws on quality-assured data from a central source, such that provider hospitals/enterprises access the system-wide aggregated cost data analyses and utilization benchmarks. This ensures the results are then replicable by each hospital/enterprise management and able to be used for goal setting at the hospital/enterprise level and communicated to staff, patients, and communities.

In terms of maximizing performance improvement of the health care system, which is the purpose of tariff setting, observable and measurable changes in use of the enabling components should include:

1. Improved integration and focus of performance accountability tools. This will include supplementary monitoring of care programs and their performance evaluation across activity settings, involving multiple linked episodes and with an outcome orientation.
2. Increased ability to measure and improve comparative quality and safety performance levels between providers. This would incorporate increasing systematic variation analysis with feedback of observations to providers and clinical units. Progressive target setting and tariff

incentives would supplement the feedback for improved performance that falls within the improvement target range.

3. More timely and meaningful information accessible as data extracted from source systems are uploaded into management information systems. The benefit of improved and timely feedback to clinical units and consumers is both provision of clearer goals or challenges and stimulation of competition.
4. Greater alignment between best practice and clinical protocol support tools and classification development mechanisms.

At regular periods during the implementation and development of the tariff-setting system, including at the end of each implementation phase, a progress evaluation should be conducted and include the above development points in its terms of reference.

4. PROCESSES AND STRUCTURES TO SUPPORT ANNUAL TARIFF-SETTING CYCLES

4.1 Introduction

A functional annual tariff-setting cycle program requires sound underlying processes and centers of responsibility for maintaining the required activity monitoring and financial reporting infrastructure. This infrastructure is also critical for efficiency and performance management of the sector by the purchasers and providers of the services as well as the policy makers and users of the services and products involved.

Therefore, the effort involved in upgrading and maintaining the necessary building blocks is a necessary investment with or without tariff setting if efficient, safe and high-quality care is to be assured from the resources available to Botswana. For this reason, the following sections focus on the process and structures that are necessary to develop and support the building blocks necessary for functional tariff setting.

The criteria for a fully functional tariff-setting annual cycle are production, maintenance, and effective use of:

1. Clear and transparent cost and activity databases for the tariff calculation, including:
 - Specified minimum datasets with rigorous coding standards
 - Regular data quality assurance reviews, including coding audits, and feedback
2. Clearly defined and replicable calculation indexation factors and values that include:
 - Fair and transparent indexation values whose sources and/or logic are referenced and explained
 - Policy-based performance factor selection that is subject to expert and public scrutiny and critical comment
3. Well understood and supported programs of stakeholder engagement so that:
 - Consultation and stakeholder comments are received, considered, and responded to at specific points in the cycle.
 - Methodologies, proposed adjustment factors, and draft tariff documentation are prepared interactively and in line with well-understood strategic goals.
 - Simulation and impact assessment appropriately address stakeholder questions.

In the annual recalibration of the tariff schedule, various prioritized refinements to the framework, enhancements, and updates should be systematically introduced to improve the “model” or the calculation formula and to refine the building blocks. In addition, the tariff-setting framework and processes should be reviewed and upgraded every 3 to 5 years to ensure that the behavioral response of the health sector to the pricing patterns is constructive and producing positive change in the efficiency, quality, and outcome effectiveness of the system.

4.2 The Tariff-setting Key Processes

The three tariff-setting building blocks that were introduced in Chapter 1 include 10 key processes that conveniently group under the three building block areas:

- 1. Specifying, measuring, and quality assuring the health care products for this tariff-setting year**
 - Counting: the unit of product delivery or the episode of care, e.g., the DRG for inpatients
 - Classification: the variables used to classify the case
 - Coding: the standards used to record and classify the case
 - Collecting activity data
- 2. Costing the product**
 - Expenditure accounting at the patient or case level including resource utilization analysis (e.g., the number of laboratory tests ordered for this case) for cost assignment. Totals of costs assigned to cases must reconcile total expenditure, and the distribution logic should be validated.
 - Financial data collection and mapping to the product cost buckets from the global expenditure line items. Expenditure fractions should be calculated for each product or output area, e.g. inpatients, outpatients, emergency department, etc.
 - Calculation of cost per unit of output
- 3. Calculating and applying the tariff**
 - Setting baseline tariff without quality/performance adjustments and baseline impact assessment
 - Impact assessment with proposed performance adjustments, e.g., for quality, safety, innovation, efficiency targets, etc.
 - Strategic purchasing of contracted activities based on the tariff, adjusted for negotiated quality assurance and performance incentive payments (i.e., applying the national reference tariff for payment negotiation)

Some of the major critical elements of these 10 processes are further elaborated below.

4.2.1 Data extraction and collection mechanisms for tariff setting

A clear relationship must be set up with payers and providers for timely provision of the data extracts and reporting streams that are required to collect and analyze activity and cost data and ultimately to calculate the tariff. These relationships and mechanisms must allow for necessary annual recalibrations and performance adjustments and facilitate the calculation of impact analysis required to inform stakeholders of any changes in observed average costs or proposed performance indexation.

Activity and financial data reporting timelines and business rules are important components of the tariff-setting framework. Some examples of business rules and mechanisms for submission and quality assurance of the data are given in Box 4.1. The business rules are an important source of:

- Uniform credible standards and compliance specifications that are used as a reference for quality assurance and data integrity audits

- Information on reporting protocols, schedules, and technical specification references. The business rules need to be complied for both activity and financial data compilation, submission, and analysis.
- Time-series monitoring of data recording/reporting/extraction and compilation levels on a hospital/enterprise level

Data submission edits may also be specified in the business rules or data submission manuals. Topics typically included in the manuals are practical “how to” details on required processes such as:

- Coding quality assurance at data entry and point of coding, including expected reviews of coding quality and minimum standards required
- Audit program specifications and principles. For example, such audits are usually sample based, risk focused, and improvement oriented. They generally have a set level of compliance required for a satisfactory finding and follow-up actions that are to be taken in response to particular problematic observations of performance discrepancies.

Box 4.1 Timeline and processes for activity data submission, quality assurance, and analysis: example business rules topics

1. Activity data are usually consolidated for analysis on a monthly basis. This is desirable, and the activity analysis result is often linked to cash flow from budget-funded systems so that the hospital is systematically remunerated for its patient care activity on a monthly basis. To ensure fair and accurate reimbursement, various data quality assurance processes are needed, such as:
 - a. Monthly and annual consolidations should be acquitted against the hospitals’ Patient Management System counts.
 - b. Annual coding and data integrity audits should be completed on a rolling sample of cases so that all hospitals are covered over a 3-year time frame.
2. Submission arrangements vary subject to the design of the submission technology.
 - a. IPMS has the capability for real-time updates of the central database as patients are registered in hospitals and admission, discharge, and transfer documentation are completed.
 - b. Various edits can be included in in these submission procedures that may return, reject, or flag records for review, further completion, or correction if they fail to provide required content, detail, or valid codes.

4.2.2 Data flows required for tariff setting

The relationship between the data flows for the activity analysis and cost analysis inputs into the tariff calculation are shown in Figure 4.1. This schema summarizes the processes for both the activity data flows and analyses and the costing study. These are vitally important for tariff setting because one of the uses for the data from these systems is the tariff calculation numerator and denominators for each of the tariff items.

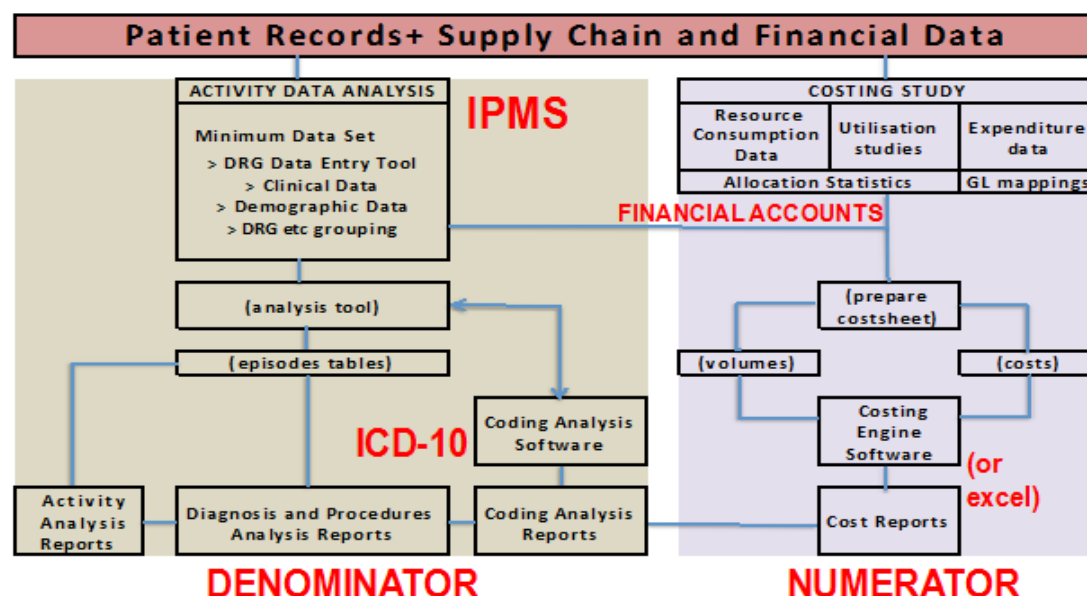
On the left side of the figure are the data flows and analysis necessary to generate the “denominator” of the cost-per-case calculation: the total number of cases. In red, we also see some of the data sources used for the proof-of-concept analysis, in particular the IPMS system. There are also some examples of the data quality assurance functions and utilities that may be used to ensure the precision and

completeness of the measurements that are critical for both tariff setting and payment accuracy and efficiency.

On the right side of the figure are the costing study data flows that are critical for generating the “numerator” of the cost-per-case calculation: the total cost of all cases generated from the sum of the costs assigned to each case and reconciled to the inpatient fraction in the case of DRGs. In this schema, a box with costing engine software is shown because this is a usual development in a system that runs cost analyses on a systematic and regular basis. In this proof of concept, the calculations were done using excel spreadsheets, and this is a viable approach where a simple top-down methodology is applied. As the cost allocation algorithms become more precise and draw on detailed utilization data, packaged standard costing software applications are useful and should be considered. This would probably be the case after two or three years’ cost data collection from a stable sample of hospitals.

While both the activity data analysis and cost analysis processes are generic to tariff setting, they must be customized to the capabilities of the financial and data system structures and also to the purchasing arrangements of the local system.

Figure 4.1 Data flows for Activity Data analysis and Costing Study reporting required for tariff-setting



Source: Authors.

4.2.3 Costing and cost analysis processes

Each tariff cycle year, a sequence of critical processes is necessary to reliably produce a sound and valid costing study for input into the tariff calculation. An example of such a timeline is shown in Box 4.2, with further detail below.

Box 4.2 Example timeline for the costing study collection

Quarter 1: Updates of collection template issued to sample hospitals; contributing participants agree to updates.

Quarter 2: Final collection guidance and template issued as part of Approved Costing Guidance.

Quarter 3: Collection portal development. Upload scheduling and validation rules and processes promulgated.

Quarter 4: Collection support system operational. Validation reports issued for data revision/consolidation.

4.2.4 Accurate expenditure identification

There must be an overall total expenditure that is a regularly reported accountable audited financial reporting output. The costing method components must reconcile to this system total. Other key components of the costing methodology include arrangement of:

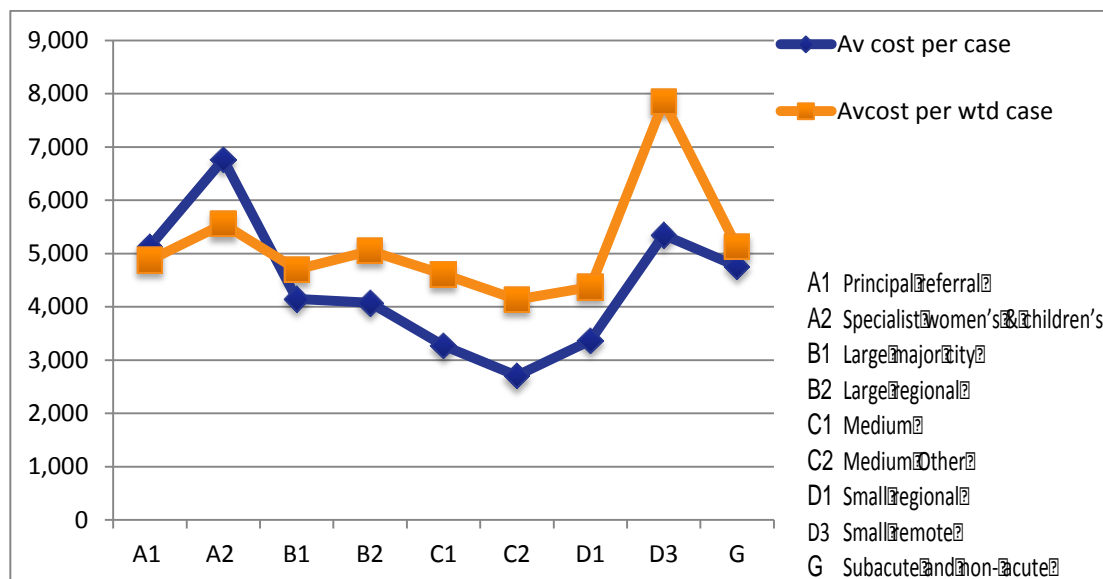
- Standard cost components/buckets
- Overhead allocation standards
- Central administration/system support costs
- Major capital costs including method of accounting for: original build, ownership, maintenance, and replacement
- Cost of capital including interest, lease costs, administration
- Economic cost: free contributions, opportunity costs

Costing standards must be clearly specified to standardize the above definitional and procedure approaches.

4.2.5 Cost variation by provider peer group analysis

In a country like Botswana, with large distances and remote communities with very limited infrastructure, the economy of providing health care differs markedly in different parts of the country. Nevertheless, the MOHW must deliver services in these localities, and therefore a tariff adjustment for these conditions may become a required inclusion in the tariff calculation. Thus, the tariff calculation factors may be added or recalibrated to make allowance for such economic factors or other role-related scale or complexity effects. This adjustment factor is sometimes referred to as the “peer group adjustment factor.” Figure 4.2 illustrates the combined effect of cost efficiency and case complexity differences between different types of providers in Australia.

Figure 4.2 Example from Australia of measured variation of average cost by provider peer hospital groupings with and without adjustment for case type (weighted case).



Source: Authors, with data from IHPA 2015.

The analysis from Australia in Figure 4.2 reports the cost per case of hospitals of different scale and capability levels. The purple line represents the average cost per case in each peer hospital group, while the average cost per case represented by the orange line is weighted to account for the case type. For example, the D3 peer group (small remote hospitals) has a high average cost per case, but it is even higher when weighted for the type of cases seen by the hospital.

These are normal and typical variations associated with scale and technological complexity, and they do not represent management or operational efficiency differentials. Thus, for fairness and to ensure appropriate incentives and improvement targets for hospitals of different types, it is important that Botswana's reference tariffs adjust for this type of variation.

4.2.6 Adapting costing methods and standards for use in Botswana

Internationally, there are well developed patient level costing standards in use in most of the countries with operating annual tariff cycles. A practical approach is to select a developed national health care costing standard and adapt it for use in Botswana. The following sequence ensures that useable material is produced from the beginning for routine examination of the actual costs of care hospital by hospital so that each provider in Botswana can benchmark its performance against peers, against best practice, and against its own previous levels.

This approach begins with a top-down methodology to estimate the global average cost per admission for inpatient episodes of care. This is a starting point for a program of systematically improving the precision and detail through phased development of the costing standards and methods. For example, the following sequence is commonly applied:

- **Year 1** – Use imported methodology to model costs

This involves choosing a national patient-level costing methodology and practice standards that have been systematically developed, implemented, and maintained. They should have been successfully used to support and facilitate a consistent funding model that underpins price negotiation and quality

competition across the health care sector. It should be demonstrably successful in supporting improvements in efficiency and effectiveness, and stabilized after a period of consistent and comprehensive use. Alternatively, a combination of more than one developed model can be used to provide a reference resource for building a specially adapted model for Botswana.

- **Year 2** – Further adapt or refine imported methods to make best use of available utilization data

The central goal is to make the best use of both activity and utilization data to accurately allocate expenditure to the cost category or cost buckets of interest for each case type. This enables payers to recognize and reward the quality and efficiency levels of hospitals and other providers. It also incentivizes best practice by providers in using their cost data for benchmarking to improve their performance.

- **Year 3** – Decide and implement national standards approach towards best practice

Botswana costing standards should be published in an easily accessible format. These may draw to a greater or lesser extent on international practice, but they should be a clear and usable resource that enables and supports standardization of practice. For tariff setting, they provide a measure of compliance and conformity with standards in cost-data extraction analysis and reporting across the sector. Outputs from the national costing study should also be published in a consolidated form.

4.2.7 Steps from top-down reference costing to episode-level costing

As mentioned above, a key goal of embedding costing processes in the system is to strengthen the abilities of providers to benchmark their cost profiles and match best practice where room for improvement is identified.

This requires a high level of precision in the tracking of resources to cases (utilization studies). The precision of these analyses can be checked by ensuring that the variability of cost assignment to the case level actually matches the variability of resource utilization. An important aspect of this is ensuring that the total costs of all cases by DRG reconcile to the totals of the whole hospital or system whose costs are being analyzed.

Key actions in improving precision and validity include ensuring accuracy of activity data, utilization data, and expenditure data by reconciliation and triangulation of the totals to each available accounting level. Approaches to refining precision and accuracy include:

- Refining totals from cross reconciling sources
- Ensuring care component cost buckets add up to the whole
- Using detailed inputs into care (e.g., claim data for inputs) as utilization ratios rather than as cost simulations and validating against utilization ratios from other hospitals, sectors, or international sources.

4.2.8 The annual tariff calculation methodology

As laid out in the tariff-setting framework above, the tariff calculation methodology is based on the actual cost of providing the services to be tarified in the most recent completed accounting year. The cost per case is calculated from the expenditure divided by the total number of cases.

A weight is then assigned to each case from a DRG costing study or from a set of reference weights recalibrated for Botswana. The weight of each case is multiplied by the average cost per case in order to calculate the case-specific tariffs as shown in Annex I.

When international reference weights or sample cost study weights are used, it is important that the tariff-setting process should include rebasing the DRG weights using updated data to generate a simulated average case payment (base) tariff for each DRG that produces a budget neutral total payment in the simulation model. The simulation and rebasing should also include recalibrating weights at the DRG level for performance (quality and efficiency) adjustment factors according to strategic purchasing objectives; this should be done annually for the best achievable results. This includes reviewing the methodology and the contents of the calculation¹³. The review and adjustment of the indexation and performance-incentive factors for the new tariff calculation proposal may come from sources such as:

- Current tariff-setting objectives, including any proposals for performance incentives in the payment calculation
- Technical model-of-care improvements that change cost structures temporarily or permanently¹⁴
- Industry provider/purchaser practice changes or policy changes
- Consultation and comment with stakeholders and technical experts based on observed cost trends or agreed efficiency improvement targets

An example of a typical schedule of consultation with stakeholders and technical is shown in Box 4.3.

Box 4.3 Example timeline for the tariff consultation process

Quarter 1: Compile and issue the National Reference Tariff Methodology discussion paper.

Quarter 2: Issue the tariff engagement documents and programs for discussion meetings; these documents include impact assessments and specific questions for advice/discussion.

Quarter 3: Publish and distribute proposed tariff calculation decisions for objection or comment.

Quarter 4: Issue national tariff documents and publication of final national reference tariff.

Impact assessment of the revised tariffs provides a very important evidence basis for discussion on proposed tariff levels. Consideration usually needs to be given to the time and cost reduction that will be required for affected providers and payers to adapt to a materially changed tariff level. Further, a transition path should be developed, either in the tariff change phasing or in the pricing negotiation.

4.3 Structures (Teams)

4.3.1 The Tariff-setting Unit

Implementing the tariff-setting framework requires a dedicated team assigned to manage the annual tariff-setting cycle. The Tariff-setting Unit would be set up as a permanent unit with a clear mandate to deliver an annual reference tariff schedule based on a clearly defined and published methodology. For

¹³ For an example of the methodology refinement guidance, refer to Monitor (2016).

¹⁴ One potential reason for these adjustments may be to incentivise uptake of beneficial new technology. For example, if a new model of stent or joint replacement prosthesis is released and recognized as delivering a material improvement in patient outcomes, adjustments may be made to tariffs of the affected DRG categories *before* hospitals have implemented the new technology in order to incentivize them to adopt it. Otherwise, the tariffs for the associated DRG categories would not reflect the cost of the new technology until two years after hospitals begin to apply the new technology—once the financial data flowing into the cost analysis are applied to the tariff.

administration and governance, the unit should initially be located in or report to MOHW with the reporting arrangement and governance to be reviewed after 5 years.

The unit would consist of five to six people: two for each of classification/coding/data analysis, costing, and tariff calculation. They would be supported by appropriate administrative capacity to manage the processes required for the tariff-setting functions and deliverables.

The unit's primary responsibility would be the operation of the tariff-setting cycle through programing and implementation of its three annual programs:

1. Activity and utilization analysis
2. Costing and cost analysis reporting
3. Tariff consultation, calculation, and publication

The unit is also responsible for ensuring the ongoing refinement of the above infrastructure building blocks. This is achieved by arranging:

- Activity and costing information standards and annual data reporting and feedback flows
- Stakeholder and expert review/advice consultation schedules
 - Maintaining a register of potential interested parties active in health care purchasing and/or provision to whom the tariff schedule would be of interest (e.g., payers, providers, regulators)
 - Circulating invitations for proposals on the coming annual cycle tariff calculation methodology
 - Circulating notices of tariff calculation proposals for comment and invitations to attend stakeholder information sessions and consultations
- Annual readiness for publication and clearance process of the reference tariff schedule
- Published 3-year or 5-year and annual work program of updates and refinement of tariff content and building blocks standards and performance
- Output publication schedule and independent periodic review

4.3.2 Technical assistance team

In the initial years of launching and implementing the new tariff-setting framework, the most practical way of getting the required level of experience and knowledge will require the MOHW to draw from external expertise. Thus, a technical assistance (TA) team should be contracted. This team would consist of three people engaged on a project contract basis as technical experts and interim leaders of the project. The TA team will be charged with initial leadership and implementation of the annual tariff-setting cycle and should report to MOHW decision makers.

The TA team's key responsibility would be providing training and skills transfer to the Tariff-setting Unit in order to further the design and operationalization of the tariff-setting cycle. Specifically, the TA team would also work with the Tariff-setting Unit in drafting the initial development roadmap, expanding the tariff-setting proof of concept, and establishing the expert advisory working groups, which provide an advisory role in methodological discussions and decision.

Further, the TA team would support the Tariff-setting Unit in producing the standard procedure manuals that enable all participants to ensure that their contributions conform to the standards for

inclusion in the system data and financial records of the system as a whole. The key manuals are the tariff cycle procedure manual (which should outline the whole annual process) and manuals related to the key building blocks. These materials are normally maintained on an open website for reference and download by participants. They are updated and revised as refinements and revisions are introduced.

The key manuals and standards documentation necessary include:

- **Data dictionary** (initially for the hospital inpatient discharge abstract minimum dataset), including specification and reference for: i) tariff-setting classifications to be used (DRG and their input data); ii) coding standards; and iii) data submission requirements and timelines for activity data and cost data.
- **Coding and data quality audit manual**, whose purpose is to specify the required levels of data quality assurance to be applied to submitted data, including standard edits and annual audit processes.
- **Costing standards and manual** for cost data and costing audit processes.
- **Tariff setting methodology manual**, which provides updated algorithms and references for indexation and adjustment factors to be used, as well as their method of application in the formula.

4.3.3 Expert advisory working groups

Expert advisory working groups play a crucial role in advising the Tariff-setting Unit and TA team throughout the tariff-setting annual cycle. Notably, the purpose of these groups is to play an *advisory* role; the Tariff-setting Unit is ultimately responsible for making decisions and implementing the tariff-setting annual cycle. Further, the experts invited to participate in the working groups are selected on the basis of expertise, not as the representative of their respective sector or organization. Their primary purpose is to validate the quality of the analyses undertaken as part of the tariff-setting cycle and to provide input in the development of the tariff-calculation methodology.

4.3.3.1 Clinical expert advisory group

The clinical expert advisory working group (CEAWG) is convened by the Tariff-setting Unit and TA team to provide an advisory role at key points in the tariff-setting process, typically two or three times throughout the annual cycle. Their primary function is to advise on the **clinical meaningfulness** of tariff-setting analytic choices and methodological decision.

For example, the CEAWG would be asked to review and comment on any proposed changes to the product classification (e.g., grouping categories, resource utilization rationale, or case assignment logic). The CEAWG would also validate the measures of relative complexity (or resource intensity weightings) to be used as cost weights. They would also comment on the proposed incentive factors and their weightings and any impact that may have on clinical practice.

Individuals chosen to serve on the CEAWG should be experts of high standing in a clinical discipline, and they should demonstrate an interest in the analysis of practice patterns, benchmarking, and evidence-based outcomes effectiveness analysis. The CEAWG should have a balance of members from surgical, medical, nursing, and allied health disciplines, as well as a balance across care acuity, intensity, and service-provision settings.

4.3.3.2 Technical expert advisory group

Similarly to the CEAWG, the technical expert advisory working group is convened by the Tariff-setting Unit and TA team to provide an advisory role at key points in the tariff-setting process, typically two or

three times throughout the annual cycle. Their primary function is to advise on the **technical validity** of the analysis of empirical data and probability measures.

In a broad sense, the technical expert advisory working group would review the tariff-setting methodology and work program and advise the Tariff-setting Unit on recommended refinements. For example, the technical expert advisory working group would review and comment on utilization analysis, costing study estimates, variability measures, and impact simulation estimates. They could also advise the Tariff-setting Unit on any community submissions related to methodology refinements.

Ideally, the members of the technical expert advisory working group should be experts in statistical analysis and clinical performance analysis, with experience in analyzing clinical service data, clinical care inputs utilization, and/or patient-level cost analysis. This would require a balance of members with experience across health service delivery as well as purchasing/funding. Expertise in financial reporting, health service efficiency, and effectiveness evaluation are also desirable.

As with the CEAWG, the experts invited to participate in the technical expert advisory working group are selected on the basis of expertise, not as the representative of their respective sector or organization. It is important that the recommendations of both the CEAWG and the technical expert advisory working group are based on technical considerations instead of perceived stakeholder interests. Broader stakeholder representation is certainly necessary, however, and this should be actively promoted in the Tariff-setting Stakeholder Consultative Forum, as described below.

4.3.4 Tariff-setting Stakeholder Consultative Forum

A program of open consultation with stakeholders is a crucial enabler of achieving transparent, well-understood, fair, and evidence-based reference tariffs. These consultations are an important forum to provide open opportunity to contribute to the formulation and finalization of the tariff calculation methodology. To enable these consultations, processes and structures must be put in place to ensure:

- A register of providers and a register of payers is maintained and updated as new participants enter the sector and each participant is informed of proposals and participation events fairly and equitably.
- Each cycle includes the process of invitation for comment and representation of stakeholders and expert advisors at open discussion workshops of proposed changes.
- Adjustments and new proposed performance factors are clearly specified.
- Impact simulation analysis is carried out and issued with the proposed changes.

4.4 Tariff Schedule Delivery Processes

4.4.1 Tariff schedule delivery: key user requirements

The fundamental fitness for purpose of the tariff schedule delivery process for its users is that it fulfills three central user requirements in the dynamic relationship illustrated in Figure 4.3. The tariff schedule delivery processes must achieve:

- I. A **development timeline** so that the tariff schedule produced is available when required for budget, purchasing, and pricing negotiations. Therefore, the annual cycle must include a **process time frame** that enables the necessary engagement and participation.

The tariff must be ready for its implementation period. Ahead of that, time must be scheduled for the payers and providers to understand the adjustments and calibrations that have been used in the calculations and prepare for the funding year.

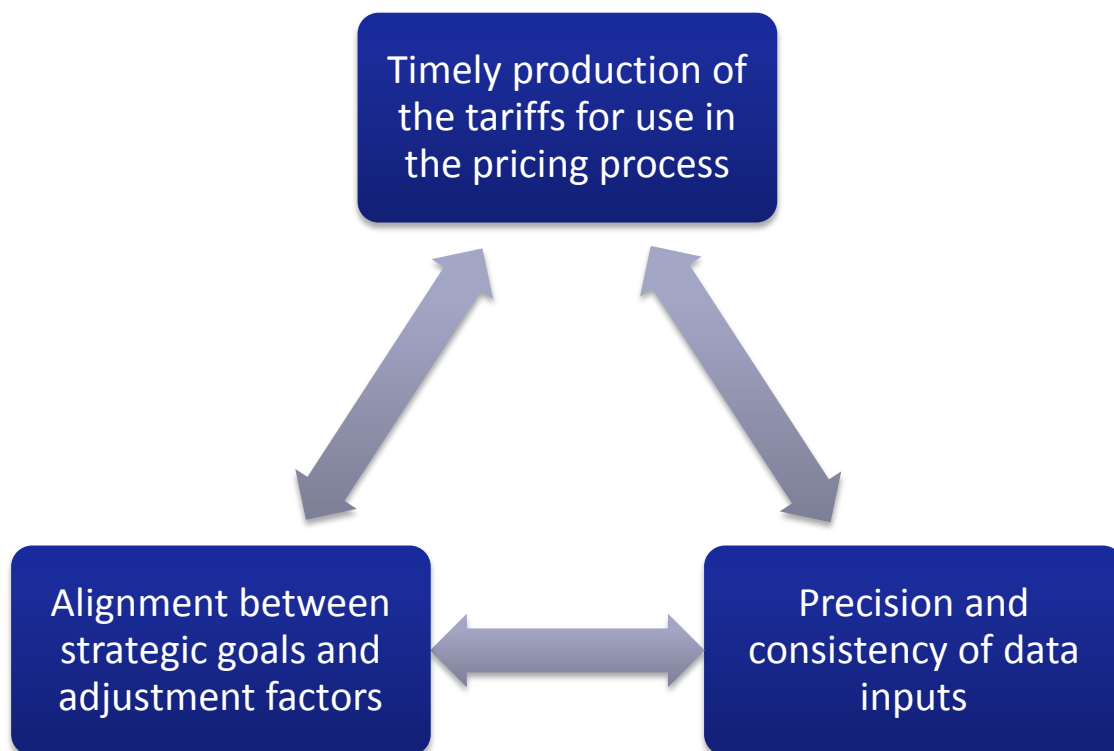
2. A clear understanding of the **data and analysis** behind the tariffs and their local use in service management.

The tariff schedule must be based on reliable and accurate data that are verifiable, replicable, and reconcilable to published sources. The data collection process must ensure that the data used are collated and compiled in accordance with clearly specified standards and practices which are open and transparent.

3. A framework and process for **tariff adjustment factors** selection that ensures they are aligned with current recognized strategy, policy, and principles.

The adjustments made to the tariff must comply with authoritative monetary indices, and purchasing adjustments must comply with agreed policy objectives, improvement goals, and market realities. These credibility factors are important to the value and relevance of the tariff in improving performance in efficiency, quality of care, and outcomes focus for the hospitals and other health care providers.

Figure 4.3 The key user requirements of a functional the tariff calculation process



Source: Authors.

4.5 Key Success Factors of the Tariff-setting Processes and Structures

Each of the processes and structures outlined above is aimed at improving the performance of the health care system in Botswana. The priority areas of improvement are set out in the Health Financing Strategy 2019–2023. For the tariff-setting process to add most value, its success depends on the following factors, which are each important both individually and in combination for enabling a useable and accepted reference tariff to be received and adopted:

1. High-level support from policy makers
2. Transparency
3. Accountability
4. Enabling competition to improve performance
5. Feedback loops to the clinical units

4.6 Revisiting the End Goal: Strengthening Performance Incentives in the Mid and Long Term

At this point, it is worth restating that the goal of the tariff-setting system is not simply to produce a set of tariffs (or prices); rather, the end goal is to incentivize performance and value for money. As data improve and the immediate tariff setting capability gaps are filled, the opportunities will increase for a greater patient satisfaction and outcomes performance measurement focus. This should be built into the road map as a mid- to long-term dimension of the tariff-setting framework. Capability should be developed from the outset in that direction.

Development of a performance orientation should be a stated intention in the tariff-setting implementation road map and align with management performance improvement functions. It should be in synergy with hospital and other health service performance objectives. This alignment would quickly deliver a strengthened and evidence-based performance orientation that is congruent with and reinforced by P4P signals that are adopted into the tariff-setting framework. The goal of a P4P incentive payment is to systematically move the focus to patient outcomes. As the purchasing strategy is developed and refined, and as specific patient outcome improvement goals are specified, the performance monitoring and the tariff incentive adjustments can be introduced systematically into the tariff calculation factors.

The general framework for performance improvement goal setting can then be developed in the generic performance domains as shown in the Figure 4.4. For focus, these should be prioritized to no more than three performance targets for each domain at any one time. Their metrics generally relate to monitoring of variation around the norms for the system and identification of best practice. The incentives are then set to recognize improved performance toward best practice with a marginal payment reward.

Application of P4P incentive payments typically occurs about 5 years after introduction of the tariff-setting program as the data reach a satisfactory level of completeness and coding precision. The first introduction of such incentive adjustments is usually applied to inpatient length-of-stay outlier adjustments to reward appropriate care according to case complexity. Usually, at this stage there should also be capacity to systematically include inpatient and all other care segments activity in the monitoring, and hence to cover the whole patient care journey for comprehensive integrated care, which is most relevant for performance measurement.

One common approach that health care organization take to measure their own performance against stated goals is the balanced scorecard. The performance framework shown in Figure 4.4 provides a useful reference point for developing a balanced suite of adjustment factors for tariff setting, as well as for performance management and reporting purposes in the hospital and health center management information systems.

Figure 4.4 The Balanced Scorecard MIS domains for a well-managed Healthcare Provider Organization



Source: adapted from Kaplan and Norton (1993).

5. CHARTING THE WAY FORWARD: CONCLUSIONS AND NEXT STEPS

The preceding chapters reported observations made on the capability of the systems in Botswana to support a national standard tariff-setting process. Chapter 2 outlined the observations made in a proof-of-concept simulation of a top-down tariff setting exercise. Chapter 3 provided an outline of a feasible framework that Botswana could use in developing its tariff setting practices. Chapter 4 outlines the necessary processes and structures that would be important to achieve a functional tariff setting cycle in Botswana going forward. This chapter focuses on the best value next steps that would advance implementation of a useful and practical tariff setting approach in Botswana.

5.1 Way Forward Conclusions

The overall observation is that the fundamental enablers for commencing a tariff-setting process are in place in Botswana, but their usability is restricted by gaps and precision limitations that are typical of a system that is in active development and has not yet achieved full utilization.

5.1.1 Current readiness and gaps for tariff setting

Some gaps need to be filled to enable rigorous, sustainable, and functional tariff-setting program. The good news is that existing capabilities and building blocks are sufficient for initiating tariff setting, initially supported by published international standards and an ongoing building blocks development program.

Gaps and priorities for developing infrastructure and processes for effective tariff-setting include:

- Activity data in two of the three hospitals have a high proportion of incomplete coding. Coding precision and detail need improvement to support high-quality activity analysis and therefore high precision tariff setting.
- Compilation of expenditure data to provide a complete cost picture is currently a complex assembly of financial accounting records from multiple sources combined with estimates. A standard and routine process for collating all the costs from the different accounting centers is needed for both tariff setting and to provide the management information required for hospitals and other provider organizations to improve their efficiency, quality, and outcomes performance.
- Systematic costing program does not currently exist to assign costs systematically and in reconcilable form to complete units of care for price negotiation, efficiency measurement, utilization analysis, and performance monitoring. Hospitals and other provider organizations should be encouraged and supported in implementing standard costing practices so that they are equipped to optimize their performance across each of the performance dimensions discussed below and illustrated in Figure 5.1.

Existing systems generally have the capability of supporting the refinements required for a rigorous tariff-setting program, and the additional capabilities that will be needed should not present major difficulties in achieving a successful implementation.

It is therefore recommended that the tariff-setting program proceed from a proof-of-concept exercise to a planned implementation of Botswana's annual tariff-setting cycle. During this initial phase, the gaps in the supporting infrastructure can be filled while the cycle processes are established and strengthened.

5.2 Next Steps

The 10 priority next steps can be grouped into three main action areas. The action areas involve a continuation from the current proof-of-concept activity into a phased implementation of an ongoing tariff-setting system as described throughout the report. The overview of the recommended next steps is summarized in Box 5.1. These next steps should be the responsibility of the MOHW during the launch period and the ongoing operation of the action areas should be assumed by the Tariff-setting Unit once it is fully established after the first year.

Box 5.1 A framework for next steps

Action Area I. Engage the recommended TA team to provide leadership and assistance with setting-up actions, including continuation of the proof-of-concept refinement and its extension into a tariff-setting implementation program

1. Implement DRG grouping capability; this includes obtaining a research/evaluation license for an established version of DRGs.
2. Establish a cohort of demonstration hospitals to lead improving activity data submission and coding rigor.
3. Extend the activity and cost analysis coverage to additional hospitals/health services firstly by projection then by improved activity coding and cost data extraction.
4. Publish and circulate results of modeling for comment by payers and providers.

Action Area II. Set up the Tariff-setting Unit with 3-year work program and goals.

The unit would initially be supported and provided with skills transfer by the TA team, which would assist in setting up the Tariff-setting Unit's work program with the unit and the MOHW. The Tariff-setting Unit would have the role of initiating the development and execution of the following tasks:

5. Establishing work program, phased goals and specified tariff-setting deliverables
6. Setting detailed targets for tariff-setting building block development
7. Implementing a consultation protocols with expert advisory working groups and sector stakeholders

Action Area III. Establish a 5-year road map for tariff-setting implementation and refinement that includes:

8. Establishing planned stages for activity reporting and costing improvement targets that cover:
 - a. All providers in the health sector
 - b. All payers in the health sector
 - c. All health care products
9. Implementing program for consolidating and extending the national infrastructure for tariff setting
10. Define, agree, and publish a series of phased milestones in the introduction of an annual tariff cycle

The TA team should be engaged and deployed within the first 6 months in order to maintain the momentum from the current project. While the Tariff-setting Unit is being established, the TA team would provide interim project leadership. The TA team would also provide the incoming Tariff-setting Unit members with systematic training, skills transfer, and support with initiation actions on each of the recommended 10 next steps. Thus, Action Areas I and II are not strictly sequential; as soon as the Tariff-setting Unit is operational, its members should collaborate with the TA team in continuing the proof-of-concept implementation.

5.2.1 Action Area I. Engage the TA team and continue Proof-of-Concept refinement and initiate the tariff-setting mechanisms

The TA team should be engaged as a matter of priority within the first 6 months.

As recommended in 5.1.1, it is proposed that the proof-of-concept tariff-setting exercise be continued as the basis for initiating and refining the tariff-setting cycle. It is important that during this phase and onward, the following processes should be established:

- Publish proof-of-concept outputs for comment and feedback on data quality and variability review
- Iteratively, in phases 2 and 3 of the proof-of-concept program, introduce increasing Botswana-specific activity and cost data detail to replace the use of international input (service-level) cost relativities
- Use the output from the proof-of-concept program as the foundation and baseline for the tariff-setting annual cycle in Action Area III

The outputs of the Area I steps relate to the [launch of the tariff-setting framework](#). The four key steps are:

- I. The MOHW, supported by the TA team, should choose a DRG variant for initial use as one of the first priority steps. Criteria to be considered for the choice may include the list of desirable attributes in Box 5.2.

Box 5.2 Desirable criteria for selecting a DRG classification system for use in Botswana

1. Availability of free research or evaluation licensing arrangements for at least a 6-month period
2. Availability of freely available cost weights and service weights as initial reference norms
3. Use in similar countries to Botswana in terms of scale and data availability
4. Ability to map current data coding standards into input data for the trial DRG variant
5. Government ownership and established program of regular update and maintenance
6. Established, effective, and comprehensive implementation in the home country's hospital funding and reporting systems

The readily identifiable options for consideration include the following classification systems:

- Australian Refined (AR-DRG)
- 3M – International Refined (IR-DRG) or All Patient Refined (APR-DRG)

- U.S. Centers for Medicare and Medicaid (CMS-DRG)
- Nordic DRGs
- German G-DRGs
- Ghana G-DRGs

As Botswana decides which of the international variants (if any) would be best to adopt, we recommend that the MOHW acquire an evaluation license of the AR-DRG system (IHPA 2018) for testing and research use. This evaluation license is free of charge and grouping software¹⁵ distributors may also make their grouping utilities available without charge for an evaluation period.

2. The MOHW, with the TA team assistance, should appoint a cohort of demonstration hospitals to lead the way in improving activity data submission and coding rigor, and thus to demonstrate examples of the potential effects of the use of data for tariff setting. Because of its close relationship with tariff setting and performance measuring, performance improvement will also be brought into focus. Hospital managers should therefore be encouraged to make use of the data collected for tariff-setting purposes as part of their management information system and performance improvement mechanisms.
3. The TA team and the incoming Tariff-setting Unit should set out and circulate a high-level interim program and time frame to extend the Activity Classification and costing coverage and data quality to additional hospitals and other settings. This program and time frame should project the high-level implementation phases and delivery targets for each of the key functions of the building blocks. For example, from the commencement of Step 1:
 - a. Coding of both Principal Diagnosis, Additional Diagnoses, and Major Procedures for all inpatients at discharge should be in place in the majority of hospitals by end of Year 1. Representative samples of at least 3 months of fully coded data from at least five hospitals should be available by this time. This can be projected to the total number of admissions of each hospital in the activity year concerned.
 - b. Costing of inpatient services in five demonstration hospitals to DRG by end of Year 1.
 - c. Tariff calculation using Botswana-specific DRG activity estimates and cost data by end of Year 2.
4. The TA team and the incoming Tariff-setting Unit should establish mechanisms and schedules for circulating the modeling and analytical outputs to interested stakeholders. This should include publishing the consolidated results on a web page. A program of follow up with hospitals for explanations of discrepancies and unusual outlier patterns of activities or resource utilization should be developed.

¹⁵ DRG grouper software provides an automated method of applying the algorithm for assigning a DRG category to an episode based on the episode record data, including patients' age, sex, length of stay, Principal Diagnosis, Additional Diagnoses, Major Procedures, and need for intensive care. It can operate dynamically at data entry to assign DRG categories on a case-by-case basis as they are coded, or it can be applied to a complete dataset of case records as a batch. Some DRG grouping software utilities also provide analysis of the hospital's caseload including its cost weight index, sometimes referred to as the hospital's "case complexity score." For this reason, grouping software is frequently interfaced with hospital MIS functions and used for input into performance analysis reporting.

5.2.2 Action Area II. Set up the Tariff-setting Unit and establish the tariff-setting work program

The Tariff-setting Unit should form the hub for the activities and structures for the tariff-setting program. The core responsibilities of the unit are to ensure that the tariff-setting structures, building blocks, and their associated outputs are established, refined, and operated in close alignment with the annual tariff cycle.

The Outputs of the Area II relate primarily to establishing the enabling structures and processes. The three key steps are:

5. The Tariff-setting Unit, with the TA team advice, should establish the Work Program for a 3-year period for the Tariff-setting Unit. The program should be approved by the MOHW and set up for evaluation, update, and extension by rolling 3-year development plans each year in consultation with a stakeholder and expert program advisory panel.
6. The Tariff-setting Unit, with assistance from the TA team, should establish the processes for specifying, updating, and maintaining the tariff-setting building block infrastructure. This includes:
 - a. Obtaining or creating manuals for standards for classification coding and counting and data recording requirements for tariff setting.
 - b. Initiating an annual patient-level costing cycle based on published patient-level costing standards and data submission protocols for a substantial hospital sample. The costing approach should initially be top down with costs allocated to cases or case types by standard utilization statistics. The annual programs should be designed to move toward a bottom-up case cost allocation method based on actual utilization as data improve.
 - c. Setting up a program of tariff schedule calculation and payment impact simulation that includes stakeholder consultation and feedback from clinical and technical expert advisory groups.
7. The Tariff-setting Unit, with assistance from the TA team, should set up interim CEWG and the technical expert advisory working group to form the basis for ongoing advisory structures established by the MOHW. They would also produce annual consultation schedules and terms of reference. The Tariff-setting Unit should also set up an interim consultation program with expert representatives of payers and providers, regulators, and policy makers. This would be an interim arrangement ahead of setting up a formal register of payers and providers for systematic invitation and circulation for comment in future annual tariff cycles.

5.2.3 Action Area III. Establish 5-year roadmap for national reference tariffs as an effective efficiency and quality-improvement mechanism

The outputs of the Area III relate primarily to setting goals for the use and value of the tariff in measuring, incentivizing, and stimulating performance improvement of the sector. The three key steps are:

8. The Tariff-setting Unit and the MOHW should publish a timeline for use of the readiness of the tariff-setting mechanism to support competitive price negotiations and quality accountability benchmarking. Outline milestones for phased implementation of the reporting and performance monitoring tools include:

- a. Building block refinement of activity, utilization, financial, and costing analytical cycles. These infrastructure elements also include data submission and analysis cycles.
- b. Payment modeling and simulation programs that establish impact assessment capability of sufficient precision to support benchmarking of relative performance between providers and activity segments of the sector.
- c. Introduction of partial cash-flow links to activity data submission compliance and timeliness.¹⁶
- d. Expansion of monitoring and tariffing coverage to inpatient-interfacing care segments, e.g.:
 - i. Outpatient
 - ii. Emergency department
 - iii. Hospital-based outreach services
 - iv. Other interfacing services

The outline timetable for provider–payer structural reform may be supported by prioritizing tariff-setting capabilities that underpin key components of the payment reforms. For example, consideration may be given to prioritizing the following tariff-setting infrastructure in these reforms:

- Expand tariff-setting and activity to include inpatient-interfacing care segments.
 - Provide increased integrated analysis of activity and performance across settings.
 - Develop the tariff architecture as a vehicle that supports systematic introduction of accountable capitation funding with performance measurement, for example, for patients with certain high-risk chronic conditions whose care may include both primary care and hospital episodes as part of the unit of care.
 - Provide a mechanism for incentive signals for use of most appropriate care setting at the case level. This applies particularly, for example, to payment incentives for strengthening primary care functions.
9. The Tariff-setting Unit and the MOHW should consolidate and extend the national infrastructure to provide the capability to simulate and assess the impact of activity-based payment for 5 percent of hospital-managed budget cashflow. Incentives may also be modeled into the payment simulations and impact assessment simulations for:
 - Managing activity to targets and performance goals by clinical prioritization to maximize allocative efficiency and outcomes
 - Payment dependent on data quality, timeliness, and completeness
 10. The Tariff-setting Unit and MOHW should design a phasing framework for supporting the introduction of tariff-cycle accountability mechanisms. The timing of the phasing in of substantial changes in tariff calculations should be smoothed to allow the sector to adapt to material changes in tariffs. The tariff-cycle phased milestones should include:

¹⁶ E.g., to incentivize standards-compliant participation, providers could be paid a bonus for timely submission of quality data.

- Tariff calculation: methodology refinement, annual cycle and publication, stakeholder consultation cycles
- Design and launch a partial activity-based funding payment to public hospitals.

5.3 Conclusion

As can be observed throughout this report, it is not a trivial matter to establish an annual tariff cycle that smoothly links to the payment mechanisms of the health care sector. However, each process of the tariff-setting cycle is valuable, in and of itself, in promoting and enabling gains in efficiency, quality, and effectiveness of health care services. For this reason, most countries implementing tariff-setting cycles have begun by working on the infrastructure that will support tariff-setting on one hand, while using those improvements to promote efficiency and value even before the tariff-setting cycle is fully established. Tariff-setting cycles are then generally implemented on a phased basis to allow the associated payment mechanisms to make best use of the calibration of the tariffs at the beginning of each payment period. Thus, the recommendations in this report point the way forward for strengthening Botswana's tariff-setting capabilities.

Identifying the existing capabilities and gaps (Chapter 2) is crucial step towards a continuing process of strengthening capacity in the three building blocks of the tariff-setting framework: activity analysis, cost analysis, and tariff calculation. Further, as described in Chapters 3 and 4, establishing a robust tariff-setting cycle will require the development of a clear roadmap for building and strengthening the components of the tariff-setting framework. In addition, establishing a Tariff-setting Unit within the MOHW will be a pivotal step in laying the groundwork for an annual tariff-setting cycle. Finally, Chapter 5 has outlined concrete next steps for the MOHW and its partners to pursue in order to continue moving the needle on tariff setting.

Over the years, Botswana's health system has made important strides in expanding access to health services, and notably, in stemming the tide of the HIV/AIDS epidemic. However, the country also faces significant challenges that will require ambitious reform efforts if the country is to protect the gains already achieved and continue strengthening and modernizing the health system. As Botswana undergoes an economic transition to lower growth rates and an epidemiologic transition to a "double-burden of disease"—characterized by higher prevalence of chronic and noncommunicable disease as well the continued burden of communicable, maternal, neonatal, and nutritional diseases—the country's health system must innovate in order to operate efficiently and ensure that resources are being used for maximum impact. Introducing the tariff-setting framework described in this report is an important step in that direction. By strengthening the collection of activity and cost data and providing managers and providers with tools for benchmarking and performance management, tariff-setting has the potential to galvanize a revolution in improving quality and efficiency. Further, this has the potential to improve the patient experience and outcomes of Botswana accessing services in both the public and private sectors of the health system. Ultimately, if implemented continuously and steadily, the tariff-setting framework can mark an important step in Botswana's journey to universal health coverage and sustained high value health care.

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Annex I List of Adjacent DRGs, cost weights, and activity volume ratios from published AR-DRG Australian hospital activity and cost statistics that were used in the initial PoC simulation

ADRG	Description	NHCCD Code	Acute Cost Weight (Actual)	AR-DRG V8	NORMS		SIMULATION #2 FOR 3 HOSPITAL SAMPLE			
					Cost	caseVol distribution %	BASE RIFF	0.09784	ALL Projection	SIMULATED
					Weight		BWP	US\$	admissions	PAYMENT
	ALL CASES		1.00	100.0000%			9,173		36,210	332,145,002
A01	Liver Transplant		28.17	0.0048%		258,415	25,282	1.7	445,337.1	
A03	Lung and Heart-Lung Transplant		31.99	0.0035%		293,440	28,709	1.3	369,021.5	
A05	Heart Transplant		32.69	0.0017%		299,870	29,338	0.6	183,565.9	
A06	Tracheostomy and/or Ventilation >=96 hours		21.97	0.1419%		201,548	19,718	51.4	10,352,984.5	
A07	Allogeneic Bone Marrow Transplant		20.70	0.0102%		189,902	18,579	3.7	702,544.5	
A08	Autologous Bone Marrow Transplant		7.76	0.0194%		71,221	6,968	7.0	501,376.4	
A09	Kidney Transplant		8.99	0.0185%		82,500	8,071	6.7	553,328.3	
A10	Insertion of Ventricular Assist Device		81.15	0.0009%		744,370	72,826	0.3	247,645.0	
A11	Insertion of Implantable Spinal Infusion Device		8.38	0.0008%		76,889	7,522	0.3	22,510.5	
A12	Insertion of Neurostimulator Device		4.99	0.0070%		45,786	4,479	2.5	116,377.3	
A40	ECMO		32.57	0.0055%		298,809	29,234	2.0	592,490.3	
B01	Ventricular Shunt Revision		3.37	0.0075%		30,950	3,028	2.7	83,609.6	
B02	Cranial Procedures		6.49	0.1742%		59,563	5,827	63.1	3,757,491.7	
B03	Spinal Procedures		3.52	0.0405%		32,271	3,157	14.7	473,684.8	
B04	Extracranial Vascular Procedures		3.85	0.0305%		35,347	3,458	11.1	390,650.4	
B05	Carpal Tunnel Release		0.44	0.1894%		4,040	395	68.6	276,989.6	
B06	Procedures for Cerebral Palsy, Muscular Dystrophy and Neuropathy		1.72	0.0475%		15,755	1,541	17.2	271,085.9	
B07	Cranial/Peripheral Nerve and Other Nervous System Procedures		1.67	0.0788%		15,334	1,500	28.5	437,709.4	
B40	Plasmapheresis in Neurological Disease, 5ameday		0.28	0.0297%		2,552	250	10.8	27,453.2	
B41	Telemetric EEG Monitoring		1.62	0.0238%		14,840	1,452	8.6	127,875.5	
B42	Nervous System Disorders with Ventilator Support		6.17	0.0192%		56,554	5,533	6.9	392,481.3	
B60	Acute Paraplegia and Quadriplegia with W/O DR Procedures		7.78	0.0038%		71,405	6,986	1.4	97,873.9	
B61	Spinal Cord Conditions with W/O DR Procedures		4.07	0.0308%		37,360	3,655	11.2	416,879.4	
B62	Apheresis		0.31	0.0088%		2,837	278	3.2	9,023.2	
B63	Dementia and Other Chronic Disturbances of Cerebral Function		2.46	0.1962%		22,576	2,209	71.0	1,603,997.9	
B64	Delirium		1.76	0.1928%		16,135	1,579	69.8	1,126,215.2	
B65	Cerebral Palsy		0.59	0.0378%		5,401	528	13.7	73,962.0	
B66	Nervous System Neoplasms		1.74	0.1034%		15,917	1,557	37.4	595,944.1	
B67	Degenerative Nervous System Disorders		1.06	0.2849%		9,718	951	103.2	1,002,515.7	
B68	Multiple Sclerosis and Cerebellar Ataxia		0.55	0.2673%		5,008	490	96.8	484,686.7	
B69	TIA and Precerebral Occlusion		0.83	0.2214%		7,573	741	80.2	606,961.4	
B70	Stroke and Other Cerebrovascular Disorders		1.97	0.5154%		18,042	1,765	186.6	3,367,209.4	
B71	Cranial and Peripheral Nerve Disorders		0.61	0.4683%		5,618	550	169.6	952,737.2	
B72	Nervous System Infection Except Viral Meningitis		2.37	0.0628%		21,719	2,125	22.7	493,949.2	
B73	Viral Meningitis		1.02	0.0368%		9,367	916	13.3	124,721.4	
B74	Nontraumatic Stupor and Coma		0.86	0.0381%		7,892	772	13.8	108,800.8	
B75	Febrile Convulsions		0.45	0.0363%		4,113	402	13.2	54,130.2	
B76	Seizures		0.83	0.5487%		7,659	749	198.7	1,521,735.6	
B77	Headaches		0.41	0.5923%		3,765	368	214.5	807,427.1	
B78	Intracranial Injuries		1.73	0.1316%		15,913	1,557	47.7	758,531.0	
B79	Skull Fractures		0.88	0.0346%		8,038	786	12.5	100,712.4	
B80	Other Head Injuries		0.39	0.4184%		3,549	347	151.5	537,760.5	
B81	Other Disorders of the Nervous System		1.14	0.3664%		10,453	1,023	132.7	1,386,747.3	
B82	Chronic and Unspecified Paraplegia/Quadriplegia with W/O DR Procedures		3.45	0.0624%		31,632	3,095	22.6	714,979.1	
C01	Procedures for Penetrating Eye Injury		1.87	0.0133%		17,179	1,681	4.8	82,755.4	
C02	Enucleations and Orbital Procedures		1.97	0.0122%		18,034	1,764	4.4	79,916.5	
C03	Retinal Procedures		0.68	0.2161%		6,243	611	78.2	488,410.2	
C04	Major Corneal, Scleral and Conjunctival Procedures		1.84	0.0144%		16,871	1,651	5.2	88,123.4	
C05	Dacryocystorhinostomy		0.95	0.0168%		8,716	853	6.1	52,889.5	
C10	Strabismus Procedures		0.81	0.0310%		7,431	727	11.2	83,358.5	
C11	Eyelid Procedures		0.68	0.0736%		6,252	612	26.6	166,525.9	
C12	Other Corneal, Scleral and Conjunctival Procedures		0.74	0.0552%		6,804	666	20.0	136,082.8	
C13	Lacrimal Procedures		0.45	0.0086%		4,161	407	3.1	13,012.1	
C14	Other Eye Procedures		0.63	0.0323%		5,785	566	11.7	67,712.1	
C15	Glaucoma and Complex Cataract Procedures		0.84	0.0579%		7,682	752	21.0	161,014.2	
C16	Lens Procedures		0.52	1.1551%		4,812	471	418.3	2,012,610.9	
C60	Acute and Major Eye Infections		1.39	0.0273%		12,789	1,251	9.9	126,364.9	
C61	Neurological and Vascular Disorders of the Eye		0.78	0.0453%		7,200	704	16.4	117,997.1	
C62	Hyphaema and Medically Managed Trauma to the Eye		0.49	0.0889%		4,493	440	32.2	144,689.6	
C63	Other Disorders of the Eye		0.56	0.1035%		5,092	498	37.5	190,766.1	
D01	Cochlear Implant		6.56	0.0118%		60,142	5,884	4.3	256,109.6	
D02	Head and Neck Procedures		3.77	0.0277%		34,607	3,386	10.0	347,472.0	
D03	Surgical Repair of Lip and Palate Disorders		2.00	0.0112%		18,304	1,791	4.1	74,170.9	
D04	Maxillo Surgery		2.15	0.0661%		19,679	1,925	23.9	470,734.7	
D05	Parotid Gland Procedures		2.43	0.0148%		22,323	2,184	5.3	119,421.3	
D06	Sinus and Complex Middle Ear Procedures		1.37	0.1269%		12,612	1,234	46.0	579,557.7	
D10	Nasal Procedures		0.99	0.1380%		9,066	887	50.0	453,172.5	
D11	Tonsillectomy and Adenoidectomy		0.74	0.3185%		6,768	662	115.3	780,522.9	
D12	Other Ear, Nose, Mouth and Throat Procedures		1.10	0.1217%		10,061	984	44.1	443,383.2	
D13	Myringotomy with Tube Insertion		0.43	0.1101%		3,965	388	39.9	158,108.8	
D14	Mouth and Salivary Gland Procedures		1.03	0.0878%		9,454	925	31.8	300,511.7	
D15	Mastoid Procedures		2.37	0.0192%		21,705	2,123	7.0	150,919.1	
D40	Dental Extractions and Restorations		0.69	0.3314%		6,365	623	120.0	763,781.7	
D60	Ear, Nose, Mouth and Throat Malignancy		1.30	0.0585%		11,886	1,163	21.2	251,982.1	
D61	Dysequilibrium		0.51	0.4537%		4,650	455	164.3	764,034.7	
D62	Epistaxis		0.50	0.1030%		4,604	450	37.3	171,663.0	
D63	Otitis Media and Upper Respiratory Infections		0.57	0.7419%		5,254	514	268.6	1,411,432.2	
D64	Laryngotracheitis and Epiglottitis		0.40	0.1256%		3,627	355	45.5	164,966.9	
D65	Nasal Trauma and Deformity		0.44	0.0872%		4,044	396	31.6	127,646.6	
D66	Other Ear, Nose, Mouth and Throat Disorders		0.51	0.3094%		4,663	456	112.0	522,378.5	
D67	Oral and Dental Disorders		0.50	0.2828%		4,622	452	102.4	473,274.8	
	ALL CASES		1.00	100.0000%		9,173		36,210	332,145,002	

ADRG	Description	NCHDCAcuteCostWeights(Actual)	AR-DRG	V8	NORMS		SIMULATION#2FOR3HOSPITALSAMPLE			
					Cost	caseVol distribution	BASEARRIF	0.09784	ALLProjection	SIMULATED
					Weight	%	BWP	US\$	admissions	PAYMENT
	https://www.accd.net.au/Downloads.aspx				1.00	100.0000%	9,173		36,210	332,145,002
E01	MajorChestProcedures	4.83			0.0809%		44,322	4,336	29.3	1,299,091.8
E02	OtherRespiratorySystemDRProcedures	1.56			0.1758%		14,298	1,399	63.7	910,168.1
E40	RespiratorySystemDisordersW/VentilatorSupport	7.11			0.0227%		65,194	6,378	8.2	537,031.6
E41	RespiratorySystemDisordersW/Non-InvasiveVentilation	3.80			0.2165%		34,881	3,413	78.4	2,734,478.5
E42	Bronchoscopy	1.40			0.1891%		12,810	1,253	68.5	877,217.3
E60	CysticFibrosis	4.17			0.0576%		38,261	3,743	20.9	797,850.5
E61	PulmonaryEmbolism	1.40			0.1670%		12,808	1,253	60.5	774,497.0
E62	RespiratoryInfectionsAndInflammations	1.36			1.3698%		12,500	1,223	496.0	6,200,122.4
E63	SleepApnoea	0.37			0.1560%		3,363	329	56.5	189,891.2
E64	PulmonaryDedemaAndRespiratoryFailure	1.58			0.0540%		14,464	1,415	19.6	282,946.0
E65	ChronicObstructiveAirwaysDisease	1.28			0.8863%		11,723	1,147	320.9	3,762,573.4
E66	MajorChestTrauma	1.34			0.1099%		12,282	1,202	39.8	488,942.2
E67	RespiratorySignsAndSymptoms	0.50			0.3662%		4,546	445	132.6	602,910.7
E68	Pneumothorax	1.27			0.0747%		11,660	1,141	27.0	315,373.9
E69	BronchitisAndAsthma	0.57			0.6268%		5,253	514	227.0	1,192,347.4
E70	WhoopingCoughAndAcuteBronchiolitis	0.77			0.2730%		7,066	691	98.8	698,333.0
E71	RespiratoryNeoplasms	1.54			0.1772%		14,095	1,379	64.2	904,466.3
E72	RespiratoryProblemsArisingFromNeonatalPeriod	0.70			0.0055%		6,456	632	2.0	12,931.1
E73	PleuralEffusion	1.45			0.0870%		13,325	1,304	31.5	419,629.1
E74	InterstitialLungDisease	1.37			0.0522%		12,536	1,226	18.9	236,812.9
E75	OtherRespiratorySystemDisorders	0.82			0.5296%		7,495	733	191.8	1,437,352.7
E76	RespiratoryTuberculosis	3.70			0.0087%		33,986	3,325	3.1	106,737.0
F01	ImplantationAndReplacementOfACDOfTotalSystem	5.22			0.0569%		47,918	4,688	20.6	986,485.2
F02	OtherACDProcedures	2.69			0.0041%		24,714	2,418	1.5	36,670.0
F03	CardiacValveProceduresW/OCPumpW/InvasiveCardiacInvestigation	14.22			0.0078%		130,401	12,758	2.8	367,021.1
F04	CardiacValveProceduresW/OCPumpW/OInvasiveCardiacInvestigation	9.78			0.0699%		89,743	8,780	25.3	2,271,496.0
F05	CoronaryBypassW/InvasiveCardiacInvestigation	10.78			0.0282%		98,914	9,677	10.2	1,008,951.9
F06	CoronaryBypassW/OInvasiveCardiacInvestigation	7.78			0.0744%		71,353	6,981	26.9	1,921,867.3
F07	OtherCardiothoracicVascularProceduresW/OCPump	8.50			0.0204%		87,141	8,525	7.4	642,438.3
F08	MajorReconstructiveVascularProceduresW/OCPump	6.36			0.0680%		58,329	5,707	24.6	1,435,612.5
F09	OtherCardiothoracicProceduresW/OCPump	4.74			0.0191%		43,518	4,258	6.9	300,566.6
F10	InterventionalCoronaryProcedures,AdmittedForAMI	2.50			0.2454%		22,925	2,243	88.9	2,037,273.9
F11	Amputation,ExceptUpperLimbAndToe,ForCirculatoryDisorders	10.02			0.0106%		91,873	8,988	3.9	353,945.8
F12	ImplantationAndReplacementOfPacemaker,OfTotalSystem	2.84			0.1318%		26,089	2,552	47.7	1,245,494.0
F13	Amputation,UpperLimbAndToe,ForCirculatoryDisorders	4.43			0.0148%		40,638	3,976	5.4	218,482.6
F14	VascularProcedures,ExceptMajorReconstruction,W/OCPump	2.36			0.2079%		21,615	2,115	75.3	1,627,233.6
F15	InterventionalCoronaryProcedures,NotAdmittedForAMIW/StentImplantation	1.86			0.1482%		17,093	1,672	53.7	917,486.1
F16	InterventionalCoronaryProcedures,NotAdmittedForAMIW/OStentImplantation	1.78			0.0093%		16,321	1,597	3.4	55,059.5
F17	InsertionAndReplacementOfPacemakerGenerator	1.37			0.0329%		12,575	1,230	11.9	150,024.0
F18	OtherPacemakerProcedures	2.58			0.0062%		23,670	2,316	2.2	52,760.3
F19	Trans-VascularPercutaneousCardiacIntervention	3.40			0.0196%		31,150	3,048	7.1	220,947.5
F20	VeinLigationAndStripping	1.03			0.0822%		9,418	921	29.7	280,186.3
F21	OtherCirculatorySystemDRProcedures	2.98			0.0301%		27,327	2,674	10.9	298,016.8
F40	CirculatoryDisordersW/VentilatorSupport	6.11			0.0121%		56,029	5,482	4.4	244,932.4
F41	CirculatoryDisorders,AdmittedForAMIW/InvasiveCardiacInvestigativeProcs	1.97			0.1334%		18,073	1,768	48.3	872,708.6
F42	CirculatoryDisorders,NotAdmittedForAMIW/InvasiveCardiacInvestigativeProcs	1.31			0.5851%		12,027	1,177	211.9	2,547,924.8
F43	CirculatoryDisordersW/Non-InvasiveVentilation	4.81			0.0278%		44,158	4,320	10.1	444,846.2
F60	CirculatoryDisorders,AdmittedForAMIW/OInvasiveCardiacInvestigativeProcs	1.20			0.3036%		11,035	1,080	109.9	1,213,223.8
F61	InfectiveEndocarditis	3.98			0.0218%		36,531	3,574	7.9	288,523.5
F62	HeartFailureAndShock	1.58			0.6474%		14,510	1,420	234.4	3,401,534.8
F63	VenousThrombosis	0.85			0.1031%		7,767	760	37.3	289,883.7
F64	SkinUlcersInCirculatoryDisorders	1.58			0.0427%		14,524	1,421	15.5	224,394.8
F65	PeripheralVascularDisorders	0.95			0.1574%		8,756	857	57.0	498,912.2
F66	CoronaryAtherosclerosis	0.59			0.1872%		5,386	527	67.8	365,198.8
F67	Hypertension	0.62			0.1205%		5,686	556	43.6	248,079.1
F68	CongenitalHeartDisease	0.74			0.0136%		6,751	660	4.9	33,284.1
F69	ValvularDisorders	0.59			0.1681%		5,451	533	60.9	331,861.5
F72	UnstableAngina	0.67			0.1839%		6,115	598	66.6	407,269.8
F73	SyncopalAndCollapse	0.70			0.6444%		6,415	628	233.3	1,496,956.1
F74	ChestPain	0.36			1.9288%		3,322	325	698.4	2,320,085.9
F75	OtherCirculatoryDisorders	1.25			0.3321%		11,466	1,122	120.2	1,378,645.4
F76	Arrhythmia,CardiacArrestAndConductionDisorders	0.75			0.8417%		6,846	670	304.8	2,086,555.6
G01	RectalResection	6.72			0.0819%		61,632	6,030	29.7	1,827,766.7
G02	MajorSmallAndLargeBowelProcedures	5.42			0.2245%		49,684	4,861	81.3	4,039,463.7
G03	Stomach,EsophagealAndDuodenalProcedures	5.00			0.0637%		45,893	4,490	23.1	1,059,009.3
G04	PeritonealAdhesiolysis	2.88			0.1553%		26,416	2,584	56.2	1,485,071.4
G05	MinorSmallAndLargeBowelProcedures	2.47			0.0223%		22,689	2,220	8.1	183,275.2
G06	Pyloromyotomy	2.12			0.0031%		19,444	1,902	1.1	21,605.6
G07	Appendectomy	1.55			0.4736%		14,256	1,395	171.5	2,444,657.5
G10	HerniaProcedures	1.21			0.5624%		11,127	1,089	203.6	2,265,758.0
G11	AnalAndStomalProcedures	0.88			0.2904%		8,109	793	105.2	852,752.7
G12	OtherDigestiveSystemDRProcedures	2.72			0.0731%		24,958	2,442	26.5	660,778.4
G46	ComplexEndoscopy	0.79			0.7913%		7,264	711	286.5	2,081,451.4
G47	Gastrosocopy	0.68			0.9418%		6,267	613	341.0	2,137,256.7
G48	Colonoscopy	0.51			1.4856%		4,686	458	537.9	2,520,985.4
G60	DigestiveMalignancy	1.28			0.1190%		11,711	1,146	43.1	504,778.4
G61	GastrointestinalHaemorrhage	0.82			0.2418%		7,547	738	87.5	660,700.9
G64	InflammatoryBowelDisease	0.50			0.3831%		4,558	446	138.7	632,259.3
G65	GastrointestinalObstruction	1.08			0.2675%		10,022	981	96.9	970,936.0
G66	AbdominalPainAndMesentericAdenitis	0.42			1.2047%		3,897	381	436.2	1,700,087.0
G67	OesophagitisAndGastroenteritis	0.63			1.0894%		5,823	570	394.5	2,296,959.5
G70	OtherDigestiveSystemDisorders	0.68			1.6719%		6,233	610	605.4	3,773,549.4
	ALLCASES	1.00			100.0000%		9,173		36,210	332,145,002

ADRG	Description	NHCDC Acute Care DRG	Weights (Actual)	PAR-DRG V8	NORMS		SIMULATION #2 FOR 3 HOSPITALS SAMPLE			
					Cost	case vol distribution	BASE TARIFF	0.09784	ALL Projection	SIMULATED
					Weight	%	BWP	US\$	admissions	PAYMENT
	https://www.accd.net.au/Downloads.aspx									
	ALL CASES		1.00	100.0000%			9,173		36,210	332,145,002
H01	Pancreas, Liver and Biliary Procedures		5.83	0.0472%			53,508	5,235	17.1	913,942.9
H02	Major Biliary Tract Procedures		4.88	0.0259%			44,740	4,377	9.4	419,749.0
H05	Hepatobiliary Diagnostic Procedures		2.08	0.0203%			19,045	1,863	7.4	140,158.1
H06	Other Hepatobiliary and Pancreas DRG Procedures		2.58	0.0403%			23,703	2,319	14.6	346,023.3
H07	Open Cholecystectomy		3.87	0.0186%			35,513	3,474	6.7	239,135.4
H08	Laparoscopic Cholecystectomy		1.83	0.5097%			16,786	1,642	184.6	3,098,284.5
H40	Endoscopic Procedures for Bleeding Oesophageal Varices		3.08	0.0136%			28,267	2,766	4.9	139,370.0
H43	ERCP Procedures		1.79	0.1589%			16,386	1,603	57.5	942,578.9
H60	Cirrhosis and Alcoholic Hepatitis		2.02	0.1006%			18,529	1,813	36.4	675,234.3
H61	Malignancy of Hepatobiliary System and Pancreas		1.34	0.1007%			12,257	1,199	36.5	446,941.6
H62	Disorders of Pancreas, Except Malignancy		1.18	0.2748%			10,804	1,057	99.5	1,074,899.4
H63	Other Disorders of Liver		1.27	0.1967%			11,695	1,144	71.2	833,196.3
H64	Disorders of the Biliary Tract		0.84	0.3347%			7,730	756	121.2	936,822.2
I01	Bilateral and Multiple Major Joint Procedures of Lower Limb		7.77	0.0163%			71,311	6,977	5.9	419,921.1
I02	Microvascular Transfer of Skin Grafts, Excluding Hand		8.24	0.0286%			75,551	7,391	10.3	781,697.7
I03	Hip Replacement		4.28	0.2831%			39,279	3,843	102.5	4,026,471.0
I04	Knee Replacement		3.86	0.2635%			35,403	3,464	95.4	3,377,525.0
I05	Other Joint Replacement		4.48	0.0331%			41,059	4,017	12.0	492,856.5
I06	Spinal Fusion for Deformity		12.15	0.0102%			111,426	10,901	3.7	410,740.0
I07	Amputation		7.66	0.0074%			70,250	6,873	2.7	189,310.2
I08	Other Hip and Femur Procedures		3.96	0.2554%			36,367	3,558	92.5	3,363,022.8
I09	Spinal Fusion		6.47	0.0582%			59,379	5,809	21.1	1,252,071.8
I10	Other Back and Neck Procedures		2.59	0.0717%			23,744	2,323	26.0	616,311.9
I11	Limb Lengthening Procedures		4.53	0.0025%			41,591	4,069	0.9	37,636.1
I12	Miscellaneous Musculoskeletal Procs for Infection/Inflammation of Bone and Joint		3.69	0.1242%			33,888	3,315	45.0	1,524,486.7
I13	Humerus, Tibia, Fibula and Ankle Procedures		2.54	0.3456%			23,309	2,280	125.1	2,916,708.1
I15	Cranio-Facial Surgery		4.32	0.0092%			39,671	3,881	3.3	131,982.8
I16	Other Shoulder Procedures		1.60	0.1257%			14,665	1,435	45.5	667,719.4
I17	Maxillo-Facial Surgery		2.17	0.0141%			19,888	1,946	5.1	101,495.6
I18	Other Knee Procedures		0.83	0.2540%			7,617	745	92.0	700,645.0
I19	Other Elbow and Forearm Procedures		1.83	0.2351%			16,826	1,646	85.1	1,432,575.9
I20	Other Foot Procedures		1.51	0.1289%			13,868	1,357	46.7	647,475.0
I21	Local Excision and Removal of Internal Fixation Devices of Hip and Femur		1.21	0.0142%			11,145	1,090	5.2	57,470.1
I23	Local Excision and Removal of Internal Fixation Devices, Except Hip and Femur		0.68	0.2082%			6,239	610	75.4	470,401.0
I24	Arthroscopy		0.95	0.0231%			8,735	855	8.4	72,938.7
I25	Bone and Joint Diagnostic Procedures Including Biopsy		1.99	0.0173%			18,213	1,782	6.2	113,794.6
I27	Soft Tissue Procedures		1.50	0.2446%			13,802	1,350	88.6	1,222,275.3
I28	Other Musculoskeletal Procedures		1.88	0.0985%			17,224	1,685	35.7	614,280.2
I29	Knee Reconstructions, and Revisions of Reconstructions		1.76	0.0885%			16,146	1,580	32.1	517,489.8
I30	Hand Procedures		0.90	0.4644%			8,251	807	168.1	1,387,299.8
I31	Revision of Hip Replacement		7.16	0.0275%			65,658	6,424	9.9	653,127.8
I32	Revision of Knee Replacement		6.70	0.0162%			61,454	6,012	5.9	360,650.8
I40	Infusions for Musculoskeletal Disorders, Same Day		0.30	0.3126%			2,712	265	113.2	306,879.7
I60	Femoral Shaft Fractures		2.91	0.0101%			26,701	2,612	3.7	97,535.5
I61	Distal Femoral Fractures		2.07	0.0089%			19,024	1,861	3.2	61,264.8
I63	Sprains, Strains and Dislocations of Hip, Pelvis and Thigh		1.03	0.0376%			9,451	925	13.6	128,537.0
I64	Osteomyelitis		2.82	0.0508%			25,853	2,529	18.4	475,470.6
I65	Musculoskeletal Malignant Neoplasms		2.16	0.0823%			19,844	1,941	29.8	591,267.3
I66	Inflammatory Musculoskeletal Disorders		1.98	0.0669%			18,203	1,781	24.2	440,993.7
I67	Septic Arthritis		2.26	0.0194%			20,758	2,031	7.0	145,989.8
I68	Non-surgical Spinal Disorders		1.23	0.5321%			11,314	1,107	192.7	2,179,905.0
I69	Bone Diseases and Arthropathies		1.28	0.1584%			11,870	1,161	57.4	680,901.2
I71	Other Musculotendinous Disorders		0.93	0.1303%			8,517	833	47.2	401,773.3
I72	Specific Musculotendinous Disorders		1.18	0.0922%			10,844	1,061	33.4	362,208.3
I73	Aftercare of Musculoskeletal Implants or Prostheses		1.67	0.0541%			15,332	1,500	19.6	300,140.5
I74	Injuries to Forearm, Wrist, Hand and Foot		0.81	0.2408%			7,441	728	87.2	648,734.6
I75	Injuries to Shoulder, Arm, Elbow, Knee, Leg and Ankle		1.17	0.3061%			10,765	1,053	110.8	1,193,167.3
I76	Other Musculoskeletal Disorders		1.36	0.0862%			12,456	1,219	31.2	388,866.2
I77	Fractures of Pelvis		1.92	0.0853%			17,647	1,727	30.9	545,070.7
I78	Fractures of Neck of Femur		1.68	0.0398%			15,450	1,512	14.4	222,769.3
I79	Pathological Fractures		2.21	0.0469%			20,246	1,981	17.0	343,524.7
I80	Femoral Fractures, Transferred to Acute Facility > 2 Days		0.37	0.0384%			3,408	333	13.9	47,386.5
I81	Musculoskeletal Injuries, Same Day		0.25	0.5808%			2,335	228	210.3	490,987.5
I82	Other Same Day Treatment of Musculoskeletal Disorders		0.24	0.7089%			2,185	214	256.7	560,919.2
J01	Microvascular Transfer for Skin, Subcutaneous Tissue & Breast Disorders		8.05	0.0095%			73,881	7,228	3.4	253,660.8
J06	Major Procedures for Breast Disorders		1.90	0.1934%			17,459	1,708	70.0	1,222,881.9
J07	Minor Procedures for Breast Disorders		0.78	0.1117%			7,123	697	40.5	288,218.3
J08	Other Skin Grafts and Debridement Procedures		1.38	0.3038%			12,663	1,239	110.0	1,392,971.7
J09	Perianal and Perianal Procedures		0.90	0.0410%			8,284	810	14.8	122,976.6
J10	Plastic or Procedures for Skin, Subcutaneous Tissue and Breast Disorders		0.75	0.1775%			6,837	669	64.3	439,503.8
J11	Other Skin, Subcutaneous Tissue and Breast Procedures		0.56	0.6175%			5,160	505	223.6	1,153,914.9
J12	Lower Limb Procedures W/ Ulcer or Cellulitis		3.28	0.0342%			30,095	2,944	12.4	373,060.1
J13	Lower Limb Procedures W/ Ulcer or Cellulitis		1.52	0.0565%			13,900	1,360	20.5	284,312.3
J14	Major Breast Reconstructions		4.71	0.0081%			43,230	4,229	2.9	127,137.5
J60	Skin Ulcers		1.22	0.0756%			11,160	1,092	27.4	305,568.7
J62	Malignant Breast Disorders		1.39	0.0204%			12,740	1,246	7.4	93,922.1
J63	Non-Malignant Breast Disorders		0.72	0.0461%			6,636	649	16.7	110,780.6
J64	Cellulitis		0.96	1.1399%			8,848	866	412.8	3,652,169.7
J65	Trauma to Skin, Subcutaneous Tissue and Breast		0.60	0.3864%			5,532	541	139.9	774,075.8
J67	Minor Skin Disorders		0.49	0.2502%			4,491	439	90.6	406,863.8
J68	Major Skin Disorders		0.81	0.1645%			7,442	728	59.6	443,354.9
J69	Skin Malignancy		0.94	0.0331%			8,640	845	12.0	103,592.2
	ALL CASES		1.00	100.0000%			9,173		36,210	332,145,002

ADRG	Description	NHCC Code	Acute Costs	Weights	Actual	AR-DRG	V8	NORMS		SIMULATION 2 FOR 3 HOSPITAL SAMPLE			
								Cost	case vol distribution	BASE RATE	0.09784	ALL Projection	SIMULATED
								Weight	%	BWP	US\$	admissions	PAYMENT
	ALL CASES							1.00	100.0000%	9,173		36,210	332,145,002
K01	OR Procedures for Diabetic Complications			4.74	0.0536%	43,527	4,258	19.4	845,104.4				
K02	Pituitary Procedures			4.52	0.0075%	41,450	4,055	2.7	111,976.2				
K03	Adrenal Procedures			3.89	0.0049%	35,657	3,489	1.8	63,822.2				
K05	Parathyroid Procedures			1.85	0.0293%	16,954	1,659	10.6	179,818.5				
K06	Thyroid Procedures			1.96	0.0877%	17,934	1,755	31.8	569,689.6				
K08	Thyroglossal Procedures			1.32	0.0047%	12,113	1,185	1.7	20,794.1				
K09	Other Endocrine, Nutritional and Metabolic DR Procedures			4.13	0.0112%	37,882	3,706	4.0	152,999.4				
K10	Revisional and Open Bariatric Procedures			4.31	0.0019%	39,575	3,872	0.7	26,596.1				
K11	Major Laparoscopic Bariatric Procedures			2.30	0.0200%	21,088	2,063	7.2	152,385.5				
K12	Other Bariatric Procedures			1.54	0.0038%	14,087	1,378	1.4	19,215.1				
K13	Plastic DR Procedures for Endocrine, Nutritional and Metabolic Disorders			2.27	0.0041%	20,829	2,038	1.5	31,044.5				
K40	Endoscopic and Investigative Procedures for Metabolic Disorders			0.96	0.0748%	8,763	857	27.1	237,255.8				
K60	Diabetes			1.27	0.4148%	11,679	1,143	150.2	1,754,308.7				
K61	Severe Nutritional Disturbance			3.03	0.0191%	27,824	2,722	6.9	192,543.3				
K62	Miscellaneous Metabolic Disorders			0.79	0.5033%	7,209	705	182.2	1,313,709.4				
K63	Inborn Errors of Metabolism			0.59	0.0717%	5,397	528	26.0	140,191.0				
K64	Endocrine Disorders			1.06	0.1393%	9,723	951	50.4	490,311.7				
L02	Operative Insertion of Peritoneal Catheter for Dialysis			1.72	0.0191%	15,782	1,544	6.9	109,004.0				
L03	Kidney, Ureter and Major Bladder Procedures for Neoplasm			5.00	0.0505%	45,836	4,484	18.3	838,088.9				
L04	Kidney, Ureter and Major Bladder Procedures for Non-Neoplasm			1.83	0.2320%	16,807	1,644	84.0	1,411,761.0				
L05	Transurethral Prostatectomy for Urinary Disorder			1.64	0.0313%	15,005	1,468	11.3	170,222.8				
L06	Minor Bladder Procedures			1.81	0.0350%	16,580	1,622	12.7	210,383.4				
L07	Other Transurethral Procedures			0.95	0.2285%	8,694	851	82.7	719,312.2				
L08	Urethral Procedures			1.02	0.0245%	9,363	916	8.9	83,045.5				
L09	Other Procedures for Kidney and Urinary Tract Disorders			2.14	0.0623%	19,610	1,919	22.5	442,075.0				
L40	Ureteroscopy			0.87	0.0092%	7,983	781	3.3	26,611.6				
L41	Cystourethroscopy for Urinary Disorder, Same day			0.25	0.5565%	2,273	222	201.5	458,108.2				
L42	ESWL lithotripsy			0.73	0.0317%	6,671	653	11.5	76,483.9				
L60	Kidney Failure			1.77	0.2872%	16,201	1,585	104.0	1,684,593.5				
L61	Haemodialysis			0.10	19.7837%	957	94	7,163.7	6,858,133.1				
L62	Kidney and Urinary Tract Neoplasms			1.27	0.0414%	11,614	1,136	15.0	174,099.5				
L63	Kidney and Urinary Tract Infections			0.95	0.9392%	8,721	853	340.1	2,965,886.0				
L64	Urinary Stones and Obstruction			0.52	0.6195%	4,801	470	224.3	1,077,017.3				
L65	Kidney and Urinary Tract Signs and Symptoms			0.74	0.3200%	6,760	661	115.9	783,417.8				
L66	Urethral Stricture			0.69	0.0128%	6,298	616	4.6	29,083.7				
L67	Other Kidney and Urinary Tract Disorders			0.62	0.5390%	5,733	561	195.2	1,118,800.5				
L68	Peritoneal Dialysis			0.14	0.1018%	1,269	124	36.8	46,772.3				
M01	Major Male Pelvic Procedures			3.76	0.0331%	34,474	3,373	12.0	412,656.6				
M02	Transurethral Prostatectomy for Reproductive System Disorder			1.50	0.1033%	13,740	1,344	37.4	513,889.8				
M03	Penis Procedures			1.01	0.0372%	9,266	907	13.5	124,850.5				
M04	Testes Procedures			0.86	0.1364%	7,897	773	49.4	390,077.2				
M05	Circumcision			0.64	0.0726%	5,907	578	26.3	155,371.7				
M06	Other Male Reproductive System DR Procedures			1.88	0.0198%	17,239	1,687	7.2	123,306.9				
M40	Cystourethroscopy for Male Reproductive System Disorder, Same day			0.25	0.0457%	2,292	224	16.5	37,909.0				
M60	Male Reproductive System Malignancy			0.69	0.1067%	6,327	619	38.6	244,506.8				
M61	Benign Prostatic Hypertrophy			0.61	0.0197%	5,559	544	7.1	39,722.8				
M62	Male Reproductive System Inflammation			0.70	0.1051%	6,388	625	38.0	243,033.6				
M63	Male Sterilisation Procedures			0.46	0.0597%	4,179	409	21.6	90,292.9				
M64	Other Male Reproductive System Disorders			0.41	0.0578%	3,783	370	20.9	79,136.8				
N01	Pelvic Exenteration and Radical Vulvectomy			4.09	0.0061%	37,500	3,669	2.2	82,590.0				
N04	Hysterectomy for Non-Malignancy			2.22	0.1913%	20,396	1,995	69.3	1,412,751.6				
N05	Oophorectomy and Complex Fallopian Tube Procedures for Non-Malignancy			1.70	0.0646%	15,609	1,527	23.4	365,175.9				
N06	Female Reproductive System Reconstructive Procedures			1.52	0.1033%	13,905	1,360	37.4	519,977.5				
N07	Other Uterus and Adnexal Procedures for Non-Malignancy			0.88	0.3994%	8,116	794	144.6	1,173,674.3				
N08	Endoscopic and Laparoscopic Procedures, Female Reproductive System			0.95	0.1769%	8,711	852	64.0	557,872.0				
N09	Other Vagina, Cervix and Vulva Procedures			0.60	0.3019%	5,549	543	109.3	606,530.1				
N10	Diagnostic Curettage and Diagnostic Hysteroscopy			0.50	0.3427%	4,613	451	124.1	572,401.7				
N11	Other Female Reproductive System DR Procedures			0.66	0.0481%	6,053	592	17.4	105,357.6				
N12	Uterus and Adnexal Procedures for Malignancy			2.92	0.0442%	26,780	2,620	16.0	428,191.6				
N60	Female Reproductive System Malignancy			1.44	0.0302%	13,232	1,295	11.0	144,916.9				
N61	Female Reproductive System Infections			0.66	0.0677%	6,031	590	24.5	147,915.3				
N62	Menstrual and Other Female Reproductive System Disorders			0.38	0.3636%	3,444	337	131.7	453,388.4				
O01	Caesarean Delivery			2.20	1.1758%	20,144	1,971	425.8	8,576,555.7				
O02	Vaginal Delivery W/DR Procedures			1.87	0.1240%	17,141	1,677	44.9	769,500.2				
O03	Ectopic Pregnancy			1.25	0.0623%	11,434	1,119	22.6	257,908.3				
O04	Postpartum and Post Abortion W/DR Procedures			1.30	0.0301%	11,949	1,169	10.9	130,226.5				
O05	Abortion W/DR Procedures			0.54	0.4049%	4,932	483	146.6	723,149.5				
O60	Vaginal Delivery			1.08	2.6913%	9,937	972	974.5	9,683,803.5				
O61	Postpartum and Post Abortion W/O DR Procedures			0.72	0.2488%	6,635	649	90.1	597,814.0				
O63	Abortion W/O DR Procedures			0.36	0.1220%	3,296	322	44.2	145,581.0				
O66	Antenatal and Other Obstetric Admissions			0.36	1.6548%	3,266	320	599.2	1,957,064.2				
	ALL CASES			1.00	100.0000%	9,173		36,210	332,145,002				

ADRG	Description	NHCCD	Acute	Costs	Weights	Actual	AR-DRG	V8	NORMS		SIMULATION #2 FOR 3 HOSPITAL SAMPLE			
									Cost	case vol distribution	BASE ARIF	0.09784	ALL Projection	SIMULATED
									Weight	%	BWP	US\$	admissions	PAYMENT
	https://www.accd.net.au/Downloads.aspx													
	ALL CASES								1.00	100.0000%	9,173		36,210	332,145,002
P01	Neonate, Wt >= 2500g, Significant DR Procedure, Vent >= 96hrs, Died or Transferred to Acute Facility < 5 Days								2.06	0.0045%	18,889	1,848	1.6	30,666.9
P02	Cardiothoracic and Vascular Procedures for Neonates								27.78	0.0040%	254,859	24,934	1.4	367,984.6
P03	Neonate, Wt 1000-1499g, Significant DR Procedure, Ventilation >= 96hours								19.99	0.0160%	183,384	17,941	5.8	1,062,796.9
P04	Neonate, Wt 1500-1999g, Significant DR Procedure, Ventilation >= 96hours								13.72	0.0091%	125,884	12,316	3.3	415,453.5
P05	Neonate, Wt 2000-2499g, Significant DR Procedure, Ventilation >= 96hours								12.43	0.0060%	114,056	11,159	2.2	246,645.8
P06	Neonate, Wt >= 2500g, Significant DR Procedure, Ventilation >= 96hours								10.01	0.0213%	91,849	8,986	7.7	708,931.9
P07	Neonate, Wt < 750g, Significant DR Procedure								57.24	0.0007%	525,036	51,367	0.2	125,765.8
P08	Neonate, Wt 750-999g, Significant DR Procedure								39.82	0.0005%	365,310	35,740	0.2	60,767.6
P60	Neonate, Wt < 750g, Significant DR Procedure								0.79	0.0862%	7,266	711	31.2	226,751.6
P61	Neonate, Wt 750-999g, Significant DR Procedure								36.23	0.0044%	332,389	32,519	1.6	530,796.6
P62	Neonate, Wt 750-999g, Significant DR Procedure								29.24	0.0087%	268,264	26,246	3.1	842,510.3
P63	Neonate, Wt 1000-1249g, Significant DR Procedure, Ventilation >= 96hours								7.94	0.0049%	72,807	7,123	1.8	128,378.5
P64	Neonate, Wt 1250-1499g, Significant DR Procedure, Ventilation >= 96hours								7.94	0.0118%	72,850	7,127	4.3	311,195.8
P65	Neonate, Wt 1500-1999g, Significant DR Procedure, Ventilation >= 96hours								5.54	0.0694%	50,799	4,970	25.1	1,275,983.6
P66	Neonate, Wt 2000-2499g, Significant DR Procedure, Ventilation >= 96hours								2.82	0.1538%	25,903	2,534	55.7	1,442,445.6
P67	Neonate, Wt >= 2500g, Significant DR Proc/Vent >= 96hrs, < 37 Completed Wks Gest								2.38	0.0960%	21,799	2,133	34.7	757,444.3
P68	Neonate, Wt >= 2500g, Significant DR Proc/Vent >= 96hrs, < 37 Completed Wks Gest								1.14	0.6922%	10,462	1,024	250.7	2,622,481.5
Q01	Splenectomy								4.60	0.0042%	42,163	4,125	1.5	63,963.5
Q02	Blood and Immune System Disorders, With DR Procedures								2.07	0.0420%	18,974	1,856	15.2	288,350.7
Q60	Reticuloendothelial and Immunity Disorders								0.82	0.5762%	7,488	733	208.6	1,562,318.9
Q61	Red Blood Cell Disorders								0.46	1.2471%	4,237	415	451.6	1,913,254.6
Q62	Coagulation Disorders								0.82	0.1579%	7,485	732	57.2	427,911.7
R01	Lymphoma and Leukaemia, Major DR Procedures								6.55	0.0121%	60,106	5,880	4.4	263,154.6
R02	Other Neoplastic Disorders, Major DR Procedures								3.70	0.0300%	33,928	3,319	10.8	367,974.1
R03	Lymphoma and Leukaemia, With DR Procedures								3.37	0.0378%	30,937	3,027	13.7	423,017.0
R04	Other Neoplastic Disorders, With DR Procedures								1.58	0.0340%	14,494	1,418	12.3	178,611.8
R60	Acute Leukaemia								2.38	0.2106%	21,788	2,132	76.3	1,661,422.5
R61	Lymphoma and Non-Acute Leukaemia								1.00	0.5713%	9,183	898	206.9	1,899,522.3
R62	Other Neoplastic Disorders								1.14	0.0643%	10,490	1,026	23.3	244,373.5
R63	Chemotherapy								0.33	3.4202%	2,988	292	1,238.5	3,700,858.8
S65	Human Immunodeficiency Virus								2.90	0.0221%	26,632	2,606	8.0	212,822.2
T01	Infectious and Parasitic Diseases, With DR Procedures								5.37	0.0979%	49,302	4,823	35.5	1,748,162.7
T40	Infectious and Parasitic Diseases, Ventilator Support								7.81	0.0073%	71,624	7,007	2.6	189,200.5
T60	Septicaemia								2.39	0.4483%	21,911	2,144	162.3	3,557,195.8
T61	Postoperative and Post-Traumatic Infections								1.11	0.1647%	10,197	998	59.7	608,264.0
T62	Fever of Unknown Origin								0.92	0.2177%	8,447	826	78.8	665,948.4
T63	Viral Infections								0.67	0.4007%	5,240	513	145.1	760,312.1
T64	Other Infectious and Parasitic Diseases								2.31	0.0850%	21,183	2,072	30.8	651,595.5
U40	Mental Health Treatment, I/ECT, Same day								0.17	0.2300%	1,600	157	83.3	133,312.1
U60	Mental Health Treatment, I/ECT, Same day								0.20	0.3809%	1,790	175	137.9	246,920.0
U61	Schizophrenia Disorders								4.83	0.4863%	44,274	4,332	176.1	7,795,776.9
U62	Paranoia and Acute Psychotic Disorders								3.19	0.1124%	29,276	2,864	40.7	1,191,770.8
U63	Major Affective Disorders								3.84	0.3816%	35,241	3,448	138.2	4,869,342.6
U64	Other Affective and Somatoform Disorders								1.84	0.1575%	16,899	1,653	57.0	963,864.1
U65	Anxiety Disorders								1.61	0.1057%	14,772	1,445	38.3	565,167.5
U66	Eating and Obsessive-Compulsive Disorders								5.42	0.0527%	49,722	4,865	19.1	949,516.8
U67	Personality Disorders and Acute Reactions								1.68	0.3732%	15,453	1,512	135.1	2,088,415.7
U68	Childhood Mental Disorders								3.03	0.0142%	27,775	2,717	5.1	142,485.8
V60	Alcohol Intoxication and Withdrawal								0.85	0.1857%	7,821	765	67.2	525,943.8
V61	Drug Intoxication and Withdrawal								1.91	0.1990%	17,513	1,713	72.1	1,261,864.2
V62	Alcohol Use and Dependence								1.57	0.0936%	14,425	1,411	33.9	489,018.2
V63	Opioid Use and Dependence								1.27	0.0159%	11,623	1,137	5.8	67,052.8
V64	Other Drug Use and Dependence								1.31	0.0562%	12,037	1,178	20.4	245,089.6
V65	Treatment for Alcohol Disorders, Same day								0.24	0.1474%	2,227	218	53.4	118,836.0
V66	Treatment for Drug Disorders, Same day								0.25	0.0530%	2,308	226	19.2	44,281.0
W01	Ventilation, Tracheostomy and Cranial Procedures for Multiple Significant Trauma								24.48	0.0180%	224,595	21,973	6.5	1,461,537.6
W02	Hip, Femur and Lower Limb Procedures for Multiple Significant Trauma								7.69	0.0166%	70,503	6,898	6.0	423,142.0
W03	Abdominal Procedures for Multiple Significant Trauma								6.66	0.0051%	61,114	5,979	1.8	111,826.8
W04	Multiple Significant Trauma, With DR Procedures								8.34	0.0134%	76,497	7,484	4.9	371,060.3
W60	Multiple Significant Trauma, Died or Transferred to Acute Facility < 5 Days								2.24	0.0117%	20,552	2,011	4.2	87,110.6
W61	Multiple Significant Trauma, With DR Procedures								3.03	0.0318%	27,838	2,724	11.5	320,821.8
X02	Microvascular Tissue Transfer and Skin Grafts for Injuries to Hand								1.43	0.0458%	13,158	1,287	16.6	218,434.1
X04	Other Procedures for Injuries to Lower Limb								1.45	0.0618%	13,323	1,303	22.4	298,046.7
X05	Other Procedures for Injuries to Hand								0.87	0.1488%	8,014	784	53.9	431,800.7
X06	Other Procedures for Other Injuries								1.89	0.2640%	14,601	1,428	95.6	1,395,596.3
X07	Skin Grafts for Injuries, Excluding Hand								3.64	0.0332%	33,399	3,268	12.0	401,799.1
X40	Injuries, Poisoning and Toxic Effects of Drugs, With Ventilator Support								4.58	0.0193%	42,042	4,113	7.0	294,006.3
X60	Injuries								0.55	1.0189%	5,042	493	368.9	1,860,089.4
X61	Allergic Reactions								0.33	0.1619%	3,056	299	58.6	179,084.0
X62	Poisoning/Toxic Effects of Drugs and Other Substances								0.84	0.7034%	7,682	752	254.7	1,956,619.3
X63	Sequelae of Treatment								0.83	0.3440%	7,638	747	124.5	951,327.3
X64	Other Injuries, Poisonings and Toxic Effects								0.66	0.1389%	6,034	590	50.3	303,514.4
	ALL CASES								1.00	100.0000%	9,173		36,210	332,145,002

ADRG	Description	NHCC Code	Acute Costs	Weights	Actual	AR-DRG	V8	NORMS		SIMULATION #2 FOR 3 HOSPITAL SAMPLE			
								Cost	case vol distribution	BASE ARIF	0.09784	ALL Projection	SIMULATED
								Weight	%	BWP	US\$	admissions	PAYMENT
	ALL CASES							1.00	100.0000%	9,173		36,210	332,145,002
Y01	Ventilation or Tracheostomy for Burns or OR Procedure for Severe Full Thickness Burns							41.08	0.0021%	376,840	36,868	0.8	285,846.3
Y02	Skin Grafts for Other Burns							3.31	0.0476%	30,363	2,971	17.2	523,062.7
Y03	Other OR Procedures for Other Burns							1.57	0.0215%	14,432	1,412	7.8	112,547.0
Y60	Burns, Transferred to Acute Facility 3-5 Days							0.56	0.0087%	5,150	504	3.2	16,276.4
Y61	Severe Burns							1.43	0.0082%	13,145	1,286	3.0	38,923.1
Y62	Other Burns							0.80	0.0530%	7,309	715	19.2	140,347.5
Z01	Other Contacts with Health Services with OR Procedures							0.95	0.0844%	8,743	855	30.6	267,323.3
Z40	Other Contacts with Health Services with Endoscopy, Same day							0.26	0.7682%	2,367	232	278.2	658,443.2
Z60	Rehabilitation							0.00	0.0000%	0	0	0.0	0.0
Z61	Signs and Symptoms							0.72	0.3046%	6,599	646	110.3	727,765.3
Z63	Other Follow Up After Surgery or Medical Care							1.38	0.1697%	12,683	1,241	61.4	779,344.3
Z64	Other Factors Influencing Health Status							0.40	1.1845%	3,665	359	428.9	1,572,077.7
Z65	Congenital Anomalies and Problems Arising from Neonatal Period							0.86	0.0054%	7,930	776	2.0	15,618.0
Z66	Sleep Disorders							0.47	0.0327%	4,300	421	11.8	50,903.3
801	OR Procedures Unrelated to Principal Diagnosis							3.60	0.0953%	33,025	3,231	34.5	1,139,598.6
960	Ungroupable							1.69	0.0054%	15,513	1,518	1.9	30,140.6
961	Unacceptable Principal Diagnosis							0.65	0.0002%	5,933	580	0.1	434.3
963	Neonatal Diagnosis Not Consistent with Age/Weight							1.05	0.0000%	9,628	942	0.0	64.1
	ALL CASES							1.00	100.0000%	9,173		36,210	332,145,002



BOLD THINKERS DRIVING
REAL-WORLD IMPACT