Endline Study for Queen 'Mamohato Hospital Public Private Partnership (PPP)

Final Report

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Abbreviations

ALOS	Average Length of Stay
ART	Antiretroviral therapy
ARV	Antiretroviral
ATLS	Advanced Trauma Life Support
BLS	Basic life support
BU	Boston University
CGHD	Center for Global Health and Development
COHSASA	Council for Health Service Accreditation of South Africa
CPT	Current Procedural Terminology
CTG	Cardiotocography
DBSA	Development Bank of South Africa
GoL	Government of Lesotho
GPOBA	Global Partnership for Output Based Aid
ICD	International Statistical Classification of Diseases and Related Health Problems
ICR	Implementation Completion Report
ICU	Intensive Care Unit
IFC	International Finance Corporation
IM	Independent Monitor
IV	Intravenous
LeBoHA	Lesotho Boston Health Alliance
LOR	Lesotho Obstetric Record
LOS	Length of Stay
MDR	Multi-drug resistant
MOH	Ministry of Health
MSW	Ministry of Social Welfare
NDSO	National Drug Service Organization
NICU	Neonatal Intensive Care Unit
OBA	Output Based Aid
OPD	Outpatient Department
PEP	Post-Exposure Prophylaxis
PMI	Patient Medical Index
PMTCT	Preventing Mother to Child Transmission
PPP	Public Private Partnership
QI	Quality Improvement
QE II	Queen Elizabeth II Hospital
QMMH	Queen ‘Mamohato Memorial Hospital
RN	Registered Nurse
rtPA	recombinant tissue plasminogen activator
SAP	System Analysis and Program Development (hospital software system)
TAN	Trained Assistant Nurse
TAT	Turn Around Time
TB	Tuberculosis
TOR	Terms of Reference
VAT	Value Added Tax
WB	World Bank

Executive Summary

Background and Introduction

In 2006, the Government of Lesotho (GoL) adopted a major new public private partnership (PPP) approach in the health care sector. The PPP had two purposes: first, to replace the aging plant and equipment from Queen Elizabeth II (QEII), the 100-year old national referral hospital in Maseru and to extend and upgrade the network of urban filter clinics which, together with the hospital, provided publicly-funded health care services in the greater Maseru district, and referral services for the country. The PPP thus included construction of a new, 425-bed national referral hospital (Queen 'Mamohato Memorial Hospital, or QMMH), a gateway clinic adjacent to the hospital, and the refurbishment and re-equipment of three urban filter clinics: Qoaling, Mabote and Likotsi. The second purpose of the PPP was to engage the private sector in new ways to ensure that these new facilities functioned effectively as an integrated care network to provide more efficient, higher quality care and expanded access to services for the population. The partnership mechanism, including contracting out for building and operating the integrated network and the use of output based aid mechanisms, was designed to increase accountability for service delivery and quality of care while maintaining the government's important role as steward of the health sector and promulgator of national health policies and standards.

Through a competitive tender process, the GoL selected Tsepong, a consortium of Netcare, a private South African health care provider, and several Lesotho-owned businesses. The consortium was contracted to build, operate, manage, and deliver clinical and non-clinical services through this integrated network over the next 18 years. The project has an overall capital value of over $100 million.

The terms of the contract specify how capital expenditures and operating costs are financed. Capital expenditures (for the construction and equipping of the hospital and gateway, and the renovation of the three filter clinics) were jointly financed with public (38%) and private funds (62%). The government contributed 400 million Maloti (M), while private capital was largely funded through a loan of M800 million from the Development Bank of South Africa (DBSA). M4 million was equity capital investment by Tsepong.

Funding for Tsepong to repay the DBSA loan and to finance annual operating expenses of the integrated network of facilities—including staffing, medicine, general expenses, preventive maintenance, ambulances, and management services—is bundled into a single unitary payment which the government pays to Tsepong each year. The unitary payment (UP) is calculated based on the estimated cost to provide services to up to 310,000 outpatients and 20,000 inpatients per year. At volumes above this ceiling, Tsepong is entitled to incremental payment per patient, according to negotiated rates. Certain services are excluded from the PPP contract, including chemotherapy and radiotherapy.

The renovated filter clinics began to see patients in May 2010, and the hospital opened on October 1, 2011. The Global Partnership on Output-Based Aid (GPOBA) provided a grant of $6.25 million, administered by the World Bank, to cover operating expenses during the interim period when the filter clinics had opened but the hospital was not yet open (May 2010-October 2011). In addition to "bridge" financing, GPOBA provided the expertise and direction in how to incorporate output based aid (OBA) principles into the monitoring and evaluation of project effectiveness. Such monitoring is crucial to the sustainability of the project.

Baseline and Endline

In preparing for the PPP, the International Finance Corporation (IFC) served as "transaction advisor," an independent advisor engaged by the government to provide advisory services such as feasibility studies, tender issuance support and financial and commercial expertise. The IFC drew on the Lesotho Boston Health Alliance (LeBoHA) as technical advisors. LeBoHA researchers collected detailed baseline indicators on the situation at QEII and the filter clinics, including indicators of access to services, utilization, clinical quality of care, referrals, patient satisfaction, and health outcomes. LeBoHA also conducted a larger baseline study of district hospitals throughout the country. The baseline indicators were useful in designing OBA "outputs," the project's key monitoring tool.

The baseline study included a clinical care assessment, laboratory assessment, and individual studies on the topics of patient origin, casualty flow, cost analysis, referral patterns and practices, and patient and employee satisfaction. Through the assessments, the research team collected 74 indicators in the area of strategic policy, hospital-wide indicators, utilization and quality, critical support services, infection control, and service specific indicators for casualty, surgery, medicine, pediatrics, and obstetrics. Summarizing their findings, the authors of the baseline study noted that:

> QEII is an old and tired facility. The infrastructure is in disrepair and cannot, economically, be remedied. The Government management systems lack the flexibility and responsiveness required by an enterprise of the size and complexity of QEII. Although there have been transient improvements from time to time, the hospital suffers from staff shortages, equipment problems, and maintenance difficulties. Given this constellation of circumstances, it is not surprising that staff morale and patient care have suffered. [1]

The report noted that QEII saw very sick patients: 12% of patient admitted died, and of these 35% died within 24 hours of admission. The baseline study documented numerous deficiencies in services, standard operating procedures, and recordkeeping attributable to factors including inadequate numbers of staff, inadequate supervision and in-service training, and maintenance and supply issues stemming from management challenges and a general lack of accountability for personal performance.

The purpose of the baseline data was to support monitoring and evaluation. First, the data have helped inform the choice of indicators for monitoring Tsepong's performance under the PPP. An independent monitor has been engaged to support the GoL for this purpose. Secondly, the baseline data form a point of comparison against which one can assess changes in operation under the PPP strategy. Baseline data are thus compared to equivalent indicators collected at "endline" —indicators of access, quality, and outcomes achieved through the operation of the PPP integrated network of QMMH, gateway, and the three filter clinics.

In the case of this study, baseline data cover fiscal year 2007 (April 2006 – March 2007), and endline data cover calendar year 2012 (January – December 2012).

[1] Bicknell WJ, Berman J, Babich L, Jack B. (2009) *Queen Elizabeth II and the New PPP Hospital: Baseline Study. A Two Volume Report. Final Report March 12, 2009*. Boston: Boston University and the Lesotho-Boston Health Alliance, Vol I, p. 20.

Study Purpose

Between February and May 2013, Boston University's Center for Global Health and Development (CGHD) and LeBoHA, conducted a study of Queen 'Mamohato Memorial Hospital, gateway clinic, and the three urban filter clinics included in the PPP. We will refer to this as the QMMH Integrated Network, or QMMH-IN. Data were collected at the end of the initial implementation phase of the PPP, 17 months after the hospital had started operation and two years after the filter clinics were opened. The endline data collected were compared to baseline data from QE II and the filter clinics (QEII-IN).

The objectives of the evaluation are:

1. To describe the endline situation of the QMMH-IN using both quantitative indicators and narrative description;
2. To compare the endline situation to the baseline, using indicators and descriptive information collected during the baseline study;
3. To highlight areas where the endline situation has changed from baseline, and to offer explanations for these changes, i.e. performance drivers, challenges;
4. To identify possible unmet needs or areas for improvement;
5. To provide quantitative and qualitative input to the Implementation Completion Report.

An important part of the evaluation was to gain a qualitative evaluation of Output-Based Aid principles/drivers and their contribution to current performance and changes since baseline, and to formulate lessons learned. This includes observations related to cost-efficiency and effectiveness (service costs, out of pocket expenditures made by patients), socio-economic equity in utilization, and aspects of the OBA model including management, risk transfer, incentive frameworks, accountability and sustainability.

Comparisons are made between QEII-IN and QMMH-IN where filter clinic data are relevant. For example, filter clinics have maternity beds and perform vaginal deliveries, so the maternity death rate has been adjusted to include filter clinic data. However, many indicators relate to inpatient hospital data only, such as QMMH average length of stay by ward and neonatal survival by birth weight. We have tried to make it clear in the text where we are referring to the integrated network as a whole versus the hospital only. In the design of the output based aid model, filter clinic operations were always considered.

The study period is rather early in the life of the PPP's operational phase. New hospitals will often take more than six months for their operations to stabilize, and PPPs of this scale also routinely suffer from start-up problems as gaps in the specification of services or contract terms are identified. This should be considered when interpreting the findings. It may be helpful to replicate this study and collect additional indicators once the hospital has achieved full staffing complement (including all specialist doctors) and has stable computerized information systems.

Methods

The mixed methods study used quantitative and qualitative data collection. Our study was not as extensive as the baseline and did not include components such as the referral or patient origin studies, staff satisfaction survey, or cost study. We reviewed administrative and clinical record data, directly observed facilities and activities, and conducted 41 key informant interviews with Tsepong staff, Ministry of Health (MOH) personnel, and others. Based on these data we calculated 24 quantitative and 14 qualitative indicators of performance.

Boston University Medical Campus and the MOH provided institutional research approval. Data collection, observation and key interviews were conducted from February to April 2013. Data from the interviews were used to document key management systems, and to explore perceptions of changes since baseline, factors affecting performance, and challenges. We also asked informants questions pertaining to principles of Output Based Aid, including how people perceive cost efficiency / effectiveness, equity of access, ways in which the facilities are incentivized to serve the poor, and the verification/monitoring system.

Findings

Queen 'Mamohato Memorial Hospital (QMMH) has 390 acute care beds. Filter clinics have an additional 24 maternity beds. QMMH has 82% occupancy, and an average length of stay of 5.0 days, compared to Queen Elizabeth II which had 409 inpatient beds and about 8 filter clinic beds. QEII hospital had 61% occupancy (see note in table), and an average length of stay of 5.94 days. About 56 patients per day are seen in the QMMH Casualty Department, compared to 73 per day at QE II. Outpatient clinics on the grounds of QMMH (including Gateway clinic) see an average of 346 patients per day, compared to 265 per day for QE II.[2]

Comparison of Overall Statistics

	QMMH-IN	QEII-IN	% Diff
Hospital beds	390	409	-5%
Filter clinic beds	24	8	200%
Total beds	414	417	-1%
Inpatient admissions (hospital)	23,341	15,465	51%
Inpatient Days (hospital)	116,648	91,808	27%
Outpatient Visits (incl. filter clinics)	374,669	165,584	126%
Deliveries (incl. filter clinics)	7,431	5,116	45%
Average length of stay (hospital)	5.00	5.94	-16%
Hospital occupancy	82%	61%	33%
Death Rate (incl. filter clinics)	7.1%	12.0%	-41%
Maternity death rate (incl filter clinics)	0.21%	0.24%	-10%
Pediatric pneumonia death rate (hospital)	11.9%	34.4%	-65%
Still birth rate (hospital)	3.1%	4.0%	-22%
Survival of very low birth weight infants (<=1,500 gr)	69.8%	NA	NA
C-section rate (incl. filter clinics)	26.8%	7.2%	272%
Patient satisfaction rate (incl. filter clinics)	86%	70.7%	22%

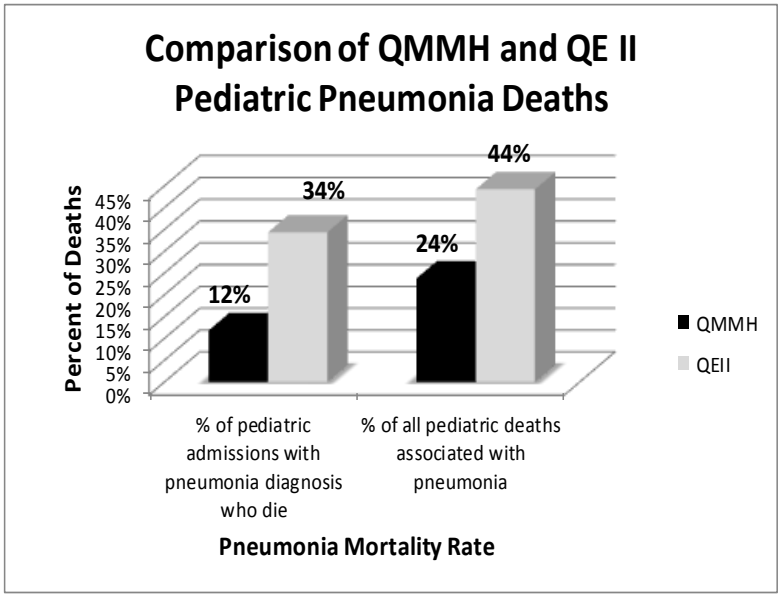
Notes: See main text for detailed definitions. Beds: 10 Casualty beds are included for QMMH because the hospital admits patients to these beds temporarily while awaiting admission to another ward. They are included in calculation of hospital occupancy. Casualty beds were not counted for QEII. Filter clinic beds are only for deliveries. At baseline, Qoaling filter clinic had beds, but the number is not recorded in the baseline study. We assumed it is same as current beds, i.e. 8 beds. Occupancy: Other data sources put baseline at 82%, in which case QMMH is equal to baseline. Survival of very low birth weight infants: QE II data not available. We assume that QEII-IN data on deliveries included 345 deliveries at Qoaling filter clinic. Overall death rate and maternity death rate include maternity inpatients at filter clinics. Methods to measure patient satisfaction vary substantially between baseline and endline, as explained in text.

New and improved services at QMMH-IN compared to QE II-IN include: 10-bed Intensive Care Unit (ICU) and 8-bed Neonatal Intensive Care Unit (NICU);[3] additional labor rooms for maternity patients;

[2] Bicknell, Berman, Babich et al. 2009, Vol I, p. 9.
[3] In 2013, three additional NICU incubators were added to handle demand.

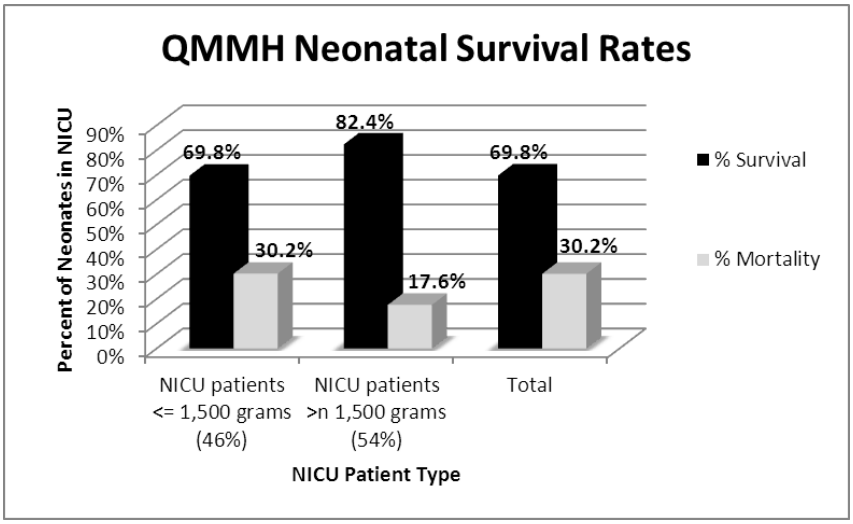
additional operating theatre capacity; greater access to pharmacy and laboratory services 24/7; improved facilities at bed-side such as oxygen hook up, automatic suction, emergency alarm; additional and improved diagnostic equipment including MRI and computerized tomography (CT); and emergency power available 24/7. Additional changes which distinguish QMMH from QE II and promote more patient-centered, high quality care include patient-friendly signage, handicapped access throughout the hospital, on-call rooms for doctors, and state-of-the-art training and conference facilities.

QMMH-IN delivered significantly more services and services of higher quality in 2012 than at baseline. The number of admissions increased 51%, outpatient visits more than doubled, and the hospital and filter clinics assisted 45% more deliveries compared to baseline. Average length of stay (ALOS) for an inpatient admission was 16% lower than at QE II indicating higher efficiency and throughput of patients. This effect may even be larger if we take into account the overall higher mortality at QE II which is likely to have distorted ALOS if patients died rather than being discharged home after they had improved through treatment.



The explosive growth in filter clinic visits may be related to the growth in antiretroviral treatment for HIV/AIDS and increased availability of drugs. We found a decrease in patients accessing care through Casualty at QMMH compared to QE II, suggesting that the filter clinics and Gateway are providing care to patients who otherwise would have inappropriately accessed care through Casualty. In light of the very large increases in overall outpatients seen, this suggests that those patients seeking care at QMMH Casualty are appropriate patients for Casualty services.

QMMH-IN achieved impressive patient outcomes: a 41% reduction in the overall death rate, a 65% reduction in pediatric pneumonia death rate (see Figure), and a 22% decline in the rate of stillbirths compared to baseline. Maternal deaths are 10% lower than at QEII. If QE II could have performed as well as QMMH, an additional 683 lives per year would have been saved. In addition, at QMMH-IN, 29% of deaths occurred in 24 hours of admission compared to 35% at QE II, suggesting much better casualty service and prompt lab tests and access to surgery.



Death within 24 hours of admission has fallen in every ward from QE II levels.

The hospital also had a high survival rate for very low birth weight babies: 70% of these infants survived, whereas without a neonatal intensive care unit (as was the case in QE II) virtually all babies weighing less than 1.5 kilos would likely have died. Patient satisfaction at QMMH-IN was also higher compared to QE II.

QMMH-IN was able to achieve these outcomes by improving management and clinical systems. Systems are largely compliant with MOH policies and protocols, including infection control, clinical treatment protocols (e.g. Preventing Maternal to Child Transmission (PMTCT), newborn treatment, etc.), medical recordkeeping, and the availability of emergency equipment. Clinicians are better able to treat patients and comply with protocols because of a well-functioning pharmacy system which has reduced drug stock outs and theft, and a laboratory system which provides most test results within an hour of ordering. Waiting time for elective surgery has been significantly reduced. Support systems keep the hospital clean and equipment functioning at all times, and key informants consistently mentioned the existence and implementation of hospital-level policies and guidelines that strengthen hospital operations by outlining and setting standards, and requiring discipline and accountability. The hospital is undergoing accreditation by COHSASA, to be completed in the last quarter of calendar year 2013.

Key informant interviews highlighted some of main differences between QMMH-IN and QEII-IN, and what they perceived as the reasons for those differences. These include cleanliness, better maintenance, more equipment, efficient management systems, the growth of a data-based decision-making culture, and staff training for improved clinical care. Informants also noted that hospital-specific policies and procedures are clearly defined, there is a greater focus on patient satisfaction, and managers enforce the rules. This has resulted in people no longer having time or the ability to "run a side business" as they sometimes did while working at QEII. Staff are held more accountable, and supervisors are supported for enforcing discipline. This helps to deter shirking and abuse of power.

People interviewed pointed to increased opportunities for training and staff development, increased job responsibilities and authority, and better working conditions as motivating factors. Staff appreciated receiving orientation when promoted, and having assessment tests to determine areas where skills needed reinforcement. In terms of working conditions, staff noted that staff are compensated for times when they are required to work longer than normal hours, and that policies related to night shifts and on call are more reasonable and fair. Staff satisfaction has increased because now staff can "actually help patients"—they have the equipment and management support to really do the jobs they are trained to do.

The PPP hospital requires greater MOH resources to operate than QEII, in part due to the inclusion of the cost of capital repayment (DBSA loan), the need to include value added tax (VAT) in the unitary payment (although VAT will ultimately be returned to the government, so it is net-zero cost), and additional services offered (e.g. an additional filter clinic (Gateway), Intensive Care Unit, and Neonatal Intensive Care Unit). Payments to the PPP hospital in 2012 were 427.6 million Maloti, or 37.2% of the MOH budget. If we include the estimated cost of services provided over the contracted demand ceiling, the expected payment rises to 473.3 million Maloti or 41.2% of MOH budget. By contrast, QE II expenditures accounted for 38.5% of the MOH budget at baseline, and less in later years as the MOH budget increased in real terms. The MOH is getting much better quality of care and patient outcomes through the PPP, albeit at a greater cost. If we exclude costs not included in the baseline

hospital expenditure figure (VAT and corporate taxes, amortization of buildings and equipment), the expenditure on QMMH-IN is 303.9 M., or 27.7% of total MOH expenditures.

While most performance indicators were impressive, some improvements can be made. For example, we noted that although 84% of patients were triaged within 5 minutes of arrival in Casualty on average, some patients were triaged by a Nursing Assistant rather than a Registered Nurse, and the triage system did not work as well during shift changes, suggesting a need for further staff training, patient information, and process analysis. Lab turn-around times, while good on average, showed variability at the individual test level. The hospital C-section rate varied throughout the time period evaluated and should be examined more closely. Waiting times at filter clinics are reported to be long and a cause of patient frustration, while time to surgery for some procedures (such as femur fracture) may be unduly long because of delays in patient preparation and testing. We are confident that the hospital has the management information systems and staff in place to diagnose and analyze problems like these, and is committed to continuous improvement of operations to promote higher quality of care.

Recommendations

The endline data show substantial improvements in clinical quality, use, and patient satisfaction compared to baseline. Yet, there appears to be lack of understanding about the overall PPP hospital among stakeholders and the general public. For example, some people seem to believe that QMMH is a "private hospital" rather than a public private partnership. Others seem to believe that quality of care, patient experience, and outcomes at QMMH-IN are not much different from baseline. These beliefs are unfounded and need to be dispelled.

Our recommendations suggest areas for improvement in the PPP strategy and the operation of the integrated network in Maseru. Some of the recommendations are specific to the hospital system (e.g. actions to increase clinical quality), while others are meant to help improve monitoring and oversight of the partnership and to inform GoL/MOH policy development for the future.

Transparency and Public Information

1. Public support for the PPP going forward will depend on increased **transparency and access to information** about the improvements in quality of care and patient outcomes at QMMH-IN compared to baseline. Findings of this report should be disseminated at MOH staff meetings, donor coordination events, and to the public. In addition, Tsepong and the MOH should enhance public information to correct possible misunderstanding about the role of QMMH in providing ART and TB treatment services.
2. The World Bank should consider supporting the development of a **detailed case study** on the pharmacy management system for other countries struggling with drug theft, wastage, and inefficiency. A second management case study on changes to bring discipline to personnel management also would be of interest.

Clinical Quality Improvement

3. Steps should be taken to continue to improve **triage timeliness** and quality. The hospital should measure bottlenecks to being seen by a physician, especially for P1 Casualty patients.
4. The Hospital should continue to invest in training and staffing needed to improve the consistency and **accuracy of medical coding**, especially in light of the data driven nature of hospital decision-making and its reporting requirements.

5. Several analyses could provide information useful for **quality improvement and efficiency**. MOH and QMMH-IN should track discharged patients and hospital readmissions to determine if patients are using recommended services and to examine causes for readmissions. As medical records coding improves, the hospital should measure patient acuity to better understand mortality trends. Increased analysis of mortality events may also be helpful. Finally, the hospital should isolate the effect on LOS from mothers who stay in the hospital because their infants are admitted to NICU.
6. To better understand trends in C-section rates, indications for C-sections and morbidity/mortality post C-section should be measured and tracked over time as coding of medical records improves.

Evaluating Access and Patient Satisfaction

7. Access and use of services at the QMMH-IN is high. At the same time, a more refined study, including a **household survey**, is needed to assess whether use of clinics varies by income level or patient origin, and whether the very poor are choosing not to seek care at the hospital due to financial or distance barriers. This information is important to evaluate whether additional initiatives should be added (above and beyond the PPP) to assure access to care for all Basotho.
8. The MOH and hospital should consider surveying **patient satisfaction after discharge**, and collecting patients' age, gender, education level and general health to allow analysis to control for these patient characteristics. The Joint Services Committee should consider whether it might be useful to periodically conduct an independent evaluation of patient satisfaction.

Integrated Network Planning

9. The MOH and QMMH-IN should closely track **trends in the use of ambulatory services**, especially at the filter clinics, and develop better projection models to inform space planning and district-wide service delivery decisions.
10. The MOH should formalize the policy to allow QMMH to **initiate ART**, and should promulgate guidelines for the ongoing treatment of these patients. The MOH, together with the hospital, should develop measurable indicators and a timeline to help monitor progress toward full implementation of these guidelines. (See also recommendation #1, on keeping the public informed about the role of QMMH in ART and TB treatment.)

Referral System

11. Activities to **improve appropriate referrals** to QMMH and post-referral communication and accountability should be supported, including a referral letter to notify referring physicians of the outcomes of their patients or a courier system between QMMH and district hospitals.
12. **Trends in Bloemfontein referrals** should be monitored and discussed in light of hospital plans for and progress in recruitment of specialists. The Joint Services Committee should consider conducting an analysis of referral patterns to better inform health system planning for the future. In addition, rates of referral as a proportion of admissions or ambulatory visits should be analyzed to evaluate changes over time.
13. **Expenditures on Bloemfontein referrals** should be analyzed to quantify the burden on the health care system. This could inform decisions about whether some of the current excluded services should be brought into the PPP contract.

Monitoring, evaluation and the role of independent monitor

14. The Joint Services Committee should put in place a process for r**eviewing Independent Monitor reports** to assure accuracy of data. The MOH should engage in **deeper dialogue** with the IM investigators. They should work more closely together to interpret current indicators,

discuss follow up actions, and develop new indicators for the future. This should involve a detailed examination of the role of the OBA outputs.

15. This evaluation was conducted while QMMH-IN was still in a "startup" mode in some sense (i.e. not all specialists on board, not yet accredited). After the hospital has been operating for 2-3 years, another evaluation should be conducted to be able to draw more definitive conclusions on efficiency and effectiveness. At that time, **additional indicators** should be analyzed and compared to the baseline study, including waiting time, staff satisfaction, and clinical indicators which require review of medical records (complication rates, readmissions, time to C-section, etc.).

Sustainability

16. A **cost study** should be conducted to examine the full cost of services (i.e. inpatient day, outpatient visit) at QMMH, gateway, and filter clinics. The cost data could enable the MOH to assess efficiency and to make projections for other purposes, such as adding or expanding a service, or cost reduction planning.
17. As hospital clinical care operations become settled, Tsepong should turn its attention to expanding other mission-related functions such as **research and training**. In addition to contributing to Lesotho health system goals, these endeavors could bring in revenue to contribute to fixed costs.

1. INTRODUCTION

1.1 Background

In 2006, the Government of Lesotho (GoL) adopted a major new public private partnership (PPP) approach in the health care sector.[4] The PPP had two purposes: first, to replace the aging plant and equipment from Queen Elizabeth II (QEII), the 100-year old national referral hospital in Maseru, and to extend and upgrade the network of urban filter clinics which, together with the hospital, provided publicly-funded health care services in the greater Maseru district and referral services for the country. The PPP thus included construction of a new, 425-bed national referral hospital (Queen 'Mamohato Memorial Hospital, or QMMH), a gateway clinic adjacent to the hospital, and the refurbishment and re-equipment of three urban filter clinics: Qoaling, Mabote and Likotsi. The second purpose of the PPP was to engage the private sector in new ways to ensure that these new facilities functioned effectively as an integrated care network to provide more efficient, higher quality care and expanded access to services for the population.[5] The partnership mechanism, including contracting out for building and operating the integrated network and the use of output based aid mechanisms, was designed to increase accountability for service delivery and quality of care while maintaining the government's important role as steward of the health sector and promulgator of national health policies and standards.

Through a competitive tender process, the GoL selected Tsepong, a consortium led by Netcare Hospital Group, and which includes several Lesotho-owned businesses who are equity shareholders. The roles of these actors are described below. The consortium was contracted to build, operate, manage, and deliver clinical and non-clinical services through this integrated network over the next 18 years, as shown in Figure 1.1.

- ***Netcare Hospital Group***, a large South African healthcare company that operates healthcare facilities in South Africa, United Kingdom and the Middle East, provides expertise in hospital and clinical care management.

- ***D10 Investments***, the investment division of the Lesotho Chamber of Commerce, provides goods and services such as office facilities, vehicles, and food.

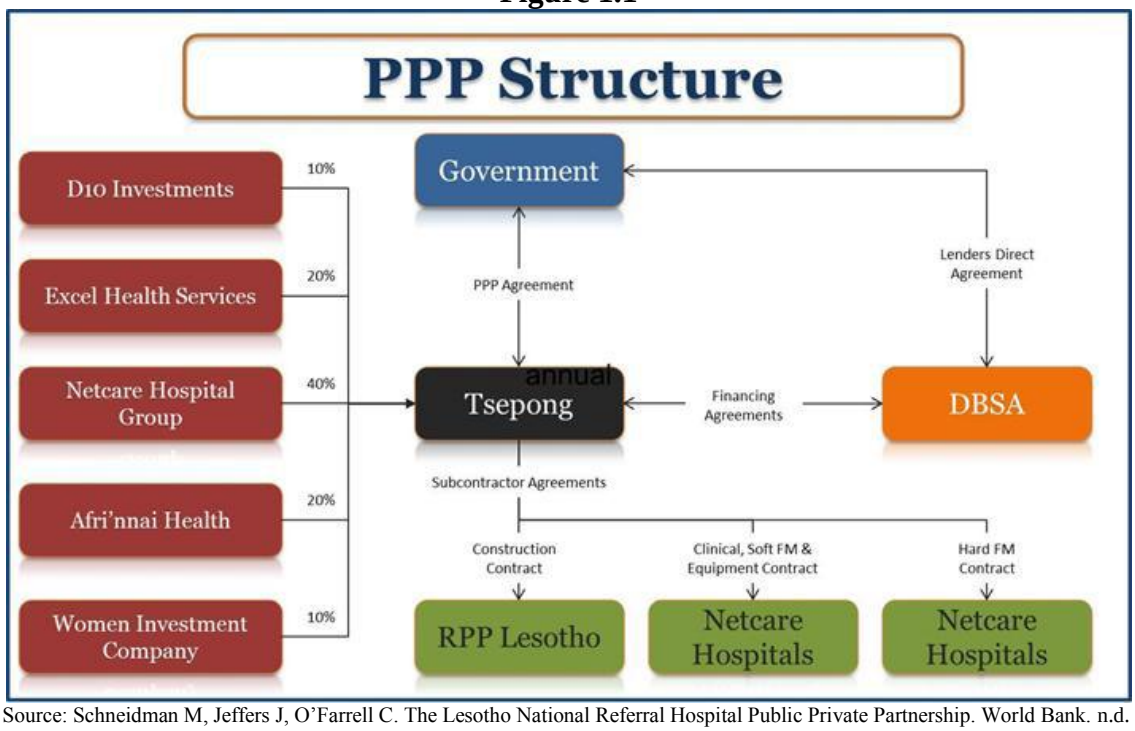
- ***Excel Health Services,*** an investor group of doctors and other health professionals based in Lesotho, provides physicians and other health professionals to the hospital.

- ***Afri'nnai,*** an investor group formed by doctors and medical specialists based in Bloemfontein, South Africa, provides specialized medical personnel.

- ***Women Investment Company***, a company of Basotho women established to encourage professional women to invest in profit-making ventures and to engage rural women in poverty reduction opportunities, provides ancillary services (e.g. laundry).

[4] Coelho CF, O'Farrell CC. (2009) Breaking New Ground: Lesotho Hospital Public-Private Partnership—A Model for Integrated Health Services Delivery. International Finance Corporation (IFC) SmartLessons. July.
[5] University of California San Francisco (UCSF) Global Health Group and PricewaterhouseCoopers (PwC). 2012. Health system innovation in Lesotho: the design and early operations of the Maseru Public Private Integrated Partnership. Healthcare public-private partnerships series, No. 1.

Figure 1.1



Source: Schneidman M, Jeffers J, O'Farrell C. The Lesotho National Referral Hospital Public Private Partnership. World Bank. n.d.

The project has an overall capital value of over $100 million. The terms of the contract specify how capital expenditures and operating costs are financed. Capital expenditures (for the construction and equipping of the hospital and gateway, and the renovation of the three filter clinics) were jointly financed with public (38%) and private funds (62%).[6] The government contributed 400 million Maloti (M), while private capital was largely funded through a loan of M800 million from the Development Bank of South Africa (DBSA). M4 million was equity capital investment by Tsepong.

Funding for Tsepong to repay capital investment (i.e. the DBSA loan) and to finance annual operating expenses of the integrated network of facilities—including staffing, medicine, general expenses, preventive maintenance, ambulances, and management services—is bundled into a single unitary payment which the government pays to Tsepong each year. The unitary payment (UP) is calculated based on the estimated cost to provide services to up to 310,000 outpatients and 20,000 inpatients per year. At volumes above this ceiling, Tsepong is entitled to incremental payment per patient, according to negotiated rates. Certain services are excluded from the PPP contract, including chemotherapy and radiotherapy. Background on the history and detail about the PPP contract is described in detail in other reports, especially a 2012 study by the University of California at San Francisco (UCSF) Global Health Group and PricewaterhouseCoopers (PwC). [7]

[6] University of California San Francisco (UCSF) Global Health Group and PricewaterhouseCoopers (PwC)., p. 24.
[7] In addition to references 4-5 above, see, for example, 'Lesotho: National Referral Hospital.' Success Stories: Infrastructure Advisory Services. IFC. June 2009; Marquez P, St. Antoine JD, and Yamashita-Allen K. 'Taking the pulse: the evolving health public-private partnership in Lesotho.' Blogs, The World Bank. March 5, 2012. http://blogs.worldbank.org/nasikiliza/taking-the-pulse-the-evolving-health-public-private -partnership-in-lesotho. Coelho CF and O'Farrell CC. 2011. The Lesotho hospital PPP experience: catalyst for integrated service delivery. *World Hospitals and Health Services*. 47(3):39-41.

The renovated filter clinics began to see patients in May 2010, and the hospital opened on October 1, 2011. The Global Partnership on Output-Based Aid (GPOBA) provided a grant of $6.25 million, administered by the World Bank, to cover operating expenses during the interim period when the filter clinics had opened but the hospital was not yet open (May 2010-October 2011). In addition to "bridge" financing, GPOBA provided the expertise and direction in how to incorporate output based aid (OBA) principles into the monitoring and evaluation of project effectiveness. Such monitoring is crucial to the sustainability of the project.

Baseline and Endline

In preparing for the PPP, the International Finance Corporation (IFC) served as "transaction advisor," an independent advisor engaged by the government to provide advisory services such as feasibility studies, tender issuance support and financial and commercial expertise. The IFC drew on the Lesotho Boston Health Alliance (LeBoHA) as technical advisors. LeBoHA researchers collected detailed baseline indicators on the situation at QEII and the filter clinics, including indicators of access to services, utilization, clinical quality of care, referrals, patient satisfaction, and health outcomes. LeBoHA also conducted a larger baseline study of district hospitals throughout the country. The baseline indicators were useful in designing OBA "outputs," the project's key monitoring tool.

The baseline study included a clinical care assessment, laboratory assessment, and individual studies on the topics of patient origin, casualty flow, cost analysis, referral patterns and practices, and patient and employee satisfaction. Through the assessments, the research team collected 74 indicators in the area of strategic policy, hospital-wide indicators, utilization and quality, critical support services, infection control, and service specific indicators for casualty, surgery, medicine, pediatrics, and obstetrics. Summarizing their findings, the authors of the baseline study noted that:

> QEII is an old and tired facility. The infrastructure is in disrepair and cannot, economically, be remedied. The Government management systems lack the flexibility and responsiveness required by an enterprise of the size and complexity of QEII. Although there have been transient improvements from time to time, the hospital suffers from staff shortages, equipment problems, and maintenance difficulties. Given this constellation of circumstances, it is not surprising that staff morale and patient care have suffered.[8]

The report noted that QEII saw very sick patients: 12% of patient admitted died, and of these 35% died within 24 hours of admission. The baseline study documented numerous deficiencies in services, standard operating procedures, and recordkeeping attributable to factors including inadequate numbers of staff, inadequate supervision and in-service training, and maintenance and supply issues stemming from management challenges and a general lack of accountability for personal performance.

The purpose of the baseline data was to support monitoring and evaluation. First, the data have helped inform the choice of indicators for monitoring Tsepong's performance under the PPP. An independent monitor has been engaged to support the GoL for this purpose. Secondly, the baseline data form a point of comparison against which one can assess changes in operation under the PPP strategy. Baseline data are thus compared to equivalent indicators collected at "endline" —indicators of access, quality, and outcomes achieved through the operation of the PPP integrated network of QMMH, gateway, and the three filter clinics.

[8] Bicknell, Berman , Babich, et al. (2009) Vol I, p. 20.

In the case of this study, baseline data cover fiscal year 2007 (April 2006 – March 2007), and endline data cover calendar year 2012 (January – December 2012).

1.2 Aim and Objectives

In February 2013, the World Bank engaged Boston University's Center for Global Health and Development (CGHD) and the Lesotho Boston Health Alliance (LeBoHA), to conduct a study of Queen 'Mamohato Memorial Hospital, gateway clinic, and the three urban filter clinics included in the PPP. We will refer to this as the QMMH Integrated Network, or QMMH-IN. Data were collected at the end of the initial implementation phase of the PPP ("endline"), 17 months after the hospital had started operation and two years after the filter clinics were opened. The endline data were compared to baseline data from QE II and the filter clinics (QEII-IN). The study builds on prior work conducted by Boston University to determine baseline indicators.

The objectives of the evaluation are:

1. To describe the endline situation of the QMMH-IN using both quantitative indicators and narrative description;
2. To compare the endline situation to the baseline, using indicators and descriptive information collected during the baseline study;
3. To highlight areas where the endline situation has changed from baseline, and to offer explanations for these changes, i.e. performance drivers, challenges;
4. To identify possible unmet needs or areas for improvement;
5. To provide quantitative and qualitative input to the Implementation Completion Report.

An important part of the evaluation was to gain a qualitative evaluation of Output-Based Aid principles/drivers and their contribution to current performance and changes since baseline, and to formulate lessons learned. This includes observations related to cost-efficiency and effectiveness (service costs, out of pocket expenditures made by patients), socio-economic equity in utilization, and aspects of the OBA model including management, risk transfer, incentive frameworks, accountability and sustainability.

The Terms of Reference (TOR) to this study are found in Annex A and discussed in the Inception Report.[9] The TOR also includes further information on the background of the study and the roles of involved agencies. The study was carried out from February 15 – May 31, 2013.

During the Inception Phase, several members of the study team traveled to Lesotho to interview key informants, finalize the indicators, and review data availability in order to develop a detailed evaluation design. We had a tour of Queen 'Mamohato Memorial Hospital and filter clinics. Based on the data collected, we developed a more detailed evaluation design.

[9] Vian TV, McIntosh N, Grabowski A. (2013) *Endline Study for Queen 'Mamohato Hospital Public Private Partnership (PPP): Inception Report*. Boston: Boston University Center for Global Health and Development, Department of Family Medicine, and the Lesotho-Boston Health Alliance.

2. METHODOLOGY

The mixed methods study used quantitative and qualitative data collection. Our study was not as extensive as the baseline and did not include components such as the referral or patient origin studies, staff satisfaction survey, or cost study. We reviewed administrative and clinical record data, directly observed facilities and activities, and conducted 41 key informant interviews with Tsepong staff, Ministry of Health (MOH) personnel, and others. Based on these data we calculated 24 quantitative and 14 qualitative indicators of performance. Boston University Medical Campus and the MOH provided institutional research approval.

2.1 Time Period for Analysis

The renovated filter clinics opened in May 2010, and QMMH hospital opened in October 2011. As it may have taken time for operations to stabilize, the endline indicators from QMMH-IN cover the one-year period from January 1 to December 31, 2012 and are compared to QEII-IN data from April 1, 2006 to March 31, 2007. Observation and key interviews were conducted from February to April 2013.

The study period is rather early in the life of the PPP's operational phase. New hospitals will often take more than six months for their operations to stabilize, and PPPs of this scale also routinely suffer from start-up problems as gaps in the specification of services or contract terms are identified. This should be considered when interpreting the findings. It may be helpful to replicate this study and collect additional indicators once the hospital has achieved full staffing complement (including all specialist doctors) and has stable computerized information systems, i.e. once hospital has been operating 2-3 years.

2.2 Quantitative Indicators

Table 2.1 lists the endline quantitative indicator definitions. For consistency, indicators retain their original alpha-numeric identification scheme from the baseline study where baseline data exists. The QMMH-IN electronic records system produces many different reports. We used Schedule 24 reports for outpatient data and Activity reports for inpatient data where data was collected through computerized records. Schedule 24 reports include inpatient data but the reports are admissions-based and do not count admissions or inpatient days in the same way that these indicators were measured in the QEII baseline report. Therefore, to make appropriate comparisons between QMMH and QEII we used data from Activity reports.[10] QMMH-IN, however, uses Schedule 24 report data for their reporting, so there may be slight differences in data presented in our study and data found in QMMH-IN reports. Details of the methodology for collecting and calculating these indicators are found in Annex B, and in the Inception Report.

We could not collect endline data on every indicator included in the baseline study due to budget and time constraints. Still, we wanted to be sure that endline indicators would represent many different

[10] In Schedule 24 reports data is collected based only on admissions for a particular month and the focus of the report is on admissions. In Activity reports data is made up of three components: 1. All patients who are final billed in a particular month (these patients could have been admitted in the month under review or in previous months); 2. All patients in progress (PIP) in the current month. These are patients who are still in hospital and have not been final billed. These patients could be admitted in the month under review or in previous months; and 3. All patients who were in progress (PIP) in the previous month. In Activity reports, components #1 and #2 are added, and component #3 is subtracted. Therefore, Activity report data includes patients final billed in the month under review (#1) plus patients in progress in the month under review (#2) minus patients who were in progress in previous month (#3).

aspects of performance, including capacity, quantity of services delivered, clinical quality, patient satisfaction, and outcomes. The final set of indicators was developed in consultation with key stakeholders from the MOH, Tsepong, and the World Bank.

Comparisons are made between QEII-IN and QMMH-IN where filter clinic data are relevant. For example, filter clinics have maternity beds and perform vaginal deliveries, so the maternity death rate has been adjusted to include filter clinic data. However, many indicators relate to inpatient hospital data only, such as QMMH average length of stay by ward and neonatal survival by birth weight. We have tried to make it clear in the text where we are referring to the integrated network as a whole versus the hospital only.

2.3 Qualitative Indicators

Table 2.2 lists the original qualitative indicator definitions. Additional indicators were added and are described in text (for example, an additional clinical quality indictor includes a description of the hospital accreditation process). We conducted 41 interviews with 36 key informants (some informants were interviewed more than once). This included 24 Tsepong staff (including hospital managers, clinical care providers, and filter clinic personnel), 8 Ministry of Health and Ministry of Social Welfare personnel, and 4 others (consultants, Tsepong sub-contractor personnel). See Annex C. Fifteen informants (42%) were male; 26 (72%) were Basotho.

Data from the interviews, observations, hospital tours, and hospital records and reports were used to document key management systems, and to explore perceptions of changes since baseline, factors affecting performance, and challenges of the PPP. We also asked informants questions pertaining to principles of Output Based Aid (OBA), including how people perceive cost efficiency / effectiveness, equity of access, ways in which the facilities are incentivized to serve the poor, and the verification/monitoring system. Sources of data for each qualitative indicator are found at the beginning of each section. See Annex A for the full list.

Table 2.1: Quantitative Indicators.

Domain	Variables	Indicators
Access and capacity		
SP1	MOHSW payments	Payment or budget as % of MOHSW spending
BD1	Total Operational Beds	Total beds, by ward, & maternity beds filter clinics
Quantity and use		
SP2	Inpatient Admissions and Inpatient Days	Total, by ward
UQ2	Average Length of Stay	Total, by ward
HW4	Percent Occupancy	Total, by ward
SP3	Ambulatory visits	Overall, % by location
CS18	ART for patients	Availability of ART drugs (24/7) for patients who are already on ART treatment
Clinical quality		
IC2	Handwashing stations (infection control)	Availability of effective handwashing stations
OB2	PMTCT	% of women admitted to labor ward with known HIV status who receive PMTCT
PD1	Newborns protocol-Vit K Injection, eye treatment	% of newborns who receive treatments
CS16	Medical Records availability	% discharged patients w/retrievable medical record
CS14	Medical Records accuracy and	Complete set of vital signs and physician's note
MS17	Availability of emergency equipment	Fully equiped crash carts; retrievable in 4 min.
CY1	Well functioning casualty triage system	% patients triaged by trained nurse w/in 5 min.
MD2	Availability of thrombolytics	thrombolytic drugs in stock
SG3	Rapid treatment of femur fractures	% of femur fractures operated on within 24 hours
PD4	Neonatal birthweight and survival	% survival of neonates <1,500 grams in the NICU
CS9	Lab test turnaround time	Time from test order to test results availability
RF1	Referrals to Bloemfontein	Adult and pediatric, oncology & non-oncology
Patient satisfaction		
PS1	Patient satisfaction	% satisfaction of patients, inpatient and outpatient
Outcomes		
UQ4	Deaths	Deaths as % of admissions ; % of all deaths within 24 hours, overall & by ward
UQ10	Deaths due to pneumonia in children	Number, % of pediatric deaths with pneumonia
UQ12	Stillbirths	% births which are still births, by type (fresh, macerated)
UQ13	Caesarian Sections	Number and % of all deliveries which are C-sections,and C-section rates by mother's HIV status

Table 2.2: Qualitative Indicators.

Domain	Variables	Indicators
Access and capacity		
	Services	Description of services offered at endline compared to baseline
	ART for patients[1]	Description of management and referral of patients who are known or suspected HIV+
	TB treatment	Description of management and referral of patients who are known or suspected TB infected
Clinical Quality		
	COHSASA accreditation	Description of accreditation system and progress
	Casualty triage[2]	Description of casualty triage process
Patient Satisfaction		
	Patient satisfaction[3]	Description of process of assessing patient satisfaction and use of results
Equity and Output Based Aid Principles		
	Perceptions of equity, monitoring, cost-efficiency[4]	Themes from qualitative interviews
Performance Drivers, Challenges		
	Perceptions of differences between QMMH and QEII, performance drivers, and challenges	Themes from qualitative interviews
Management Systems		
	Human resources	Description of systems for recruiting, training, compensating and supervising staff
	Equipment and facilities	Description of systems for procurement and maintenance of equipment and facilities; availability of emergency power
	Drug management	Description of systems for selecting, procuring, distributing and using medicines
	Patient registration and fee collection	Description of systems for registering patients, collecting fees, and managing medical records
	Data collection for maternity	Description of recordkeeping and reporting for maternity patients and reporting to MOH
	Referral system	Description of system for referrals to QMMH, from filter clinics & Districts, and from QMMH to Bloemfontein

[1]In report, this description is presented with quantitative indicator CS18, Section 3.2. [2]Description presented with quantitative indicator PS1, Section 3.4. [3]Description is presented with quantitative indicator CY1, Section 3.3. [4]Cost-efficiency is discussed with quantitative data presented as part of indictor SP1, Section 3.1.

3. FINDINGS: QUANTITATIVE INDICATORS

Quantitative indicators are grouped into 5 categories: Access and Capacity; Quantity and Use of Services; Clinical Quality of Care; Patient Satisfaction; and Outcomes. In each category, we define the indicator, describe the methodology for data collection and calculation, and present our findings. For some but not all indicators, we also include recommendations. These recommendations are also revisited at the end of the report.

OBA components are mostly evaluated qualitatively, in Section 4 of this report. However, analysis of indicators of cost-efficiency and cost-effectiveness—an important OBA principle—can be found in the first quantitative indicator (SP1) below, pages 23-24.

3.1 ACCESS AND CAPACITY

(SP1) MOHSW Payments

All payments per year to the operator of QMMH and the filter clinics (i.e. QMMH-IN), as a percentage of total MOHSW expenditures.

Methodology: This indicator assesses the impact of the PPP hospital on allocation of government health spending in Lesotho. The goal is to assess affordability from the viewpoint of the MOH as well as the GoL as a whole. The indicator helps us answer the questions: Is the amount of payments to the PPP hospital sufficient to operate a hospital and associated clinics of good quality? Is it affordable for the MOH and for the Government as a whole? And how are PPP payments affecting allocations in other parts of the health care system?

Payments to the operator of QMMH-IN (numerator) and the total MOHSW expenditures for the time period under analysis (denominator) were collected from the Ministry of Health. We reviewed actual invoices provided by the PPP Coordinator's office for all months except May, August, September, and December where data were provided by the Financial Controller. VAT (14% of payment amount) is based on an estimate from Netcare and MOH invoices. The invoices applied deductions for not meeting performance standards where applicable (months of Jan-Feb 2012). The invoices also included payment for variation orders (e.g. for staff accommodation), and a late payment penalty assessed by the Development Bank of Southern Africa (DBSA) in November 2012.

Payment totals recorded by the MOH did not include additional payments for services over the maximum contracted amount (referred to as "excess demand"), as these amounts had not been billed at the time of our analysis. Since this is an expense which will have to be paid in the future--Tsepong intends to begin charging for excess activity in financial year 2013/2014)[11]--we estimated the likely amount of the additional payments to include in our analysis. It should be noted that Tsepong raised a dispute with the GoL in June 2011 which is still unresolved. Extra services activity forms part of the dispute, which has been referred for resolution through Arbitration. Hence, the figures we present have not been validated and could change based on the results of the Arbitration. We based our projection on the estimated rate to be paid per inpatient admission or outpatient visit times the number of excess inpatients/visits provided over the contractual demand parameters.[12]

[11] Mark Hellowell. (2013) The Queen 'Mamohato Memorial Hospital PPP Project: Report of the PPP Expert to the World Bank Core Team. Draft. Edinburgh: University of Edinburgh.
[12] See notes from Table 3.1 for more details on sources of data and calculations.

The payment figures do not include any interest charged for late payments. For example, the MOH withheld payments from November 2012 to February 2013 for unexplained reasons; a lump sum payment was made to Tsepong in March 2013 for the back payments, but it did not cover the full amount of outstanding balance.[13] Hence, our projection may underestimate actual costs.

For the total MOHSW expenditures (denominator), the MOH split from the Ministry of Social Welfare (MSW) during Fiscal Year 2013. Calendar months January-March 2012 include social welfare expenditures; however, it is unclear whether the calendar months April 2012-December 2012 include the social welfare part of the budget. If so, then the denominator used in our calculations would be comparable to the baseline estimate.

Comparison data for QE II expenditures and for the MOHSW budget were obtained from the baseline step-down cost analysis conducted by Robert Puglisi using 2006-2007 data. To compare current payments to the PPP operator with baseline expenditures on QE II, we adjusted QE II expenditures in two ways. First, we applied annual inflation rates as measured by the consumer price index.[14] This averages to 8% per year from 2006-2012; however it may underestimate the value of what MOH would have been paying today as costs at QE II were rising 13.7% per year on average from 2000 to 2007 and there is no reason to think that the increase would have declined over time given the aging facility and growing demand.[15] Therefore our second estimate, which applies the 13.7% figure, is our best estimate of what the MOH would have been paying to operate QE II in 2012.

Findings:

In this section we present three major findings: 1) projected payment due to Tsepong for excess demand; 2) QMMH-IN expenditures compared to QEII in current 2012 Maloti, with adjustments to correct for cost driver differences between endline and baseline; and 3) PPP payments as a percent of MOH budget.

1) Projected payment for excess demand: Tsepong has populated a patient register that supports actual activity numbers to be used in the estimation. The utilization figures which Netcare has used differ from this report for the following reasons.

- On the inpatient side, the Netcare figures are higher than our estimates by 527 inpatients. The bulk of this is due to inclusion of some patients who were referred to Bloemfontein for covered services and needed to be hospitalized. These referrals were not counted in the hospital software system (SAP) and therefore did not appear in our data. In addition, our inpatient count is from Activity reports, including adjustment for patients in progress (PIP), whereas Netcare uses Schedule 24 reports which do not include adjustments for patients in progress. This might affect numbers at the very beginning and end of the calendar year.
- On the outpatient side, Netcare figures are lower than our estimates by 20,335. Netcare figures are adjusted for errors in how patients were counted in the filter clinics in January, February, March and a small portion of April. These adjustments were due to change from ME+ to SAP electronic systems.

Using our estimates of 2012 activity levels, we calculate that the amount due to Tsepong for excess utilization is at least 45.7 million Maloti, or 10.7% of the total payments already billed. Our estimate is

[13] Mark Hellowell. (2013)
[14] http://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?page=1
[15] Baseline report, Vol I, p. 73.

lower than financial calculations by Netcare, supported by patient register data, which project that Tsepong is entitled to M52.4 million additional payment for excess demand.

Table 3.1: Projected payment due to PPP Hospital for excess demand in 2012 (Maloti).

	Inpatients	
A	Actual inpatients treated in 2012	23,341
B	Demand parameter (ceiling)	20,000
C	Number of inpatients in excess of demand parameter(A-B)	3,341
D	Cost to be reimbursed per inpatient above ceiling	12,263.05
E	Total projected payment due Tsepong (C*D)	**40,970,850**
	Outpatients	
F	Actual outpatients treated in 2012	374,669
G	Demand parameter (ceiling)	310,000
H	Number of outpatients in excess of demand parameter(F-G)	64,669
I	Cost to be reimbursed per outpatient above ceiling	73.64
J	Total projected payment due Tsepong (H*I)	**4,762,225**
	Total	
K	Total projected payment (inpatient and outpatient) due Tsepong (E+J)	**45,733,075**
L	Total payment already billed by Tsepong	427,601,230
M	Percent of additional payment due (K/L)	10.7%

Sources: We obtained the demand ceilings (B, G) and estimated per-unit reimbursement amounts (D, I) from the Netcare General Manager of Finance (email communication to N McIntosh from C Smith, May 30, 2013). The per-unit reimbursement rates are not yet validated because indexation (i.e. inflation adjustment) is subject to dispute resolution through Arbitration and currently unresolved. All parties agree that reimbursement amounts should be indexed.

2) QMMH-IN expenditures compared to QEII: Table 3.2 compares the payment for QMMH-IN to expenditure on QE II-IN adjusted to current 2012 Maloti.

Table 3.2: Comparison of Annual Expenditure for QMMH-IN and QEII-IN adjusted for inflation (conservative) and historical budget growth (best estimate)

	QMMH	QE II conservative estimate	% Change	QEII best estimate	% Change
Total Billed Payment	427,601,230	145,054,470	195%	211,866,994	102%
Plus Cost of Excess Demand (estimate, not yet validated)	45,733,075	-		-	
Total Payment including Excess Demand Costs	473,334,305	145,054,470	226%	211,866,994	123%
Less VAT and corporate tax (must be paid by MOH but are returned to Government)	59,639,119	-		-	
Total Annual Payment/Expenditure, excluding taxes	413,695,186	145,054,470	185%	211,866,994	95%
Capital Expenditure (19.34% of QMMH budget excl VAT) and Capital Interest (6% of QMMH budget excl VAT)	95,047,501				
Total Annual Payment/Expenditure, excluding taxes & capital costs	318,647,685	145,054,470	120%	211,866,994	50%

Note: Data are in 2012 Maloti and include filter clinic expenditures. Figure for QEII conservative estimate was adjusted using annual Lesotho inflation rates (World Bank). Figure for QEII best estimate was adjusted using average budget growth rate of 13.7% per year from 2000-2007. Taxes include VAT (14%) and corporate tax (1.9%). Effective corporate tax rate is estimated from the PPP financial model data from Netcare.

Looking at the best estimate figures and including the projected cost of excess demand (discussed above), this shows that the government is paying 123% more for QMMH.

When comparing endline and baseline, it is important to adjust for cost drivers which vary between these two points in time. For example, the PPP strategy of using a private operator means that VAT and corporate taxes apply, yet these costs were not relevant at baseline and are essentially a "net zero" at endline because the tax payments revert to the GoL. Another significant change in creating the PPP was to include capital costs, but this also distorts the comparison to baseline as QE II had little capital investment and building and equipment depreciation was not included in the operating budget.

If we exclude taxes, the Government of Lesotho is paying 95% more than at baseline, [16] and if we also exclude amortization of capital cost, the GoL is paying 50% more than baseline.

The Unitary Payment for the PPP including excess demand is higher than initially projected. However, the higher payment needs to be considered in light of several issues, including:

- GoL request to build and operate Gateway clinic, which was not in the original contract;

[16] The baseline report recommended subtracting VAT from the Unitary Payment when estimating the true cost of the hospital to the government, and that other corrections should be made for taxes and revenue paid by the operator of the PPP to the government (p. 78).

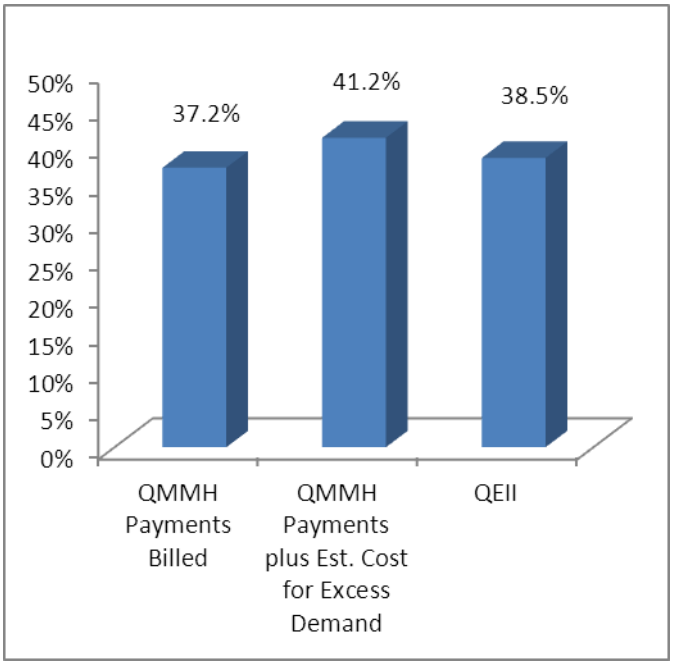
- increased patient utilization, better outcomes, and higher quality (as subsequent indicators will show), in part due to higher investments in maintenance and clinical/management systems than at baseline;

- additional services offered at QMMH-IN which were not available before such as the Intensive Care Unit (ICU) and Neonatal Intensive Care Unit (NICU).

It should also be noted that the PPP hospital, through its filter clinics and role as district hospital, is the major provider of primary health care in Maseru where a quarter of the population live.[17] Thus, the spending is not only on a referral hospital, but an integrated health care delivery system serving a continuum of health care needs for a large part of the country.

3) PPP payments as a percent of MOH budget: Notwithstanding the points above, affordability of the PPP hospital within its current budget envelope is a concern. Total MOHSW budget in 2012 was 1,149,228,719 Maloti, and total payments to operators for QMMH-IN in 2012 were 427,601,230 Maloti. This means that **payments to the PPP hospital in 2012 accounted for 37.2% of the MOH budget**. If we include the projected payments for excess demand, the total payments rise to 473,334,305 Maloti, or **41.2% of the MOH budget**. By contrast, QE II-IN expenditures accounted for 38.5% of the MOH budget at baseline.[18] See Figure 3.1.

Figure 3.1: Comparison of Payments, as percent of MOH budget.



The net payment including the cost of excess demand and excluding VAT and corporate taxes is 413,695,186 Maloti, or 36.0% of total MOH expenditures. Net payment including excess demand and excluding taxes and capital costs is 318,647,685, or 27.7% of total MOH expenditures.

These percentages are near or above the 30% mark considered to be an adequate level of funding by the authors of the baseline study; however, when we consider the PPP payments (including taxes) as a percentage of the MOH budget it exceeds the 40% mark which the baseline study considered a risk for adequate financing of district health services. There is no clear international standard for how much a country or Ministry should allocate to its only tertiary referral hospital and district health services (including primary health care) in its capital district, and in fact the MOH budget has risen significantly since baseline so it may be that the 59%

[17] According to the 2006 census, Maseru district population was 23% of the total population (Kingdom of Lesotho. Statistical Yearbook 2008. Maseru: Ministry of Finance and Development Planning, Bureau of Statistics). The 2009 Demographic and Health Survey reports that the urban population is increasing. (MOHSW and ICF Macro. Demographic and Health Survey 2009. MOH: Maseru, Lesotho and ICF Macro: Calverton, Maryland.

[18] While expenditure as a proportion of the MOHSW budget was 38.5% at baseline, it was much lower in the following year (i.e. 28.8% in 2007/08). The average expenditure as a proportion of the MOHSW 1999/2000 to 2007/08 is 31.1% (Hellowell, 2013).

available for the rest of the health system goes further than was envisioned in that report. This is especially true if the district budgets are adjusted downward to account for lower volume as patients seek care at QMMH-IN rather than in district facilities (referral patterns are discussed further later in the report). However, affordability is clearly an issue for the MOH at present, as illustrated by the non-payment of Tsepong invoices for several months in 2012 and early 2013. Unless costs are managed very closely and/or additional GoL budget is allocated to the Ministry, the PPP expenditures may continue to be above 40% of MOH budget in the future, possibly causing strain on the Ministry's ability to adequately fund its other objectives.

Estimate of Efficiency

Within the scope of this study we could not do a complete cost analysis as was done during the baseline study; however, we wanted to give a rough estimate of the PPP integrated network's efficiency compared to QE II and filter clinics. This analysis sheds light on the OBA cost efficiency and cost-effectiveness component.

We did not have adequate information to be able to separate costs into outpatient and inpatient departments, therefore we used inpatient day equivalents as the denominator for the unit cost. An inpatient day equivalent is a combination of inpatient days and outpatient visits, weighted to account for the differences in resources used to produce each type of output. We used a ratio of 3 outpatients to 1 inpatient, a standard ratio used in neighboring South Africa and other African countries.[19] The baseline step down analysis of QE II found that the cost of an inpatient day was 2.7 times the cost of an outpatient visit. We cannot really know if this ratio holds today for QMMH, so the data below should be interpreted with caution.

We used the "best estimate" of total QEII-IN costs (see Table 3.2), and we used three estimates of QMMH-IN total cost: billed payments, billed payments excluding taxes, and billed payments excluding taxes and capital costs. The results are shown in Table 3.3.

The estimates show that QMMH-IN is 6% more expensive than QEII-IN on a per unit cost basis if we exclude taxes. If we also exclude capital costs, QMMH-IN is more efficient than QE II-IN, with a 22% lower unit cost. These are favorable comparisons given the greater quality of service delivered, as shown in the indicators which follow.

RECOMMENDATIONS:
(1) A **cost study** should be conducted to examine the full cost of services (i.e. inpatient day, outpatient visit) at QMMH, gateway, and filter clinics. The cost data could enable projections to be made for alternative choice decisions (for example, to add or expand a service, or cost reduction planning).

[19] Health Systems Trust. 2011. Cost Per Patient Day Equivalent in District Hospitals. Accessed 4/28/2013 http://www.hst.org.za/news/cost-patient-day-equivalent-district-hospitals; Barron P, Monticelli F. Key district health indicators. Volume 1. Durban: Health System Trust. 2007. http://www.hst.org.za/uploads/files/district_indic.pdf Vujicic M., Addai E, and Bosomprah S. 2009. Measuring Health Workforce Productivity: Application of a Simple Methodology in Ghana. World Bank HNP Discussion Paper Series August 2009. www.worldbank.org. Accessed 5/2/2013; Barron P, Monticelli F. Key district health indicators. Volume 1. Durban: Health System Trust. 2007. http://www.hst.org.za/uploads/files/district_indic.pdf Accessed 5/2/2103.

Table 3.3: Cost per Inpatient Day Equivalent at QMMH-IN and QE II-IN (in 2012 Maloti).

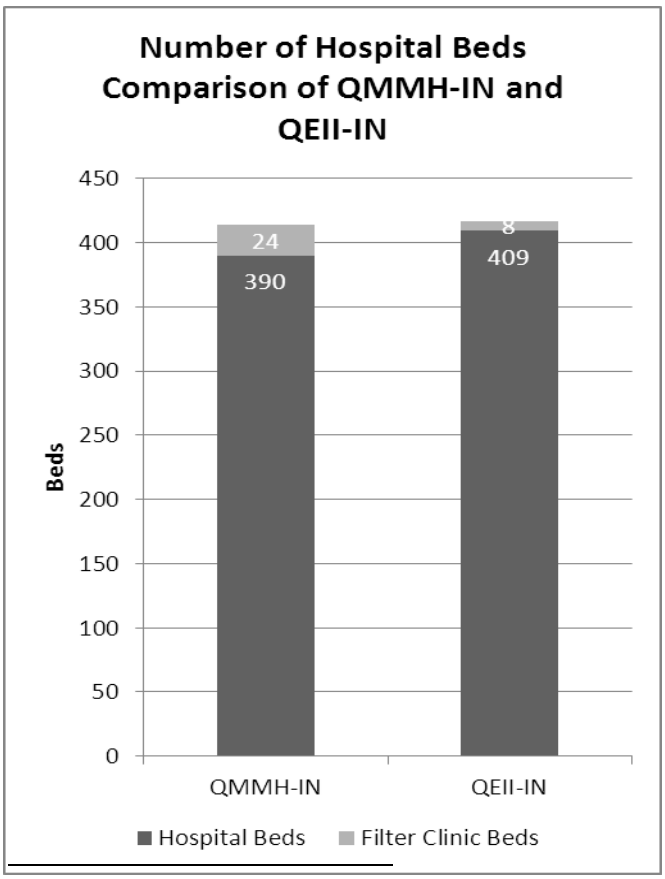
	QMMH	QEII best estimate	% Change
Inpatient day equivalents	241,538	147,003	64%
Cost per IDE, billed payment	1,770	1,441	23%
Cost per IDE, excluding taxes	1,523	1,441	6%
Cost per IDE, excluding taxes and capital costs	1,130	1,441	-22%

(BD1) Total Operational Beds

Total number of operational beds by ward, and maternity beds in the filter clinics. The OECD defines an operational bed as a bed that is regularly maintained and staffed, and immediately available for the care of admitted inpatients as of the close of the reporting period.[20]

Methodology: Total number of operational beds was gathered from computerized data at QMMH-IH. Operational beds are listed separately for the hospital and filter clinics. Included in the count are 10 Casualty beds used for observation or for patients awaiting a bed in another ward, and beds occupied by tuberculosis (TB) patients waiting for multi-drug resistance (MDR) assessment. We did not count 3 new incubators now operating in the NICU but which were not operational in calendar year 2012, the period of analysis. We also excluded the 35 private beds which are equipped but not yet in use, mortuary beds, and maternity ward cradles (since normal newborns are not admitted patients).

Figure 3.2:



The 2009 Baseline Report has conflicting information about the number of beds at QE II in 2007, citing 410 and 409. A breakdown of the number of beds by ward showed 409 beds and this is the number we have used in our comparisons. The baseline analysis was not clear about whether the 409 total at QEII included maternity beds at Qoaling Filter clinic, but we assume it did not. The baseline report did not list the number of beds at Qoaling, so we have assumed it is the same as at endline, i.e. 8 beds. *Findings:* In 2012 there were 390 operational beds at QMMH and 24 filter clinic beds--8 maternity beds at each of the three filter clinics (Mabote, Qoaling, and Likotsi). At baseline there were 409 beds at QEII hospital and an estimated 8 beds at Qoaling filter clinic. (Figure 3.2)

Total beds including hospital and filter clinics did not change very much from baseline to endline: 417 beds at baseline (409 at QEII and 8 at Qoaling) to 414 at endline (390 at QMMH and 24 at the 3 filter clinics).

[20] OECD Health Data 2012: Definitions, Sources, and Methods. Accessed June 1, 2013 http://www.oecd.org/els/health-systems/oecdhealthdata2012.htm

In 2013 QMMH added 3 more NICU beds (incubators). In addition, 35 private beds at QMMH are not yet operational. With the addition of the private beds and the 3 NICU beds, there would be a total of 428 inpatient beds at the hospital, or 452 beds in the integrated network including filter clinics. According to the Operations Director, the private beds are awaiting inspection by the Board of Healthcare Funders (BHF) of South Africa. Opening these beds was initially delayed because the demand for QMMH was higher than expected and resources which would have been used to operate the private beds were redirected to public beds and outpatient services where there was excess demand.

Table 3.4: Operational beds by ward at QMMH and QE II.

Wards	QMMH	% Total	QE II	% Total
Surgical, Female	35	9%	31	8%
Surgical, Male	35	9%	36	9%
Gynaecology	20	5%	26	6%
Ophthalmology	20	5%	40	10%
Medical, Female	30	8%	35	9%
Medical, Male	30	8%	37	9%
Maternity incl. postnatal	70	18%	78	19%
Medical/Surgical Pediatrics	65	17%	71	17%
Ward G (Lodging & others)	30	8%	NA	NA
Orthopedics	30	8%	24	6%
ICU	10	3%	NA	NA
NICU	5	1%	NA	NA
TB	NA	NA	19	5%
Private	NA	NA	12	3%
Casualty	10	3%	not included	NA
Total Hospital	390	100%	409	100%

Notes: Orthopedic beds and Male medical beds were combined in the baseline study. According to the stepdown analysis at baseline, which used data from the Matron's Office, the Male Medical Ward had 37 beds and the Orthopedics Ward had 24 beds. One key informant disagreed with the figure of 78 maternity beds, which we obtained from the baseline stepdown analysis of QEII. The key informant thought that at baseline the true number of maternity beds was 72. In 2013, QMMH added 3 more incubators in the NICU ward. Casualty beds were not included in the total bed count at baseline, but are included in endline because they are used as overflow beds.

Table 3.5: Maternity Beds at Filter Clinics.

Filter Clinic	QMMH	QEII
Mabote	8	0
Qoaling	8	8
Likotsi	8	0
Total Filter Clinics	24	8

3.2 QUANTITY AND USE

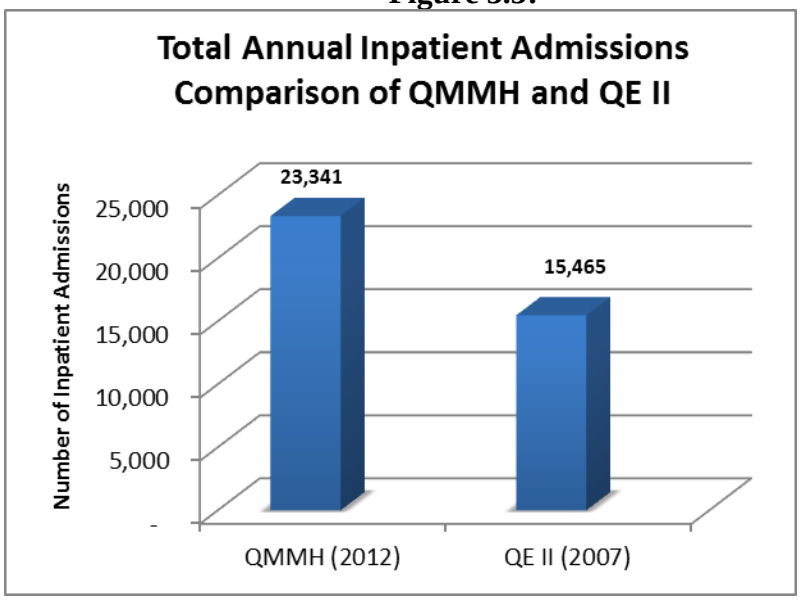
(SP2) Admissions and Patient Days

QMMH hospital admissions and patient days. Patient days is defined as the total number of days of inpatient stay by admitted patients. We did not count filter clinic deliveries in these figures, as these are counted separately.[21]

Methodology: Admissions and patient days were gathered from computerized inpatient data reported monthly from January to December 2012. We show the data on an annual basis, and by ward. The Private Ward at QMMH is not yet open, so no admissions or patient days are counted there. At QMMH a person may be admitted to Ward G, a ward where many lodging patients are admitted, and admissions and patient days are captured there. These are not double counted even if a patient is later moved to a different ward.

Findings: QMMH had 23,341 admissions, compared to 15,465 at QE II, an increase of 51% (Figure 3.3). Ward level comparison is shown in Figure 3.4.

Figure 3.3:



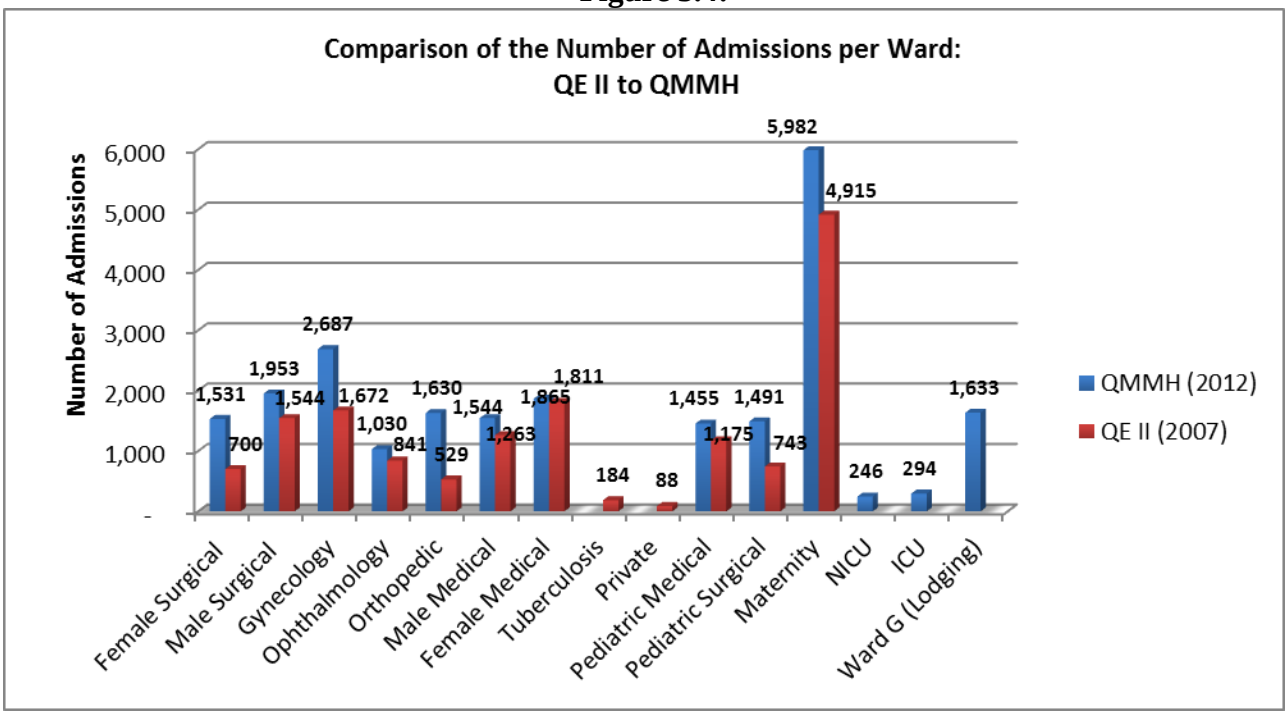
There are a few differences between the wards at QMMH and QE II so some wards do not have an equivalent comparison. For example, the Orthopedic ward (Ward H) at QMMH is mixed gender whereas at QE II it was a male only ward. There is no Tuberculosis ward at QMMH; patients with

[21] There were 7,431 deliveries at QMMH-IN in 2012. This includes 4,472 births at QMMH hospital and 2,959 births at the filter clinics.

tuberculosis are admitted into a medical ward while they wait to be transferred to a government tuberculosis facility. QE II did not have an NICU, ICU or Step Down[22] ward, and the Private ward is not yet open at QMMH. In addition, in the data for QE II the Step Down wards were incorporated into the medical and surgical wards.

For all the wards where comparisons were possible, QMMH had higher numbers of admissions compared to QE II. Earlier reports suggested that some Basotho women were electing to cross the border to deliver in South Africa, rather than deliver in Maseru.[23] Higher admissions in maternity may indicate a reversal of this trend.

Figure 3.4:



Similarly QMMH had higher numbers of inpatient days compared to QE II (Figure 3.5). This was true in most wards (Figure 3.6), with the exception of the Ophthalmology and Pediatric Medical wards where inpatient days were lower than at QE II. Overall, total inpatient days at QMMH were 116,648, or 27% more inpatient days than QE II. [24]

Having 51% more admissions but only 27% more inpatient days shows higher efficiency and throughput of patients, and is reflected in significantly lower lengths of stay (see Average Length of Stay, UQ2, below).

[22] The Step Down Ward (Ward G) at QMMH admits patients who need monitoring. Depending on space this may include patients awaiting next day transportation to Bloemfontein or other transfer, or nursing mothers whose infants have been admitted to the NICU from filter clinics. A second Step Down Ward (Ward H) is primarily used for orthopedic patients. To facilitate comparison with QE II, we have called it Orthopedics.

[23] Bicknell WJ, Feeley R, Beggs A, et al. Economic Study of Referral Health Services in Lesotho: the Future of Queen Elizabeth II Hospital: Volume 1. Maseru and Boston: Lesotho Boston Health Alliance. June 2002.

[24] Internal records at QMMH hospital show total inpatient days as 116,557, or 91.5 days less than our total of 116,648. The difference is due to correction for patient days which should count toward the previous calendar year in Ward O.

Figure 3.5:

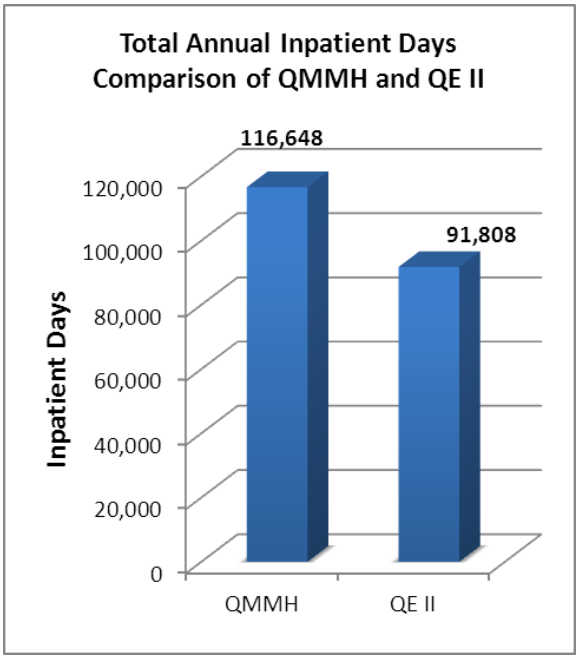
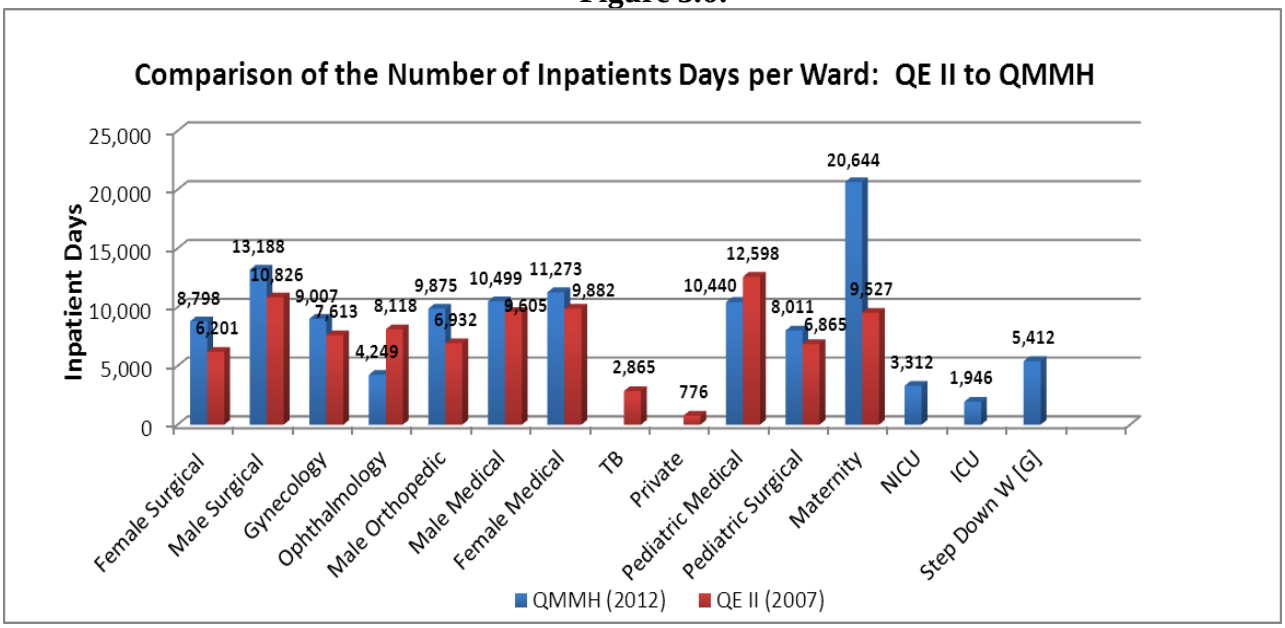


Figure 3.6:



(UQ2) Average Length of Stay (ALOS)

Overall average number of days spent as an inpatient per admission for QMMH and by ward. This indicator presents hospital-level data only.

Background: Average length of stay (ALOS) is a commonly used measure of hospital efficiency. Lengths of stay significantly longer or shorter than expected may indicate poor quality of care.[25]

[25] Adverse drug events, pressure ulcers, nosocomial infections and other hospital complications have been associated with longer lengths of stay, but at the same time, shorter length of stay could lead to more adverse events after discharge. See

Methodology: The total length of stay per patient at QMMH was collected through examination of monthly computerized inpatient data reports for January 2012- December 2012. The monthly data reports the total number of patient days and the total number of admissions for each month for each ward. The average monthly length of stay (LOS) by ward was determined as follows: we summed monthly admissions for each ward over 12 months, summed the monthly patient days for each ward over 12 months, and divided the total annual number of patient days by the total annual number of admissions reported for each ward. Average overall length of stay for QMMH was determined by dividing the total number of patient days across all wards by the total number of admissions across all wards.

Findings: Table 3.6 compares ALOS by ward. Two services, the ICU and NICU, which exist at QMMH did not exist at QE II. If we remove the patient days and admissions of both of these wards from the overall hospital's average, QMMH's overall ALOS drops to 4.9 days from 5.0 days. Similarly, QE II had one ward, the Tuberculosis ward that does not have an equivalent at QMMH. If we remove the Tuberculosis ward patient days and admissions, QE II's overall ALOS decreases from 5.9 days to 5.8 days.

Table 3.6: Comparison of QMMH and QE II Average Length of Stay.

Ward	QMMH (2012)	QE II (2007)	% Difference
Female Surgical	5.75	8.86	-35%
Male Surgical	6.75	7.01	-4%
Gynecology	3.35	4.55	-26%
Ophthalmology	4.12	9.65	-57%
Orthopedic	6.06	13.1	-54%
Male Medical	6.80	7.60	-11%
Female Medical	6.04	5.46	11%
Tuberculosis		15.57	
Private		8.82	
Pediatric Medical	7.18	10.72	-33%
Pediatric Surgical	5.37	9.24	-42%
Maternity	3.45	1.94	78%
NICU	13.46		
ICU	6.62		
Step Down Ward G	3.31		
Overall ALOS	5.00	5.94	-16%

Decreases in ALOS occurred in all wards except maternity, with the largest decreases occurring in the Ophthalmology and Orthopedic wards. Although the reasons for the decreases are not clear, it may be related to improved timeliness and quality of medical and surgical care. Fewer delays to diagnosis and treatment should result in quicker recoveries and discharges. This effect may even be larger if we take into account the overall higher mortality at QE II which is likely to have distorted ALOS if patients died rather than improving and being discharged home.

Another reason for lower ALOS could be increased availability of appropriate follow-up outpatient care post discharge. If such care is available, there is less need to keep patients hospitalized so that they receive the care they need. At the same time, some key informants suggested there are difficulties surrounding follow-up care (i.e. getting the district hospital which referred the patient to come and pick the patient up, or finding an alternative way to transport patient), and that patients may be staying longer than necessary.

Eappen, Lane, Rosenberg et al. 2013. Relationship between occurrence of surgical complications and hospital finances. *JAMA*. 309:1599-1606 and Bueno, Ross, Wang et al. 2010. Trends in Length of Stay and Short-term Outcomes Among Medicare Patients Hospitalized for Heart Failure, 1993-2006. *JAMA*. 302:2141-2147.

The exception to this trend is the maternity ward, where the average length of stay increased 78% compared to QE II, from 1.94 days to 3.45 days. This is likely due to the fact that vaginal deliveries for non-high risk mothers are now performed at the filter clinics, whereas in the past almost all deliveries were done at QE II. In addition, the hospital introduced a 10-bed kangaroo care unit for low birth weight infants in the postnatal ward which increases the length of stay in this unit as it represents 25% of the beds.

QMMH staff also attributed the longer lengths of stay to treating higher numbers of low birth weight infants in the NICU: during the time these infants are being treated their mothers remain in hospital, while at QEII, it is possible that the baby would have died and the mother would have gone home earlier (there were some pre-term babies born at QEII, though fewer than at QMMH and with less favorable outcomes, according to staff who worked there). QE II did not have an NICU and we do not have data on birth weight of infants at baseline, so we cannot test the validity of this supposition.

The hospital length of stay may also reflect an increased proportion of C-sections done (7% at QE II vs. 44% at QMMH, or 27% including filter clinics) as recovery post C-section is longer than recovery post vaginal delivery. The average hospital stay after C-section in the United States is 4 days compared to 2 days for vaginal deliveries.[26] In addition C-sections may require prolonged stays if there are any postoperative complications.

RECOMMENDATIONS:
(1) Track discharged patients' follow up care and hospital readmissions within a month of discharge. In particular it would be useful to assess if patients accessed recommended outpatient services post discharge and/or if they were readmitted for reasons related to their hospitalizations. This information would give context to LOS stay data and help assess if LOS is associated with quality of care.

(2) Isolate the effect on LOS from mothers who stay in the hospital because their infants have been admitted to NICU.

(HW4) Percent Occupancy
Percent occupancy by ward is based on the total number of available beds per ward and the total number of inpatient days per ward. It is a hospital-level statistic.

Methodology: Percent occupancy by ward was calculated by dividing the total number of patient days for the 12 months in a given ward by the total number of available "bed days" for the 12 months. The total number of patient days was collected through examination of monthly computerized inpatient data reports for January 2012-December 2012. The monthly data reports the total number of patient days by ward, the total number of beds per ward, and the total number of available bed days per ward. Bed days per month is a measure of total capacity: total number of beds multiplied by the total number of days in the month. Percent occupancy can be over 100% because the patients are admitted to particular ward and overflow patients are placed in other wards (but counted in the ward in which they were admitted). Overall percent occupancy for QMMH as a whole was calculated by dividing the total number of patient days summed across wards for the 12 months, by the total number of available bed days across wards for the 12 months.

[26]Kuper, DE. Newborns' and mothers' Health Protection Act: Putting on the brakes on drive-through deliveries. Marquette Law Review 1997:80(2):667-692

Findings: The overall hospital occupancy for QMMH was 82% compared to 61% at QE II. However, we found discrepancies in the baseline report regarding occupancy rates at QE II which may affect this comparison.

The occupancy rates by ward at QE II were calculated using the matron's midnight census registers of each ward on a sample of days, resulting in an estimated 82% overall hospital occupancy. However, if we use raw data from QE II by ward and calculate occupancy by summing the total number of inpatient days across wards and dividing by the total number of available bed days across wards (the same method used to calculate occupancy at QMMH), we get an overall hospital occupancy rate of 61%. It is unclear why there is such a discrepancy in these estimates, though it may be due to undocumented differences in methodology used at baseline, inaccuracies in matron registers from baseline study, a sample that did not include data for the full year, or other factors. A nurse who had worked as a nurse manager at QE II suggested that the registers could have missed between 10-20% of patients.

Table 3.7: Annual Occupancy Rates at QMMH and QE II.

	Annual Occupancy Rates	
Ward	**QMMH (2012)**	**QE II (2007)**
Female Surgical	69%	55%
Male Surgical	103%	82%
Gynecology	123%	80%
Ophthalmology	58%	56%
Male Medical	96%	74%
Female Medical	103%	77%
Tuberculosis		41%
Private		18%
Pediatric Medical and Surgical*	78%	75%
Maternity	81%	33%
NICU	182%	
ICU	53%	
Ward G	49%	
Orthopedic**	90%	
Total	82%	61%

*QE II data did not separate pediatric medical and surgical wards so total pediatric occupancy (medical and surgical beds) was calculated for both hospitals.
** Male Orthopedic ward beds that existed in QE II were incorporated into the Male Medical Ward in Baseline data.
***Total occupancy in QMMH includes the 10 Casualty beds. Inpatient days are not counted in this ward, so there is no ward-level occupancy rate.

Percent occupancies greater than 100% at QMMH reflect patients who were admitted to one ward but who occupied a bed in another ward (for example, a Casualty observation bed). Patients are counted in the ward in which they are admitted, not in the ward in which they occupy a bed. In some cases beds in wards have been modified to accommodate overflow from other wards. For example, some beds in the maternity cradles were upgraded with ventilators and other equipment to accommodate stable NICU patients. In addition, as mentioned in the Total Operational Beds indicator, to accommodate the demand for NICU services QMMH added three more incubators in the NICU ward in 2013. There are arrangements between other wards to accommodate overflow of other patients.

Occupancy rates for maternity inpatients at the filter clinics were not analyzed because this was not an indicator in our study. However, key informants stated that maternity units at the filter clinics are underutilized. When QE II was open, only Qoaling Filter Clinic had beds. Underutilization may be due in part to it taking time for mothers to feel comfortable delivering at a filter clinic compared to delivering at the hospital. A key informant suggested that if maternity beds at filter clinics continue to be underutilized, some of the space allocated for maternity care might be used by primary care services to address increased patient volumes (see SP3 below).

(SP3) Ambulatory Visits

The number of ambulatory visits at the three filter clinics (Mabote, Likotsi, Qoaling), Gateway, Casualty, and hospital outpatient department (OPD) specialty clinics, as a percent of all PPP ambulatory visits.

Methodology: The total number of ambulatory visits per year (January 2012- December 2012) was obtained from an examination of monthly computerized reports of ambulatory visit data (Schedule 24 reports). The number of PPP ambulatory visits was calculated by summing all visits at the three filter clinics, Gateway, Casualty, and all hospital OPD specialty clinics across 12 months. This number counts patients who attended the clinic in order to receive a medication refill. According to the Operations Director, a relatively low number of patients are visiting only for medication refills. On average, patients receive 4 services per outpatient visit. Patients also visited the old clinics and QEII for repeat prescriptions, so these data are comparable to baseline. Although QEII provided refills of ART prescriptions, this is not currently done at QMMH hospital (following government policy).

The percent of ambulatory visits of each filter clinic, Casualty and hospital OPD clinics was determined by dividing the yearly number of ambulatory visits to the clinic by the yearly total number of PPP ambulatory visits and multiplying by 100.

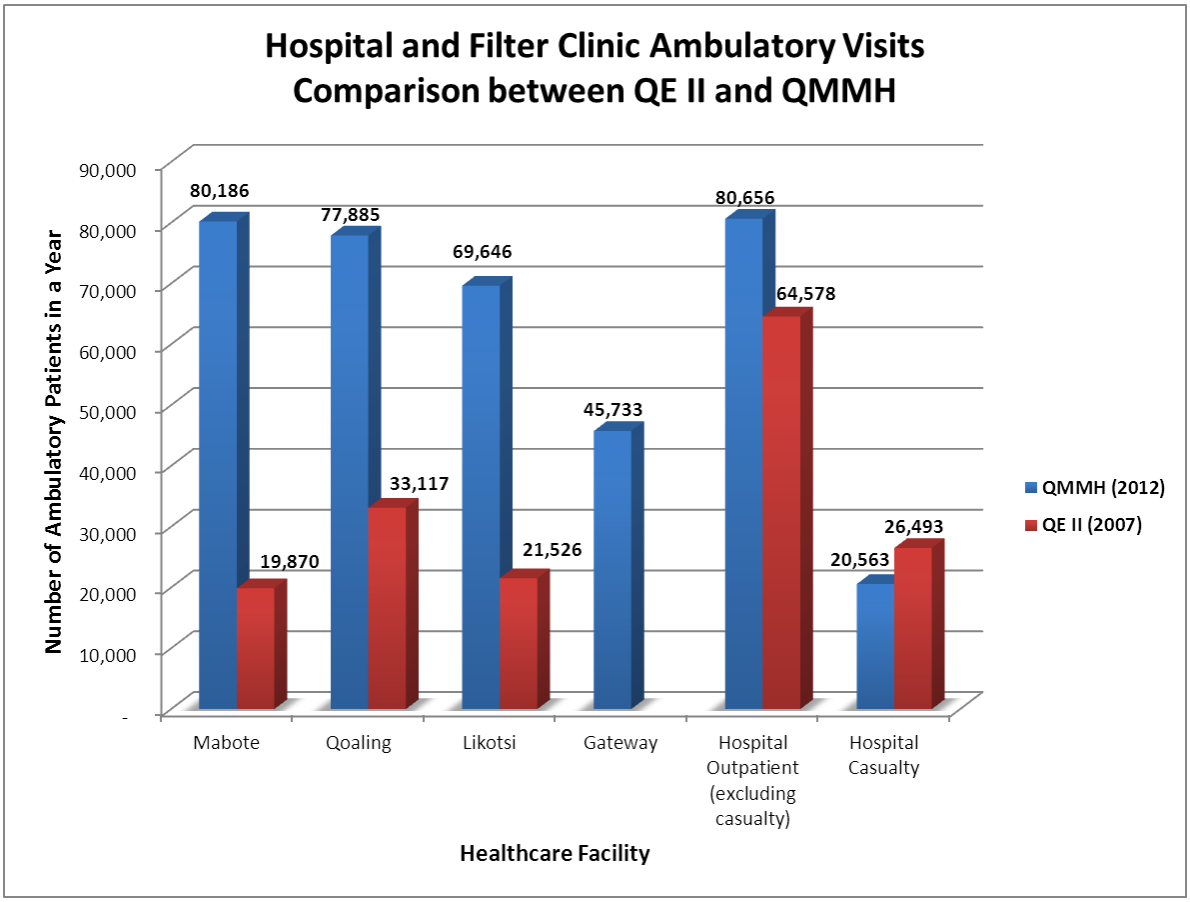
Findings: With the exception of Casualty, there have been increases, sometimes dramatic, in the number of ambulatory visits at QMMH-IN compared to QE II-IN. Overall, the PPP hospital recorded 374,669 ambulatory visits, more than double the number of outpatient visits at QE II-IN.[27]

Table 3.8: Annual Ambulatory Visits and Percent of Total Ambulatory Visits.

Health Care Facility	QMMH (%)	QE II (%)	% Difference
Mabote	80,186 (21%)	19,870 (12%)	303.6%
Qoaling	77,885 (21%)	33,117 (20%)	135.2%
Likotsi	69,646 (19%)	21,526 (13%)	223.5%
Gateway	45,733 (12%)		
Hospital Outpatient (excluding casualty)	80,656 (22%)	64,578 (39%)	24.9%
Hospital Casualty	20,563 (5%)	26,493 (16%)	-22.4%
Total	**374,669 (100%)**	**165,584 (100%)**	126%

[27] The Tsepong Performance Report of June 2012 lists a projected annual (October 2011 to September 2012) volume of 443,737 ambulatory visits at the PPP hospital, Gateway, Casualty, and Filter clinics. The Financial Manager stated that this estimate used an incorrect methodology. In addition, the projection in the June report was calculated based on the data from October 2011 to June 2012 (Tsepong's financial year), while the data collected for this evaluation is based on a calendar year (January to December). This may account for the difference in the estimated and actual annual utilization. See also the note on ME+ system errors in text.

Figure 3.7:



For the period January to March 2012, the filter clinics were on a different system, ME+, prior to going over to the electronic System Analysis and Program Development (SAP) system. The Financial Manager stated that a comparison of SAP and ME+ data suggested that ME+ information may be over-estimating the number of ambulatory visits for these months. However, because of problems restoring data from ME+ the hospital could not accurately assess this. For the months January to March 2012 the Financial Manager estimated that Mabote, Likotsi and Qoaling were overstating ambulatory visits by 10,524, 10,020 and 5,229, respectively. If adjustments are made based on these estimates the ambulatory visits become 69,609 (Mabote), 59,598 (Likotsi) and 72,625 (Qoaling), and the total number of ambulatory visits becomes 348,782. This represents an overall increase of 110% compared to QEII-IN.

In addition, it should be noted that figures reported in the baseline report for QE II-IN were considered minimums. The report stated that inaccuracies with records almost certainly resulted in undercounting. However, even if the estimated maximum total number of ambulatory visits for QE II-IN is used (180,000, according to the baseline report), there is still a 108% increase in the number of ambulatory visits seen at QMMH-IN compared to QE II-IN, if numbers are unadjusted for possible filter clinic overstatements. The explosive growth in filter clinic visits may be related to the growth in antiretroviral treatment for HIV/AIDS, a portion of which may be for refills of ART prescriptions.

The decrease in patients accessing care through Casualty at QMMH compared to QE II suggests that the filter clinics and Gateway are providing care to patients who otherwise would have inappropriately

accessed care through Casualty. In light of the very large increases in overall outpatients seen, this suggests that those patients seeking care at QMMH Casualty really needed emergency services.

RECOMMENDATION:

(1) If increases in ambulatory visits continue, the PPP hospital system, including Gateway and the filter clinics, may run out of capacity to handle volumes. The MOH, Tsepong, and the Independent Monitor should closely track trends over time in the use of ambulatory services, especially at the filter clinics, and develop better projection models. This will inform space planning and district-wide decisions about service delivery.

(CS18) ART for Patients

Availability of antiretroviral treatment (ART) drugs 24 hours per day, 7 days a week for inpatients and Casualty patients who are on treatment.

Methodology: Information about availability of ART and treatment of inpatient and Casualty patients on ART treatment was gathered through key informant interviews of QMMH Pharmacy and Casualty staff during the months of February and March 2013. We used these data to determine if ART drugs are available 24/7 (yes/no).

Findings: ART drugs are available at QMMH 24/7.

Queen 'Mamohato hospital is not accredited to initiate ART in newly diagnosed HIV+ patients. This is in accordance with government established policy. Pre-test counseling, testing, post-test counseling and ongoing treatment are done at the hospital's three filter clinics and other facilities accredited to initiate treatment. The government established this policy because Queen 'Mamohato hospital is a referral hospital and is not able to provide ongoing management and follow up for HIV+ patients; however, the MOH intends to change the policy in the future according to some key informants.

The hospital maintains some ART medications for patients who need them while awaiting transfer, or for patients who forgot their medications at home or need a refill at discharge to tide them over before they can be seen by the clinic where they are usually managed. In addition, a small supply of ART is kept in Casualty for patients who are already on ART but don't have their medications with them.

The supply of ART for these patients comes from the MOH, or is borrowed from filter clinics or the Baylor Center for Treatment Excellence, a pediatric AIDS treatment center located next to QMMH. The MOH provides small amounts of ART, QMMH staff record use of these medicines and, based on these statistics, the MOH resupplies the medicine. For pediatric patients who are in need of ART, doctors may request medication through an informal process from Baylor if the medication is not in stock at QMMH.

There is a supply of Post-Exposure Prophylaxis (PEP, prophylactic treatment started immediately after exposure to the HIV virus) that is kept in the QMMH pharmacy where it is available 24/7. PEP is part of a comprehensive universal precautions package to reduce staff exposure to infectious hazards at work. Usage is documented in a registry and stock is supplied by the MOH. PEP Availability was also measured at baseline (indicator IC3). At QE II it was reported that there were several instances where PEP was not available in the inpatient pharmacy or in Casualty. This occurred because staff did not accurately report use of PEP so stocks were not replenished. At QMMH staff documentation of use is done systematically, stocks are replenished, and PEP is always available.

It is a challenge when uninitiated HIV positive patients are identified. According to hospital staff, most uninitiated patients are in late stages of AIDS (stage 3 or 4). Currently, these patients are either referred to their local clinics or to Senkatana, the local ART center, for initiation. The hospital is working with the MOH to become accredited to initiate ART for such cases. This would enable the hospital to initiate treatment of newly diagnosed HIV positive patients as soon as they are identified. If this is the case, the MOH would supply medicines for these patients. While key informants stated that the MOH senior administration has expressed support for this strategy, implementation seems to be stalled at lower levels.

RECOMMENDATIONS:

(1) The MOH should formalize the policy to allow QMMH to initiate ART, and should promulgate guidelines for the ongoing treatment of these patients.
(2) The MOH, together with the hospital, should develop measurable indicators and a timeline to help monitor progress toward full implementation of these guidelines as quickly as possible.

3.3 CLINICAL QUALITY

(IC2) Hand Washing Stations

Availability of effective hand washing stations (running water, paper towels, and soap or hand sanitizing chemical scrub) within 10 meters of hospital ward beds and bassinets.

Methodology: We measured this indicator using two sources of data. First, we used the Independent Monitor's (IM) report,[28] which collects an indicator A2: Infection Control Measures. This includes "compliance with hand washing infection control standards and protocols." During quarterly visits they examined 100 hand washing stations for "appropriate soap, water, and/or hand sterilization solution, and paper towels." We reviewed the reports of the IM for the period Jan.-Dec. 2012. We noted the change in the definition of the indicator, which helps explain results in the IM quarterly data. Secondly, we also did spot checks of 6 wards (33 rooms) and the large resuscitation room over 4 days to determine if hand washing stations were within 10 meters of ward beds.

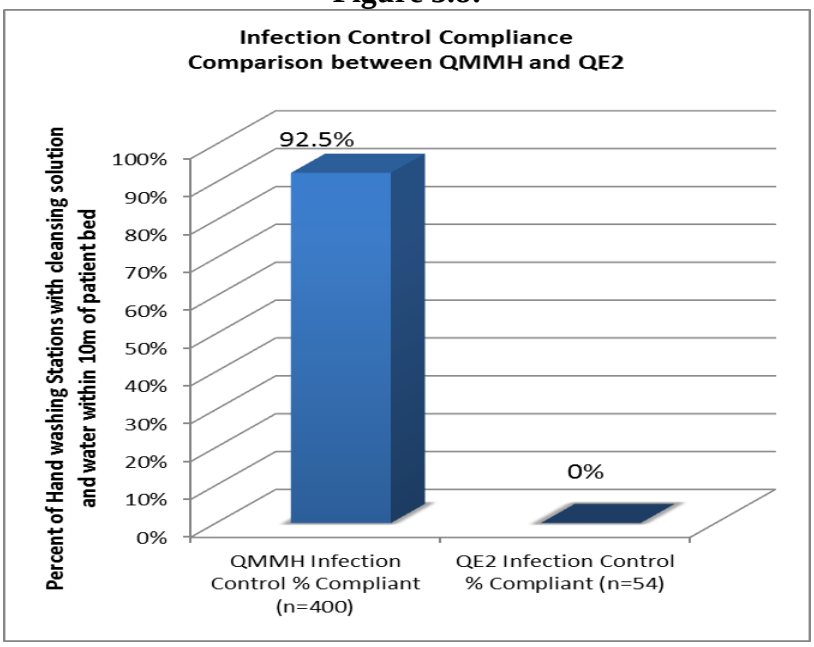
Findings: QMMH is 92.5% compliant with the infection control indicator according to IM data as shown in Figure 3.8, and was 100% compliant during the spot checks we conducted in 33 rooms.

For first quarter 2012 the IM criteria specified that hand washing stations must have soap to meet their criteria of 'fully equipped hand washing station.' Our indicator, however, included having soap and/or sterilization solution (alcohol-based hand rub) as meeting criteria. Therefore, while QMMH did not meet IM criteria in the first quarter of 2012, it met our criteria. The IM amended their criteria to include having soap and/or chlorhexidene scrub, effective second quarter of 2012.

In the third quarter of 2012 (July-Sept), the QMMH achieved 70% compliance with IM criteria. The hospital thought that the low score was because the assessment was performed during a hospital strike and QMMH had skeleton staff performing functions, including replenishing supplies of paper towel. (The spot check to confirm compliance for Quarter 3 happened in the first month of Quarter 4.) QMMH met 100% IM compliance for the second and fourth quarters of 2012.

[28] During the study period, the Independent Monitor was Turner & Townsend (Proprietary) Limited, 21 Fricker Road, Illovo, Johannesburg, South Africa.

Figure 3.8:



During spot checks of hand washing stations at QMMH, we found that all hand washing stations were within 10 meters of patient beds or gurneys. The Baseline Report indicated that QE II was 0% compliant with this indicator. It stated that none of the 54 hand washing stations in QE II wards had both running water and soap.

(OB2) Preventing Mother to Child Transmission
Percent of known HIV+ women admitted to the hospital maternity ward who received PMTCT.

Methodology: The percent of women admitted to the maternity ward with known HIV status was gathered by examining the monthly report of statistics of the maternity ward for the period January-December 2012. This data was only collected at the hospital and not at the filter clinics. The percent was calculated by dividing the number of women admitted to the maternity ward (HIV+, HIV-, unknown status) by the total number of women admitted to the maternity ward. It should be noted that the maternity ward statistical report seems to have some inconsistences. For example, the number of mothers delivered is reported as 4,348, which is less than the total of women for whom HIV status was reported (4,384), and in the original report we received, the data for HIV positive and HIV negative status were incorrectly labeled as the reverse (a fact discovered and corrected upon later review).

In addition, we used the data collected by the IM to evaluate indicator A3: Prevention of Mother to Child Transmission ("compliance with national protocol for the prevention of mother to child transmission") to determine the percentage of HIV+ women who received ART.

Findings: HIV status was known in 95% of women admitted to delivery wards, and the hospital is compliant with the Government PMTCT protocol, as shown in Table 3.9 and Figure 3.9.

Table 3.9: HIV Status of Women Admitted to the QMMH Maternity Ward in 2012

HIV-	2,918 (66%)
HIV+	1,248 (29%)
HIV status unknown	218 (5%)
Total	4,384 (100%)

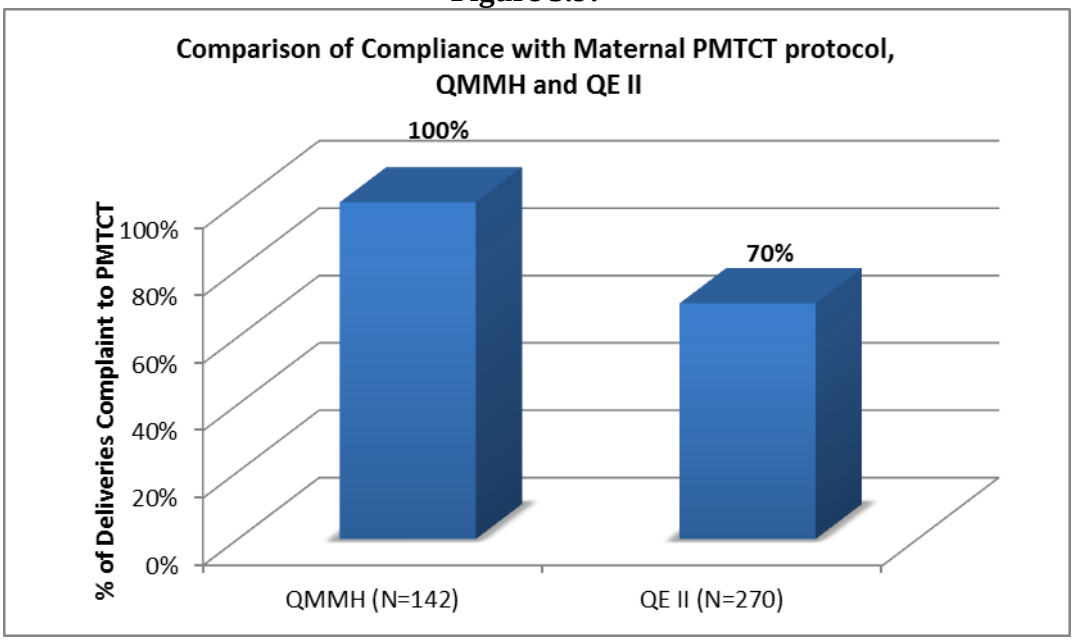
Data source: QMMH Maternity Ward Report. The stated HIV- and HIV+ statistics were incorrectly reversed in the original report and are corrected here based on information from Operations Director (email communication from Karen Prins to Taryn Vian, 5/12/13).

The percentage of HIV+ maternity patients (29%) is slightly higher than the population average of 23%.[29] This could indicate that HIV positive pregnancies are viewed as high risk and referred in greater numbers than pregnancies where the woman is not infected with HIV.

For the percentage of HIV+ women who received ART, the IM stated that they review 100 records per quarter or 10% of records of all HIV+ women admitted who gave birth in that quarter. They reviewed 44, 32, 35, and 31 records in quarters 1 to 4 of 2012, respectively.[30] We observed that the IM annual total of 1,263 applicable cases (HIV+ women admitted to the maternity ward) for review is much less than the 2,918 HIV+ women reported on the Monthly Maternity Reports in 2012. This suggests that the IM may have under-reviewed records.

At the same time, data from qualitative interviews suggested that compliance with ART treatment in HIV+ women was very high, lending support to the finding of 100% compliance by the IM.

Figure 3.9:



Data source: Independent Monitor reports

[29] National AIDS Commission. 2012. Lesotho Global AIDS Response Country Progress Report, p. 35.
[30] Original IM reports label quarters sequentially from the beginning of their contract. This means that Q1 is labeled Q7, Q2 is Q8, Q3 is Q9, and Q4 is Q10. We call them 1-4 since we are only concerned with one calendar year.

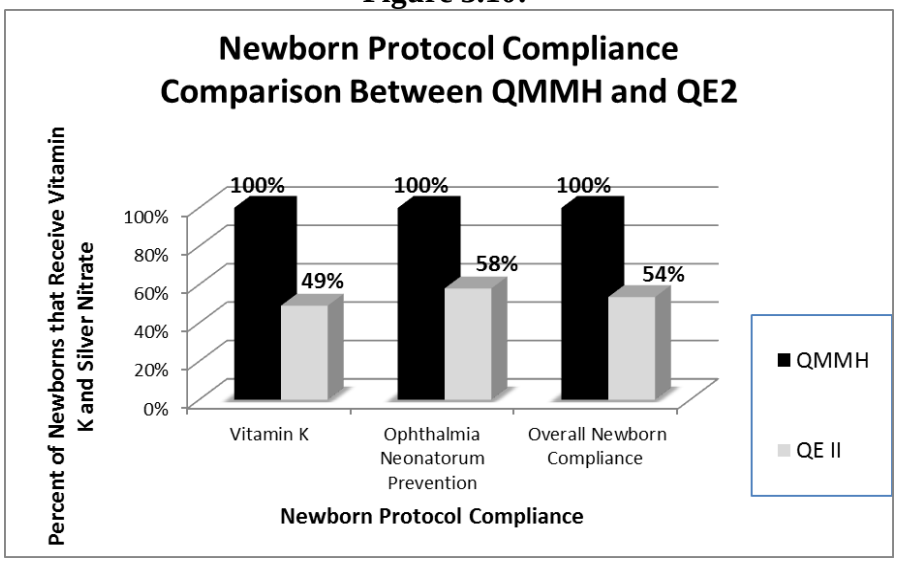
(PD1, PD2) Newborn Protocol Vitamin K and Eye Treatment
Percent of newborns who receive Vitamin K by injection and eye treatment for the prevention of Ophthalmia neonatorum.

Methodology: We used the 2012 data collected by the IM to evaluate indicator A4: Newborn Protocol ("compliance with national government protocol for newborns"). The Newborn Protocol requires recording of birth weight; skin, eye, and cord hygiene; administration of chloramphenicol or tetracycline hydrochloride eye ointment; and Vitamin K injection, and other best practice measures. Baseline data reviewed 120 randomly selected maternity charts (10 charts from each month over a 12 month period).

Findings: IM data report that the hospital is fully compliant with Government newborn treatment protocols. At baseline, QEII was only 49-58% compliant, based on the protocol. See Figure 3.10.

There are some concerns with the IM data involving these indicators. For the first and third quarters of 2012, the reported number of records reviewed was very small (4 and 3, respectively). The IM was contacted and they stated that the number of records reviewed for the first quarter was in fact 44, and 35 for the third. The reported number of records reviewed for the second and fourth quarters was 118 and 134, respectively. The IM was not responsive when asked to provide updated information on the number of records in compliance. However we assumed that the 100% compliance that the IM had reported was still valid.

Figure 3.10:



RECOMMENDATION:

(1) The Joint Services Committee should put in place a process for reviewing IM reports to assure accuracy of data. Reporting errors do happen, but they need to be quickly corrected and a new report submitted.

(CS16) Retrievable Medical Records
Percent of discharged patients who had a retrievable inpatient medical record. This is a hospital-level indicator only.

Methodology: We used the reports of the IM to evaluate indicator A8: Medical Records: Availability ("medical records that are available"). The IM assessed whether medical records were available three months after discharge by examining records of all patients who were discharged on a randomly selected day in each quarter of 2012. To supplement the IM report, we report on the percentage of medical records that were retrievable for the 319 chart pulls done during the endline study. These include the number and percent of retrievable charts requested for C-Sections (n=50); NICU admissions (n=127); and Femur Fractures (n=142) cases. All data are hospital-only, and not filter clinics.

It is worth mentioning that there were almost no medical records handed over to the operator of QMMH-IN at the time QEII was closed. A new set of medical records had to be created by staff as patients presented.

Findings: The IM examiners were able to retrieve 100% of the inpatient medical records they sought, compared to 73% records which were retrievable at QE II (Figure 3.11). BU evaluators were able to retrieve 89% of records sought.

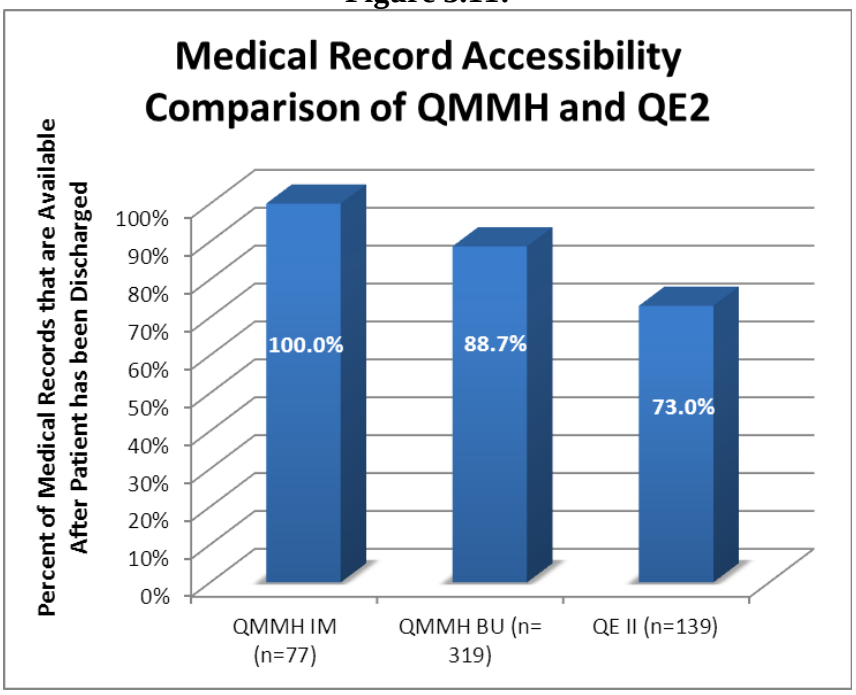
There are some concerns with the IM data. For the first three quarters of 2012 the IM reviewed 19, 6, and 11 records (for the fourth quarter they reviewed 41 records). Though possible, it seems unlikely that the total number of discharges for a 380 bed hospital on a randomly selected day for each of these quarters is less than 20 patients or as low as 6 patients in one quarter (for the second quarter). The IM was contacted and confirmed that these were the number of records reviewed but did not reply with information on the dates for sample selected. As a result we could not verify if the number of records reviewed included all records of discharged patients on the randomly selected day.

According to the authors of the QE II baseline report, the 73% figure for QE II is artificially high as the baseline team carried out a rigorous search unlikely to be done by busy medical record staff.

The endline study team's experience of receiving 89% of charts may reflect real world conditions. Medical records staff were given a list of chart Patient Medical Indexes (PMIs) and asked to pull them, with no other instructions. However, charts were not randomly selected for the endline chart requests but were done for specific ICD and procedure codes (C-sections or femur fractures), or for patients admitted to a specific ward (NICU). In our experience chart retrievability varied between our different chart pulls, with most of the unavailable charts (30 of the 36 unavailable charts) being from the NICU pull. There is a higher mortality rate in NICU patients compared to the other types of charts, and deceased patient charts are filed in a different section of medical records, perhaps making it more difficult to locate them.

While a retrievable medical record is an essential adjunct to providing quality care in a system that uses paper records only, it is less important in a system that has both electronic and paper medical records. In addition to having paper records, QMMH-IN the SAP electronic medical record (EMR) system. Clinicians with access can retrieve a patient's record electronically. Currently the paper records may have more detail and be more complete than the EMR; however, as medical coding and the ability to add additional information into the EMR improves, the EMR record may be as complete, or more complete, than the paper medical records. If this is the case, the ability to retrieve paper medical records would no longer be an indicator of quality care.

Figure 3.11:



RECOMMENDATION:

(1) This indicator should be revised in the future to test for retrievability of electronic medical records if they contain information comparable to paper records.

(2) The Joint Services Committee for the PPP should determine if the IM is correctly sampling indicators. In the event that the IM chooses a random date on which to analyze discharges, the hospital financial manager should independently report the actual number of discharges on that date, to provide a control that an adequately sized sample has been drawn.

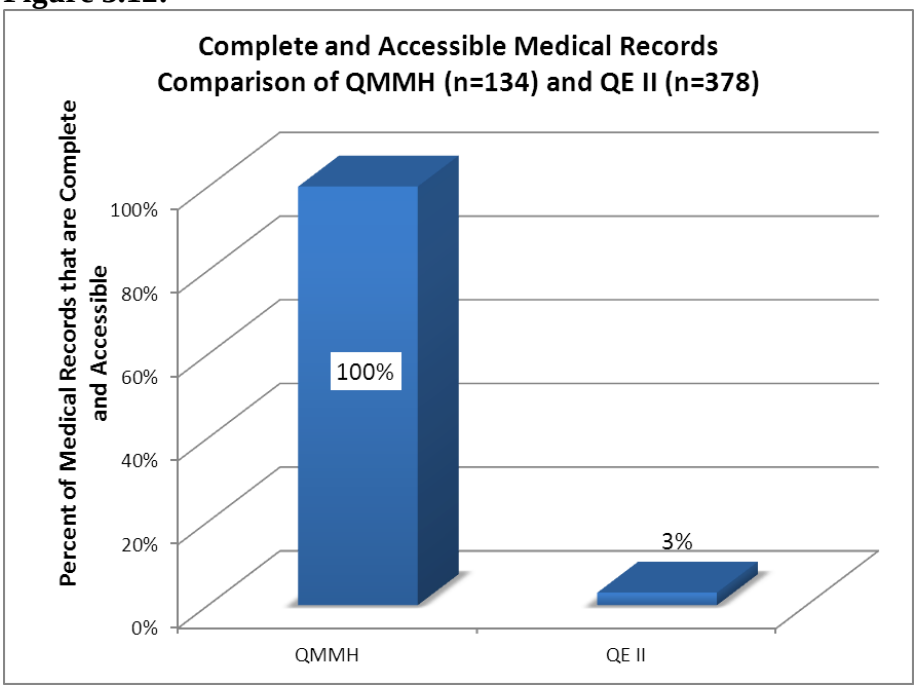
(CS14) Medical Records Completeness

Complete set of vital signs and physician's note in file for non-obstetric inpatient medical records recorded at least once per day throughout the patient's stay. This is a hospital-level indicator.

Methodology: We used the reports by the IM to evaluate indicator A9: Medical Records: Accuracy and completeness ("medical records that are accurate and complete"). Each quarter the IM examined records of all patients who were discharged on a randomly selected day, at least 3 months after discharge. They assessed two indicators of completeness: (1) complete set of vital signs at least one per day, and (2) a physician's note at least once per day (excluding obstetrics where notes are generally written by nurses). Although the baseline gathered additional data (i.e. charting of vital signs up to 4 times per day, and various levels of partial vital signs) we believe these two indicators are adequate to provide comparison to baseline.

Findings: The IM reported that 100% of the 134 records they evaluated were complete, compared to only 3% at QE II, as shown in Figure 3.12.

Figure 3.12:



Over the course of 2012 the IM reviewed 134 records. The IM stated that they request all records of discharged patients on a randomly selected day. The numbers of charts requested for the first 3 quarters of 2012 appeared very low for a 380 bed hospital (15, 6, 11, respectively; 102 charts were reviewed in the 4th quarter). The IM was contacted but did not reply when asked what days were randomly selected. We were therefore unable to verify if the appropriate numbers of charts were reviewed.

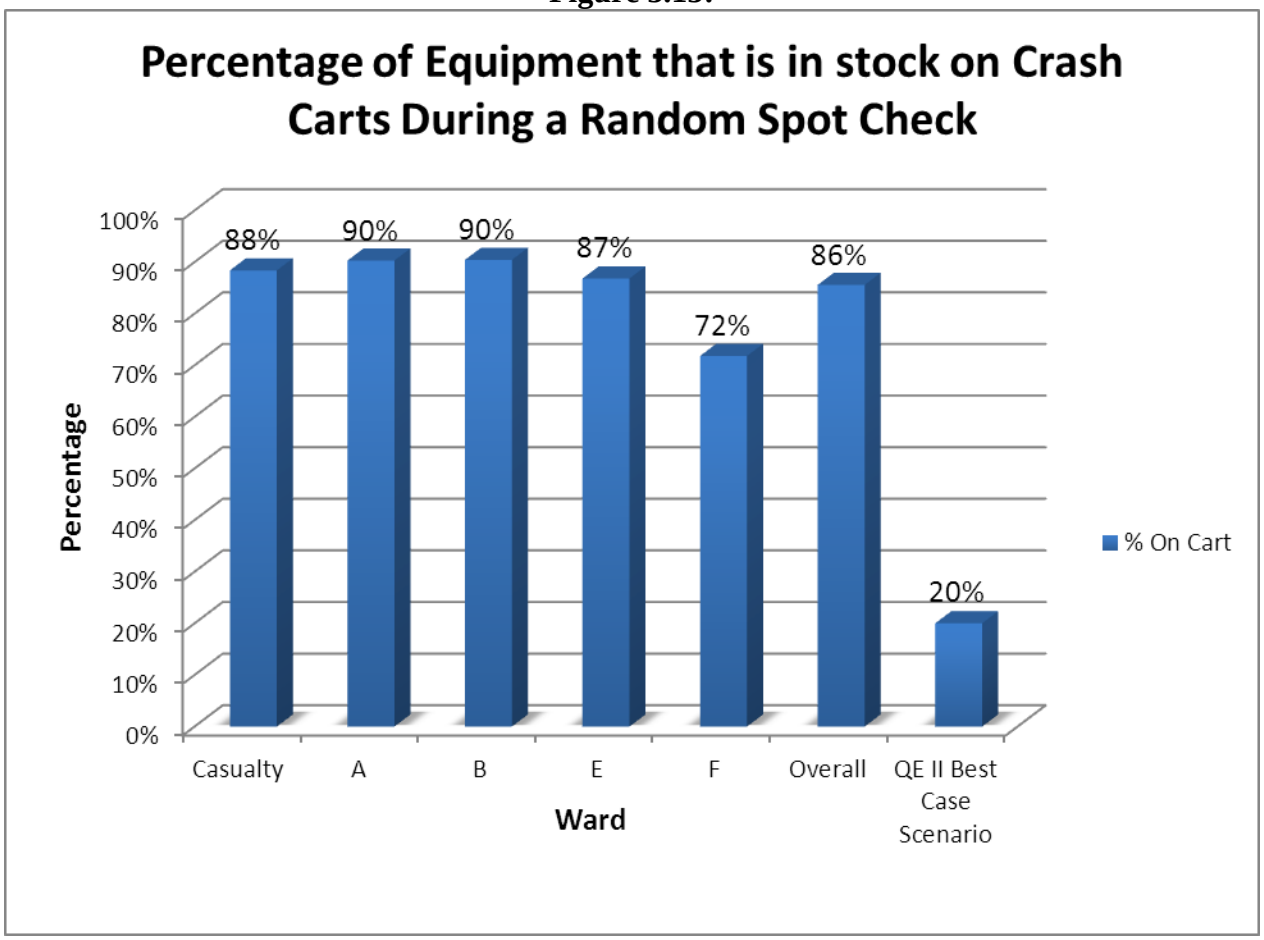
(MS17) Emergency Equipment Supplies
Availability of a fully equipped crash cart in the Casualty unit and hospital medical wards; and crash cart retrievable within 4 minutes.

Methodology: We requested a list of the quantity and types of items expected to be on a fully equipped crash cart at QMMH. We obtained the list from the Pharmacy Manager (for consumables) and Equipment Manager (for small equipment). Then, an inventory of the crash carts was done using direct observation against this list in the Casualty, and Surgical and Medical wards (A, B, E, and F). We compared the total items observed to be on the cart with the total items expected to be on the cart (72 or 74 items, depending on the ward), and calculated a percentage of items found on cart. For equipment that was only partially in stock on the cart, the percentage that was present was recorded. For example, 2 syringe catheter tips are expected to be on each cart. If a cart had only 1 unit, we recorded 0.50 (50%). Retrievability of crash carts was done by direct observation.

Findings: Crash carts were available within 1 minute in all 5 locations at QMMH, and most were well equipped, with carts having 72%-90% of expected items (Figure 3.13). This compares to only 1 crash cart available at QE II.

Crash carts are located in each ward at QMMH and all are within a minute of patient beds. Nurses do crash cart inventories twice a day (morning and evening) and replace missing items. Pharmacy staff also track expiration dates of drugs on crash carts and replace them as needed.

Figure 3.13:



The comparison of the availability of a 'fully equipped' crash cart between QMMH and QE II is somewhat difficult. The criteria outlining what constituted a fully equipped crash cart at QE II differed from the criteria used for QMMH, with QMMH have a more extensive list and number of items (See Annex D for the complete list of items used in the QMMH criteria). While the Baseline Report listed items used for QE II, quantities were not given. Furthermore, at QE II none of the surgical or medical wards had a crash cart that was available within 4 minutes of the ward. At QE II Casualty had a crash cart, but it is unclear how well stocked it was. Therefore, in a best case scenario, with a 100% stocked crash cart in Casualty, QE II would have a fully-equipped crash cart available within 4 minutes of only one of the five wards assessed (Casualty, and two medical and two surgical wards), yielding a 20% score.

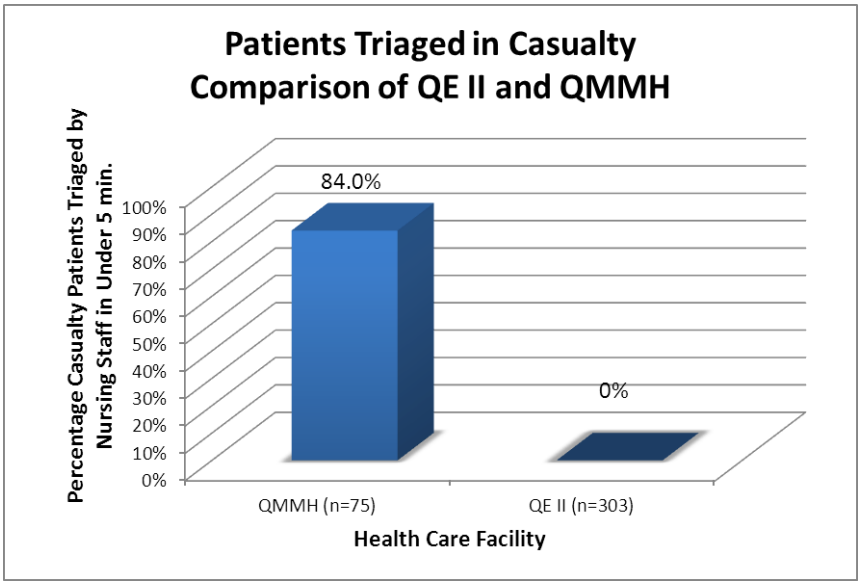
(CY1) <u>Triage</u>

Percent of patients who are triaged by an appropriately trained nurse within 5 minutes of arrival at the Casualty ward.

Methodology: Triaging methods in the Casualty ward were determined through direct observation for several hours on 4 days in March 2013. Observations took place on a Tuesday, Wednesday, Thursday, and Sunday. Two observations were during a shift change (e.g. 5 p.m. to 7 p.m.). Based on key informant interviews with Casualty staff, we describe the type and coverage of nurse training to appropriately triage patients.

Findings: We found that 84% of patients were triaged within 5 minutes of arrival in Casualty on average, with a range of 56% to 100% depending on the time of observation (Table 3.10). However, some patients were triaged by a Nursing Assistant rather than an RN. The triage system is explained below, followed by more detail on our findings.

Figure 3.14:



A triage system was implemented in the Casualty Unit at QMMH in February 2012, with three priority levels: P1- patients need medical attention immediately; P2- patients require treatment within 60 minutes; P3- patients can wait for medical attention for 60 minutes or longer.

The nursing staff in Casualty is made up of 19 Registered Nurses (RNs) and 12 Nursing Assistants (TANs). Twelve Casualty Unit RNs received training in South Africa covering Basic Life Support (BLS) and a short version of Advanced Trauma Life Support (ATLS) training. Both trainings, which each lasted 1-2 weeks, had exams and successful candidates acquired certificates. The ATLS training included triage process and skills. The nursing staff spend 4 months in South Africa during the initial training period. RNs and TANs may also receive training on the job. All RNs are expected to do triage. Most of the staff also have completed Advanced Cardiovascular Life Support (ACLS) training that was presented in Lesotho.

In principle, walk-in patients to the Casualty ward are greeted by a triage-trained RN at the front desk who does a basic assessment based on a visual examination and discussion with the patient. The nurse pays particular attention to the "ABCs" (airway, breathing, circulation). If the patient is assessed as being P1 (e.g. the patient has open wounds, asthma, seizures, burns or fractures), he/she is immediately directed to the resuscitation room or a procedure room, and 'P1' is noted on the intake form. If the patient is assessed as being P2, or P3, the nurse puts the P number on the intake form, the patient is asked to register at the registration desk and take a seat until another nurse can do a more thorough assessment in a private triage room (e.g. blood pressure, O2 saturation, heart rate, etc.). Nurses call patients in order of their P number priority for this assessment, and children/babies are prioritized over adults.

In practice, however, the process works a little differently (see process chart in Figure 3.15). From our observations in Casualty we found that initial greeting at the front desk was not always done by an RN trained in triage. Due to RN staffing issues, at times a nursing assistant worked at the front desk. Observations of the triage process showed that in practice the system worked well for P1 patients. Urgent cases went directly to the nursing staff member at the front desk and were immediately directed to the resuscitation room or a procedure room. Patients with less urgent needs, however, sometimes did not go to the front desk to check in. The process then relied on the person at the front desk being

attentive and checking the waiting room for new patients, and then calling them up to the desk. By the end of our observations, signs had been put up in Sesotho and English requesting that patients check-in with the nurse at the front desk upon arrival.

During our 8 hours of observation, we recorded 75 patients, of whom 63 (84%) on average were triaged within 5 minutes (range: 56-100%). It is unclear if an RN trained in triage did the initial triage, however. For this reason, the 84% should be viewed as a best case scenario. The Baseline report stated that it was not possible to measure this indicator at QE II because nurses were not triaging patients.

Table 3.10: Triage Time by Date Observed, QMMH compared to QE II.

	Under 5 min.	Over 5 min.	Total	% under 5 min.
Tuesday March 12, 2013 (9:25-11:25)	31	1	32	96.9%
Wednesday March 13, 2013 (17:20-19:35)	9	7	16	56.3%
Sunday March 17, 2013 (16:53- 19:15)	7	4	11	63.6%
Thursday March 21, 2013 (12:05-14:05)	16	0	16	100.0%
QMMH (n=75)	63	12	75	84.0%
QE II (n=303)	N/A	N/A	0	0%

We observed some gaps in the triage process. For example, during nurse shift changes the front desk was unoccupied for long periods of time (45 minutes during one observation). During these times the Casualty Unit guard would sometimes take urgent cases back to the procedure rooms; other times the urgent cases would just go back on their own and find a nurse/physician. Less urgent cases were left to wait in the waiting area until a nurse appeared to check them in. During non-shift change times a person was at the front desk continuously with few exceptions, and during these exceptions her absence was short (1-2 minutes), usually related to taking patients to the resuscitation or procedure rooms.

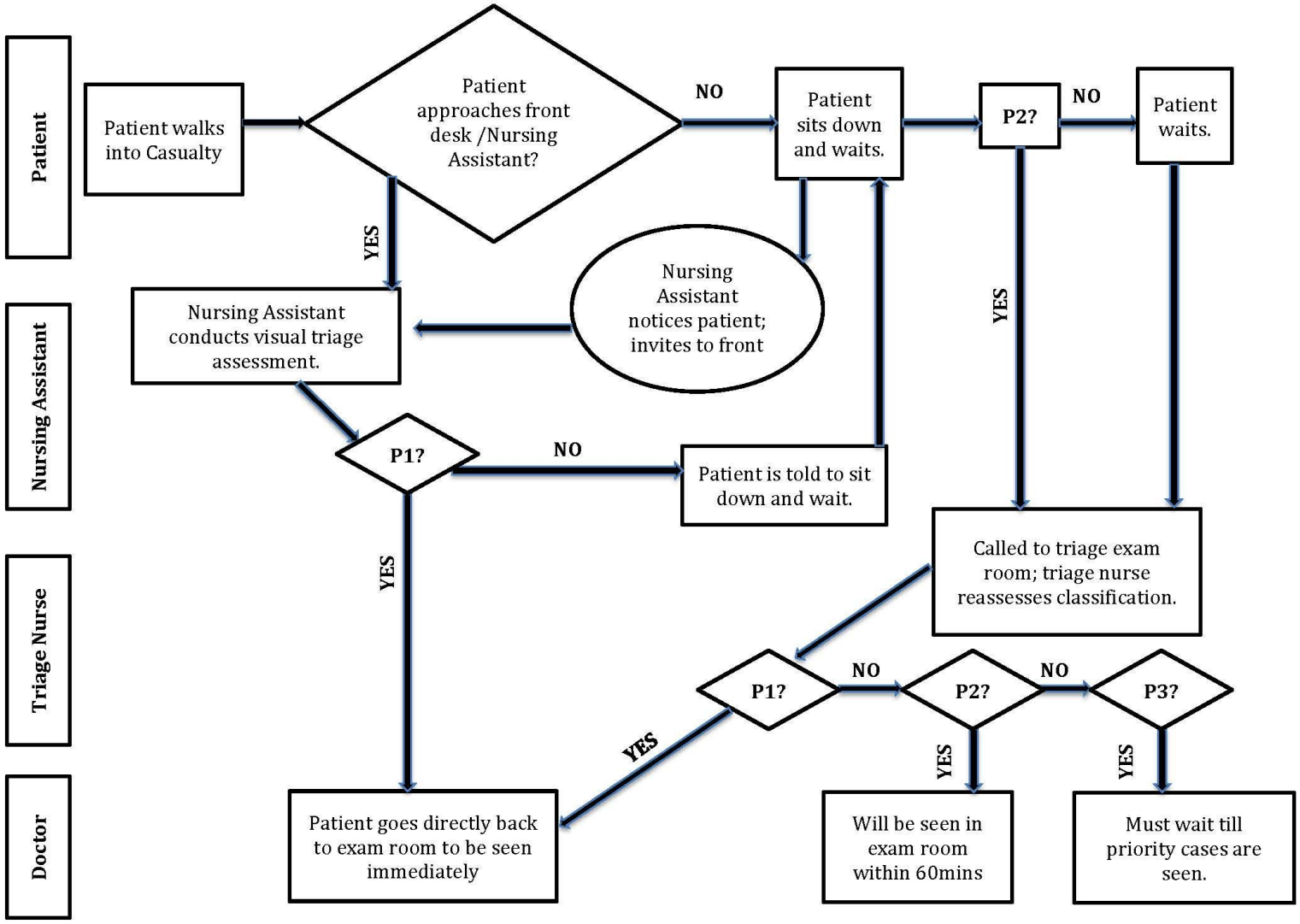
Anecdotally we heard from the Casualty Nursing Manager that patients were happy to be greeted by a nurse as soon as they arrived in the Casualty Unit, rather than by the Registration staff as was done in the past. In addition nurses thought the system made it easier to identify urgent cases. For instance, caregivers of patients often came to Casualty but left the patient in the car until they could be seen. Caregivers might not communicate the urgency of cases. By nurses interacting with the caregiver at arrival they could request that patients be brought in quickly for assessment. In addition they stated that patient satisfaction surveys showed that since the triage process was implemented fewer patients complained about long waits to be seen in Casualty.

RECOMMENDATION:

(1) Appropriate triage improves efficiency of care in the Casualty unit and patient outcomes. All RNs in Casualty should be formally trained in triage. Ideally, the front desk should always have a triage-trained RN on duty. If staffing levels will not permit this and triage-trained nursing assistants will be used, the policy should be adjusted and supervision systems adapted to assure triage decisions are appropriate.

(2) It may also be useful in the Casualty unit to measure time to be seen by a physician, especially for P1-patients. This would help identify the extent to which doctors are a bottleneck affecting patient flow and timely treatment in Casualty.

Figure 3.15: Process Map of Triage in Casualty Ward at QMMH, March 2013.



(MD2) Availability of Thrombolytics
Availability of the thrombolytics rtPA (Actilyse) and streptokinase (streptase) for use in the treatment of acute myocardial infarction (MI) and ischemic stroke (Yes/No).

Methodology: The availability of thrombolytics was determined by interviews with the intensivist (physician) and pharmacy informants and reports of medicines in stock. We describe how the hospital developed protocols for the use of expensive thrombolytics used in the treatment of acute myocardial infarction and stroke, and training given to staff. We discuss the procedures in place to ensure availability of these thrombolytics.

Findings: Thrombolytics are available. The protocols and supply systems are described below.

Thrombolytics are drugs commonly prescribed to dissolve clots associated with myocardial infarction and ischemic stroke. At QMMH several thrombolytics are available, including aspirin, enoxaparin, and rivaroxaban (brand name Xarelto®) for hip/knee[31] replacements; recombinant tissue plasminogen activator (rtPA) for stroke; and streptokinase for myocardial infarction. To outline their appropriate use and set eligibility criteria, especially for the use of rtPA and streptokinase which are both expensive medications, a thrombolytic protocol is being developed. There is a need for thrombolytics to treat stroke and myocardial infarction patients because the closest treatment center with cardiology services is Bloemfontein, at two hours distance, and the effectiveness of thrombolytics in patients is very time sensitive. QMMH's intensivist has taken the lead in drafting the thrombolytics protocol with input from hospital pharmacists, the Medical and Casualty departments, and experts at Bloemfontein. Bloemfontein is involved because it is important that they are aware of the patient's management prior to arrival.

Internal medicine physicians learn appropriate use of thrombolytics while rotating through the ICU. Nurses have also been trained, especially in Casualty, and all other departments have been informed of the protocol.

It is unclear what the need for rtPA and streptokinase will be. It often takes time for patients to get to the hospital and given the time sensitive nature of treatment (streptokinase must be administered within 12 hours of myocardial infarction symptoms; and rtPA within 3 hours of stroke symptoms) many patients may present outside of the window of treatment opportunity.

There is stock of aspirin, enoxaparin and rivaroxaban in the pharmacy, and one dose each of rtPA (Actilyse 100 mg) and streptokinase (Streptase 7500 units). The policy is that RTPA and streptokinase doses are to be replaced as they are used, but as of April 2013 the drugs had not been used for a stroke or MI case. Enoxaparin and rivaroxaban have been routinely used in hip/knee and other surgical cases. In 2012 1,117 doses of enoxaparin and 26 doses of rivaroxaban were administered, according to pharmacy records.

(SG3) Rapid Treatment of Femur Fractures
Femur fractures operated on within 24 hours of admission as a percent of total operated femur fractures.

[31]Knee replacements were done as part of the Eastern, Central & Southern Africa (ECSA) Medical and Surgical Camp arranged by the Ministry of Health (http://www.health.gov.ls/index.php?option=com_content&view=article&id=58:ecsa-medical-a-surgical-camp-in-lesotho&catid=45:news&Itemid=16) Otherwise knee replacement is not a routine operation within the PPP agreement.

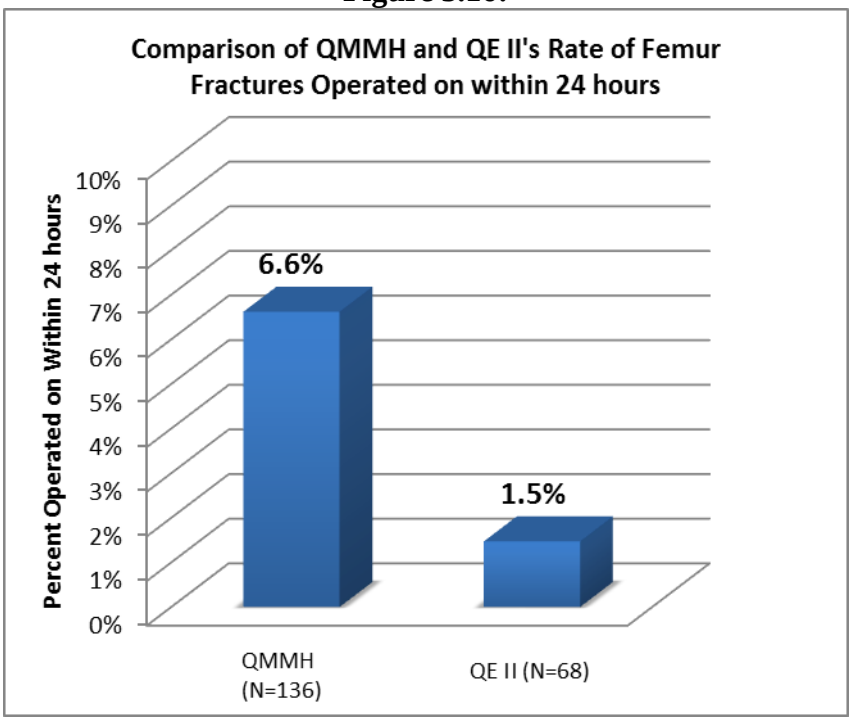
Methodology: Treatment of femur fractures was chosen as an indicator on prompt surgical care. The total number of femur fractures from January to December 2012 was obtained through review of operation logs. The medical records of these patients were reviewed to record time of admission and time the patient was taken to theater. We subtracted the admission time from theater time to determine days/hours until surgery. We counted the number of patients with days/hours to surgery under 24 hours and under 48 hours. The percent of femur fractures operated on within 24/48 hours was calculated as the number of patients with femur fractures operated on within 24/48 hours divided by the total number of patients with femur fractures, and multiplied by 100. We also determined the average days until operation for all cases.

Findings: Few femur fractures (6.6%) are operated within 24 hours, although the percentage is higher than at QE II (1.5%). Thirty-one percent of cases are operated within 48 hours. The average time to operate on a femur fracture was 4.2 days.

Table 3.11: 2012 QMMH Femur Fracture Operations.

	Number of Patients (%)
Within 24 hours	9 (6.6%)
Within 48 hours	42 (30.9%)
More than 48 hours	85 (52.5%)
Total Patients with Femur Fractures	136 (100.0%)

Figure 3.16:



At QE II, 48 hour data were not collected, so a comparison is not possible. According to the orthopedic surgeon in charge, delays in time to surgery are related to time needed to prepare the patient for surgery (e.g. patients may need X-rays or other studies), and patient volume and ward capacity, with

higher patient volumes leading to longer times to surgery. The number of femur fracture operations done at QMMH was twice the number done at QE II.

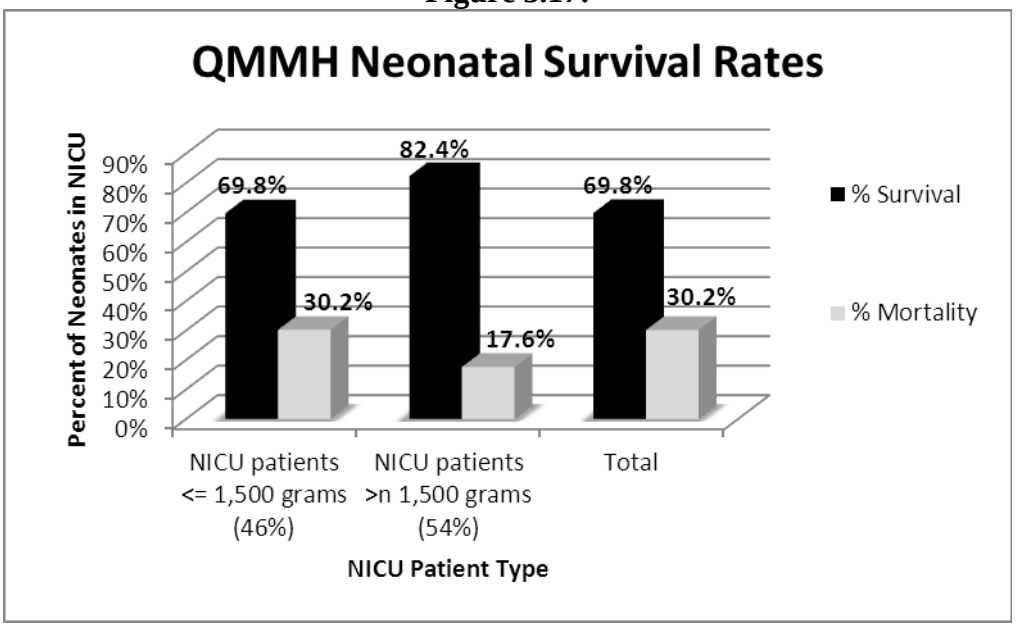
(PD4) Neonatal birth weight and survival

Percent and survival to discharge of neonates in the NICU ward with birth weights less than or equal to 1,500 grams (3 lbs.).

Methodology: This is an indicator of clinical quality, as it is difficult to treat infants with very low birth weight. It is also an outcome measure. Birth weight for neonatal admissions is recorded on the patient chart but is not entered in the electronic medical record. We listed all neonates admitted in four months in 2012 (Jan, April, Jul, Oct). From this listing of PMI (patient master index) numbers, we drew medical records and recorded birth weight and discharge status (survived or died). Records were grouped into birth weight less than or equal to 1,500 grams, and over 1,500 grams. For each group of neonates, we determined the number who survived to discharge. The percent of neonates with birth weight less than or equal to 1,500 grams was calculated by dividing the number of neonates <= 1,500 grams by the total number of neonates in the sample and multiplying by 100. Survival rate was calculated by dividing the number of neonates who survived in each birth weight group by the total number of neonates in that group.

Findings: The hospital is able to successfully treat and discharge many very low birth weight babies. We were able to retrieve records of 94 (76%) of the 127 NICU patients discharged during the period under study. Among these patients, 43 (46%) had birth weights equal to or less than 1,500 grams, and about 70% of these survived to discharge. Of the 51 infants weighing more than 1,500 grams, the hospital was able to save 82%. The lowest birth weight neonate who survived to discharge was 700 grams (1.5 lbs.), among the records reviewed.

Figure 3.17:



The remaining 33 records were either missing (n=30) or did not have birth weight information (n=3). However, all of these records but one had information in SAP regarding whether the patient died in hospital or was discharged alive (16 died in hospital and 16 were discharged alive) giving an overall NICU mortality rate of 30% (38/126), as shown in the Total column in Figure 3.17.

RECOMMENDATION:

(1) QMMH should investigate how NICU patient medical records are stored, especially deceased patients. By documenting standard procedures and conducting periodic audits, the hospital may be able to improve the process by which records are retrieved.

(CS9) Laboratory test turnaround time (TAT)

Time elapsed between when a sample is received in the laboratory to the time test results are reported.

Methodology: We measured this indicator in two ways. First, we used the Independent Monitor report data for 2012. The IM's indicator Provision of Laboratory Services (A7 Laboratory Services Test Turnaround Time) measured if 90% of laboratory results were reported for key tests within 60 minutes, from the time the specimen was logged into the lab to the time the test result was reported electronically, by telephone or lab result slip delivery. The tests monitored by the IM are: 1) urea, electrolytes, and creatinine; 2) glucose; 3) neonatal bilirubin; 4) beta HCG; 5) full blood count plus platelets; 6) cerebro-spinal fluid cell count; 7) HIV screening; and 8) CD4. The IM was contacted to get more information about the number of lab tests that were measured for their indicator but they were not responsive.

We also measured this indicator using the 2012 monthly activity reports produced by the laboratory. These reports contain data on the time from receipt of a specimen in the laboratory to electronic reporting of results for 7 tests: 1) cerebro-spinal fluid cell count (CSF); 2) full blood count (FBC); 3) glucose (measures amount of sugar glucose in a sample of blood, for diagnosing pre-diabetes or diabetes); 4) glucose fasting (more definitive test for diabetes, with sample taken 8-12 hours after eating); 5) beta human chorionic gonadotropin (HCG; pregnancy test); 6) HIV screening; and 7) urea, electrolytes (UE; kidney function test). We were only able to obtain 9 months of data (January-September 2012); hospital staff could not locate the remaining 3 months. We collected data on total number of tests run during the period, and turnaround time per test. For CFS and FBC testing a sampling frame selecting every 40^{th} test (2.5% sample) was done. For all other tests, all tests were assessed. The overall turnaround time was weighted by test frequency, with types of test run more frequently being more heavily weighted.

Findings: The IM report stated that for all four quarters in 2012, 90% of all laboratory tests were completed within 60 minutes, meaning that the hospital was <u>100% compliant</u> with the indicator for all of 2012. The report did not include the number of tests used to make this determination.

Our own analysis had similar findings. Based on our sample of 1,113 tests, the average TAT was 49 minutes. Turn-around time ranged from 33 minutes for glucose fasting test, to 107 minutes for HCG (pregnancy) test, as shown in Figure 3.18.

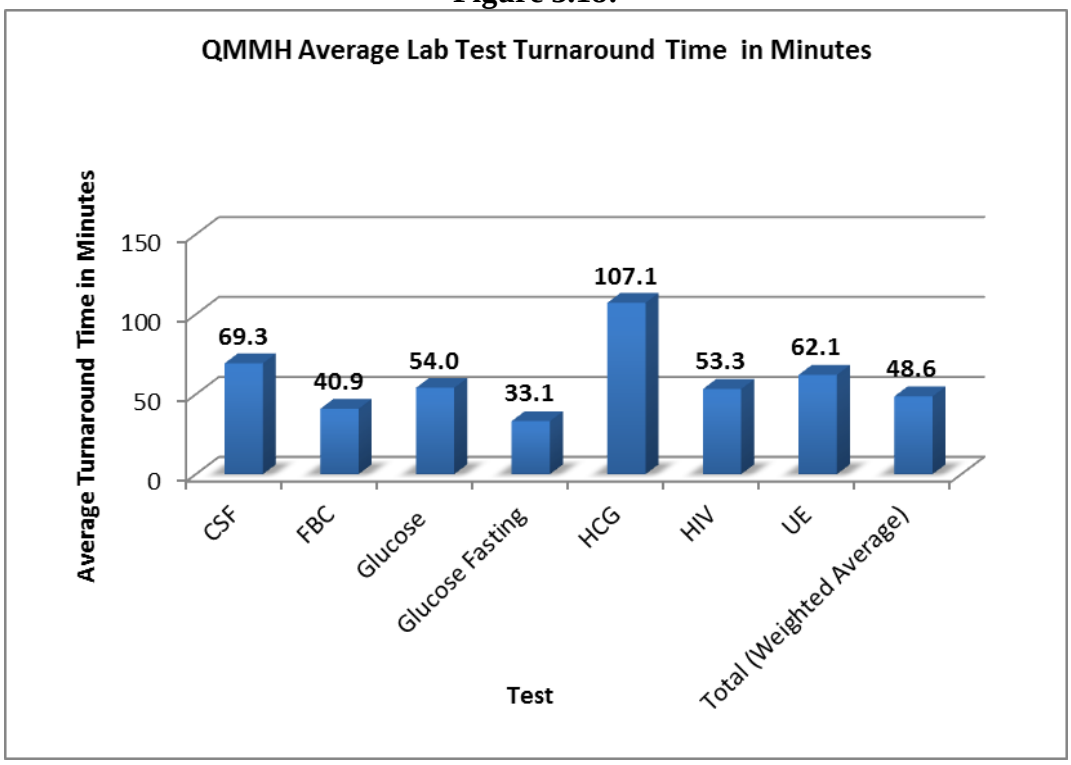
The majority of small delays affecting TAT were attributed to:

- additional time needed to do further studies to investigate an abnormal test result before reporting;
- peak testing times that had larger workloads (as workloads increased, TATs also increased); and
- requisitions which were missing information (e.g. patient date of birth).

Longer delays affecting TAT were due to network and power problems. During times when the QMMH generator is tested (twice a month) or the emergency generators are tested, tests cannot be run

and there are delays of an hour or more when instruments are brought back online. In addition, in 2012 Vodacom Network down time was a continuous problem, according to key informants. For instance, from April to September 2012, the Vodacom Network was down 33 days, or an average of 5 days each month. The Vodacom Network is used to transmit results electronically and when it is down staff said that results cannot be reported; however, the Operations Director stated that the majority of the tests are performed on site and results can be printed so this function should not be dependent on Network availability. It is possible that additional training of staff is needed.

Figure 3.18:



(RF1) Unique Referrals to Bloemfontein
Percent oncology cases referred to Bloemfontein broken down by adult and pediatric cases.

Methodology: We reviewed computerized patient data to collect the total number of unique patients and the total number of oncology patients referred to Bloemfontein broken down by adult and pediatric cases. For each age group (adult, pediatric), the percent oncology cases was calculated by dividing the total number of oncology cases referred to Bloemfontein by the total number of unique cases referred to Bloemfontein. Data were not available to allow us to classify patients by income level, therefore we cannot report on whether poor families or individuals are being adequately provided with services.

Descriptive data on the referral process is included in findings to put the quantitative data in perspective. We discuss how changes in diagnostics and availability, and training of specialists may be related to patterns of referral. We also discuss efforts by the hospital to manage referrals.

Findings: In 2012, QMMH unique referrals to Bloemfontein numbered 2,173, compared to 1,353 in 2006-7 for QE II (Figure 3.19). Forty-two percent (N=919) of QMMH referrals were oncology cases, compared to 49% (N=663) at QE II (Table 3.12). In the same time periods the total number of

outpatients and admissions, respectively, for QMMH and QE II were: 374,555 and 23,341 (QMMH) and 165,584 and 15,465 (QE II).

Patients requiring specialty services not offered at QMMH are referred to Bloemfontein for treatment. These include both services that are excluded under the PPP agreement, and some other services. Excluded services are paid for by the Ministry of Health outside of the hospital unitary payment and include: transplants (other than corneal); joint replacement (other than hip[32]); chronic end stage renal disease treatment; elective cardiac and vascular surgery; chemotherapy and radiotherapy; advanced fertility treatment (including in vitro fertilization); plastic surgery; and cosmetic dentistry. All other QMMH referrals to Bloemfontein are paid for out of the hospital's unitary payment. This creates an incentive for the hospital to bring specialty services in-house. Referrals to Bloemfontein must be approved by senior hospital staff (see narrative below). The majority of referrals are scheduled outpatient appointments (approximately 90%, according to a key informant) rather than urgent admissions.

Figure 3.19:

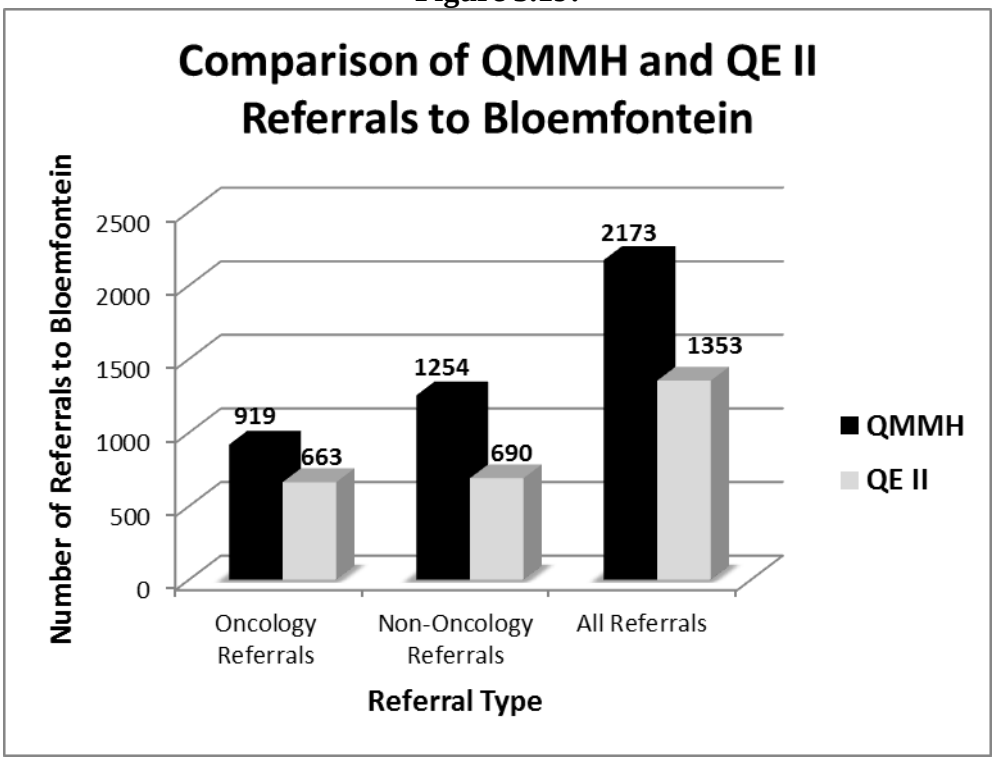


Table 3.12: Unique 2012 QMMH Referrals to Bloemfontein.

Unique Bloemfontein Referral	**Number (%)**
Adult Oncology Referrals	843 (92%)
Pediatric Oncology Referrals	76 (8%)
All Oncology Referrals	**919 (42%)**
Adult Non-Oncology Referrals	1,065 (85%)
Pediatric Non-Oncology Referrals	189 (15%)
All Non-Oncology Referrals	**1,254 (58%)**
All Referrals	**2,173 (100%)**

[32]Knee replacements were done at QMMH as part of an ECSA camp arranged by the Ministry of Health, but outside of this arrangement are not routinely done at QMMH and are excluded.

One of the goals of having the QMMH referral hospital is to retain a larger percentage of seriously ill, non-oncology patients rather than referring them to Bloemfontein for care. Patients receiving chemotherapy and radiotherapy are excluded from the PPP contract so the focus in on non-oncology patients. In order to make a comparison between QE II and QMMH regarding whether QMMH is caring for more seriously ill, non-oncology patients in-house, the number of non-oncology referrals to Bloemfontein should be viewed within the context of providing care for all seriously ill patients. Therefore it is useful to compare the numbers of such referrals to Bloemfontein as a percentage of inpatients, as inpatients are our best indicator of seriously ill patients.

The number of unique, non-oncology referrals by QE II and QMMH were 690 and 1,254, respectively, and the number of inpatient admissions was 15,465 and 23,341. The rate of non-oncology referrals to Bloemfontein as a percentage of inpatient admissions was nearly the same in both hospitals: 4.5% in QE II and 5.4% in QMMH. This shows that non-oncology referrals as a proportion of hospital activity are comparable, even though there has been a growth in work load and not all specialties are yet staffed at QMMH.

It is too early to assess trends in referral pattern changes as the mix of specialty services is currently in flux. The hospital intensivist is new, a urologist will join the hospital in May 2013, and the hospital is actively recruiting other specialists (e.g. neurologist, orthopedic surgeon). As the mix of in-house services changes, the types and numbers of referrals are also expected to change. For instance, of the 1,254 non-oncology referrals made in 2012, 196 were orthopedic cases, 121 were urology, 135 were neurology or neurologic surgery, and 140 were pediatric and adult cardiology referrals. Having a urologist, cardiologist and/or neurologist on staff will likely impact these referral types.

Bringing specialty services in-house may actually increase certain referrals. With the improved diagnostic ability of specialists, previously undiagnosed patients may be identified and need to be referred. For example, myocardial infarction patients may be more often diagnosed with a cardiologist on staff and these patients may then be referred to Bloemfontein for stents. In addition, with improved clinical care, some patients who would otherwise have died (e.g. pediatric cases with congenital abnormalities) are now surviving and are being referred to Bloemfontein for specialty services. While trends in referral patterns cannot yet be assessed, anecdotally key informants stated that not all specialist cases are being referred to Bloemfontein. Many cases are now treated at QMMH (e.g. patients needing some orthopedic procedures).

RECOMMENDATION:

(1) Trends in Bloemfontein referrals should be monitored over time. Referral information needs to be discussed in light of hospital plans for and progress in recruitment of specialists. While it is likely that most referrals are justified, the Joint Services Committee should consider conducting an in-depth analysis of referral patterns and reasons for referrals to better inform health system planning for the future. An analysis of referrals by income level may help evaluate questions of economic barriers to access.

(2) To assess whether some of the current excluded services that are referred to Bloemfontein should be brought into the contract with Tsepong, it would be helpful to analyze expenditures on Bloemfontein referrals and to quantify the burden on the health care system. It is possible that the MOH could take advantage of Tsepong's economies of scale to cut the costs of treatment.

3.4 PATIENT SATISFACTION

(PS1) Patient Satisfaction

Percent patient satisfaction, combining inpatient and outpatient

Methodology: We used the reports by the IM to evaluate C1: Patient and Family satisfaction. This indicator measures overall patient and family satisfaction with outpatient and inpatient services at the facility level. Outpatient and inpatient data are combined. Patients indicate satisfaction on a 5-point scale. In accordance with the IM's instructions, the hospital calculated percent satisfaction by adding the top two categories of response (100% satisfied and 75% satisfied) and dividing this total by the total patients who filled out the survey minus the patients who were indifferent (indicated 50% satisfaction, i.e. neither satisfied nor unsatisfied). We were unable to compare ward level detail, as it was not made available.

Comparative baseline data are from a survey of 391 ambulatory patients who sought care at outpatient clinics of QE II (including Casualty) and at the three filter clinics over a one-week time period in 2008.

Findings: In 2012, QMMH achieved an overall rate of 86%, compared to 71% satisfaction at QE II. Patient satisfaction at the filter clinics ranged from 69% to 92% in 2012. It should be noted that the sources of data and methods of data collection are not directly comparable, especially since QE II data include only outpatients and QMMH combined hospital and filter clinic data. See Figure 3.20.

Patient satisfaction appears to correlate with patient volume at the filter clinics. Likotsi has the lowest patient volume and the highest patient satisfaction of the three filter clinics, while Qoaling and Mabote have higher patient volumes and lower patient satisfaction. It is likely that lower volume clinics have shorter wait time, which could affect satisfaction. We were unable to measure waiting time during this study, but it is an important issue and should be studied in the future.

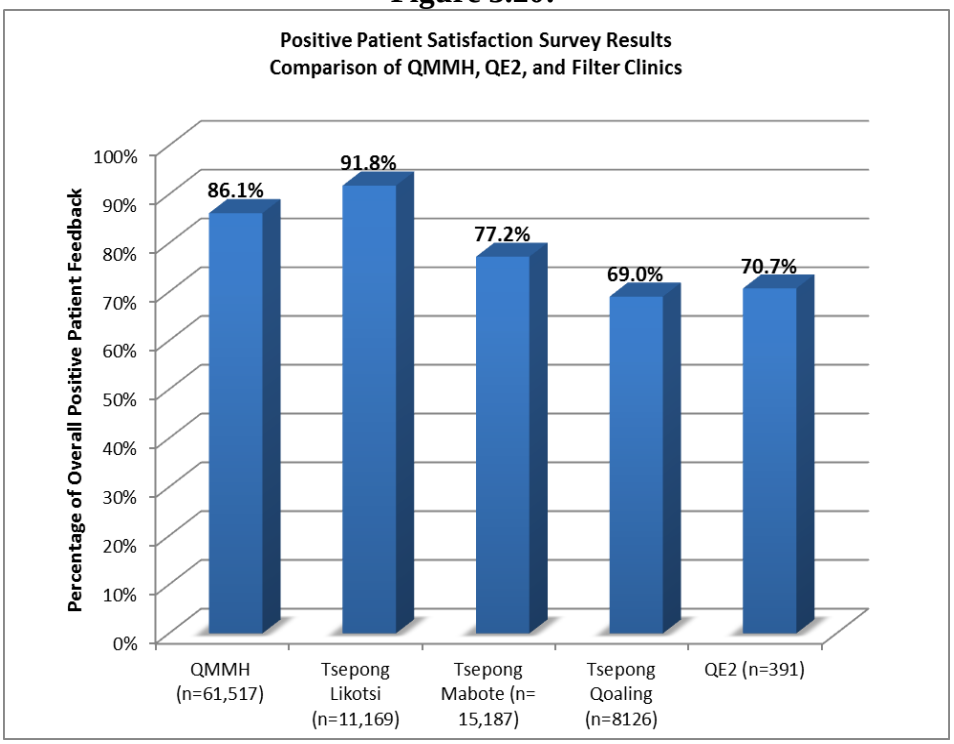
Process of data collection:
QMMH conducts patient satisfaction surveys on an ongoing basis and reviews data monthly. Different patient satisfaction questionnaires are available for inpatients and outpatients, in Sesotho and English. In addition, there is a customer service phone number which patients are encouraged to call to report incidents, lodge complaints or leave compliments. The questionnaire includes a general question about overall satisfaction with the service. The survey also includes questions about satisfaction with various services relevant to inpatients or outpatients (e.g. food service, pharmacy, laboratory, etc.).

For inpatients, ward nurses hand survey questionnaires to patients to complete as part of the discharge process. Friends and family members may also complete the questionnaire. In cases where a patient is not able to complete the questionnaire unassisted, a staff member may help. If someone has helped the patient complete the form, their name is recorded on the questionnaire. Patient satisfaction surveys are a relatively new concept to patients and some need assistance. For instance, some patients were checking 0% satisfaction because they had 0% complaints.

After completing the form, the patient submits it in unsecured collection boxes, also located on the wards. Ideally, nurses distribute the inpatient survey form as part of the discharge process and patients fill them out as they are leaving. In practice, however, nurses on the medical wards give the survey to patients several days after they are admitted. This change in procedure was allowed to increase

response rates tied to performance awards (see below). Completed inpatient surveys are submitted to the Public Relations Office by the help desk officer at the hospital.

Figure 3.20:



For outpatients and filter clinic patients the process is similar. Questionnaires are available in the outpatient and filter clinics. Porters at filter clinics distribute forms to patients and may help patients fill them out. Patients put completed forms in secured boxes at the clinic. Forms are submitted by the information clerks at the filter clinics to the Public Relations Officer at the hospital.

The question on general satisfaction has five response options: satisfaction of 0%, 25%, 50%, 75%, and 100%. Overall satisfaction is calculated by summing responses of the top two satisfaction response categories (75% and 100% satisfied) and dividing them by the sum of the 0%, 25%, 75%, and 100% responses. Patients answering that they are 50% satisfied are deleted from the denominator, reportedly because the IM thought that these patients were indecisive and therefore not relevant. QE II satisfaction rates were calculated to include the middle category of responses in the denominator. However, few observations fell into this category, so the data between QMMH and QE II are likely to be comparable. In addition patient satisfaction was not controlled for age, gender, educational level or patient mix at QMMH, variables that have been shown to be associated with patient satisfaction. The baseline study at QE II reported slightly higher satisfaction among women (72% versus 68%), and higher satisfaction among parents or guardians of pediatric patients. Comparisons may be inappropriate if QE II and QMMH had different patient populations regarding these patient characteristics (we did not analyze patient demographics).

The QMMH hospital management team rewards wards for high response rates and high patient satisfaction rates. Each month a ward is selected as having the highest satisfaction percentage score or the highest response number. Occasionally the management team selects a ward based on the "most improved" satisfaction rate. Everyone working in the winning ward, from consultants to cleaners, gets a 100M ($11) voucher to use at Pick n Pay (a large grocery store). Because patient lengths of stay in

the medical wards are longer compared to other wards, the medical wards were at a disadvantage to receive the highest response number award. To remedy this, they now survey inpatients 3-4 days after being admitted, rather than at discharge.

An analysis of the patient satisfaction data is done to detect problems. Frequent complaints are about nursing, the food service, the time it takes to register, and noise. If the complaint is serious, the Public Relations Officer follows up with the patient if contact information is available, or, if a complaint names a staff member, a manager will investigate and address the situation. Open-ended responses are organized by relevant ward and are sent to ward managers monthly, together with satisfaction rates. In this way, ward managers are aware of complaints in their wards and can take corrective action.

Patient satisfaction data is also used to make positive changes in systems and infrastructure. For example, at the filter clinics patients complained that seats were cold, and the clinics responded by adding PVC (polyvinyl chloride) slats. In addition, canvas sheets were installed to provide shelter against the elements.

Problems with the survey include:

- patients answering questions that are not relevant to their stay (e.g. Casualty patients commenting on their satisfaction with laboratory or X-ray services that they did not receive);
- not gathering patient perceptions from all patients (for example, data are often not reported by patients or families in ICU ward); and, initially,
- a long delay between survey administration and ward feedback, making it difficult to reward wards in a timely fashion.

An effort was made to analyze data sooner and now feedback is given to the ward managers within a few weeks.

We have some concerns about the validity of the patient satisfaction data. Several factors combine to possibly bias data towards higher satisfaction. For example, having patients fill out the survey while still in the hospital or at the clinic, having nurses (or others) help patients fill out the survey, having completed surveys submitted in unsecure boxes on the wards, and calculating satisfaction rates by excluding patients who are indifferent (50% satisfied). At the same time, it may be difficult to get patient satisfaction information after the patient has left the hospital or clinic, and patients who need assistance in reading or completing the form may not be included in survey data if assistance is not provided.

RECOMMENDATIONS:

(1) To reduce possible bias in patient satisfaction data, the MOH and hospital should consider surveying patients after they have been discharged. Alternative methods might include sending research assistants to patients' homes, or using patient cell phone numbers to text them a brief patient satisfaction survey that they can text back. In addition, getting patients' age, gender, income level, educational level and health status would allow analysis to control for these characteristics and to identify disparities. This would guide policy involved with incentivizing poor families to seek treatment.

(2) The Joint Services Committee should consider whether it might be useful to periodically conduct an independent evaluation of patient satisfaction.

3.5 OUTCOMES

(UQ4) Death rate and Deaths Within 24 Hours

Death as a percent of admissions network-wide (including hospital and filter clinics) and by ward, and the percent of deaths within 24 hours of admission. This includes maternal deaths.

Methodology: The total number of admissions (including maternity admissions at the three filter clinics), the total number of deaths (including maternity deaths at the filter clinics) and the total number of deaths occurring within 24 hours of admission by ward were collected through examination of monthly computerized data reports for January 2012- December 2012. Death as a percent of admissions was calculated by dividing the total number of deaths by the total number of admissions system-wide (including the maternity admissions at the filter clinics) and by ward. The percent of deaths within 24 hours of admission was calculated by dividing the total number of deaths within 24 hours by the total number of all deaths system-wide and by ward.

Findings: Overall mortality at QMMH is 7.1% including deliveries at filter clinics, compared to 12% mortality at QE II, or a 41% reduction in mortality (Table 3.13). If QE II could have performed as well as QMMH, an additional 683 lives per year would have been saved. At QMMH hospital, 29% of deaths were in 24 hours of admission compared to 35% at QE II, suggesting much better casualty service and prompt lab tests and access to surgery. Death within 24 hours of admission has fallen in every ward from QE II levels. There were no deaths at the filter clinics during the year.

Medical patients

Male and female medical patients had higher mortality rates at QMMH (33% and 30%, respectively) compared to QE II (26% and 19%, respectively). While it is unclear why this is the case, it is possible that the treatment and care of HIV+ patients explains some of the discrepancy. ART treatment for HIV+ patients has improved since 2007. In 2007 patients with end stage AIDS were likely sent home to die and would not be reflected in QE II mortality rates. In 2012, at QMMH, patients who fail ART are admitted to the medical ward and are more likely to die in hospital.

In addition, it is possible that patient acuity was higher at QMMH than at QE II, although we could not confirm this. Anecdotally we heard that very sick patients might not go to QE II because it was felt that the hospital could do nothing for them, while such patients are admitted to QMMH. In 2012 filter clinics might also do a better job than they did in 2007 in treating patients, so that patients who are referred to QMMH have higher acuity compared to those who were previously referred to QE II. Furthermore, it is possible that some patients who were admitted through Casualty at QMMH would have previously died in Casualty prior to admission at QE II and therefore would not be counted as deaths in the QE II medical wards.

Surgical patients

Mortality rates in female surgical patients increased (from 6% to 7.6%) at QMMH compared to QE II, while it decreased in male surgical patients (from 8% to 6.2%). This could possibly be attributed to differences in types of surgical patients in male and female wards, and improvements in some areas of treatment. For example, there are many patients with terminal breast cancer on the female surgical ward. At QE II these patients were likely sent home to die and would not be reflected in their mortality statistics, while at QMMH they are cared for and die in hospital. In addition, care for trauma patients has improved at QMMH compared to QE II and there are more male than female trauma patients. This

contributes to reductions in QMMH male surgical mortality rates compared to QE II, and also differences in mortality rates between male and female surgical patients at QMMH.

Maternity patients
Maternity mortality was 0.24% at QE II (12 deaths out of 5,116 deliveries)[33], while QMMH experienced 19 deaths out of 8,941 maternal admissions including filter clinics (0.21%). A 2008 Lesotho population-based estimate for maternity mortality rate was 964 deaths per 100,000 live births[34] which is much higher than the maternity mortality assessed at either QE II or QMMH. Hospital-based estimates, however, may either over- or under-estimate actual maternal mortality rates in the population.[35] It is likely given the rural nature of the country that most maternal deaths occur outside of hospital settings in Lesotho and that both QE II and QMMH rates underestimate the population-based maternal mortality rate.

The decline in maternal mortality is likely due to improvements in overall quality of care for obstetrics patients. Increasing C-section deliveries at QMMH above the very low levels at QEII may have contributed to reducing maternal mortality and stillbirths,[36] however C-sections are also associated with increased maternal morbidity (e.g. surgical site infections, uterine rupture, thromboembolisms), re-hospitalizations and higher costs, outcomes that were not measured in this study.[37,38] Therefore, C-section rates should be viewed within the larger context of all maternal outcomes (see Indicator UQ13 for more discussion on C-sections).

Table 3.13. Mortality as a Percent of Admissions and Percent deaths within 24 hours.

Ward	QMMH deaths as a % of admissions	QMMH % deaths within 24 hrs	QE II deaths as a % of admissions	QE II % deaths within 24 hrs
Female Surgical	7.6%	28%	6.0%	56%
Male Surgical	6.2%	35%	8.0%	52%
Gynecology	2.2%	33%	2.0%	51%
Ophthalmology	0.9%	22%	0.2%	
Orthopedic	1.3%	23%	3.0%	56%
Male Medical	33.4%	17%	26.0%	52%
Female Medical	30.0%	28%	19.0%	51%
Tuberculosis			13.0%	52%

[33] Maternal deaths were determined by examining all female inpatient registry books and looking for whether a death was diagnosed as being related to maternal complications. This meant that some deaths actually took place in Gynecology ward. P. 42 of Baseline report, Vol. II.
[34]Hogan, MC, Foreman, KJ, Naghavi, M, Ahn, SY, Wang, M, Makela, SM, Lopez, AK, Lozano, R, Murray, CJL. Maternal mortality for 181 countries, 1980-2008: a systematic analysis of progress toward Millennium Development Goal. 5. *Lancet*. 2010;375:1069-23
[35]Geelhoed, DW, Visser, LE, Asare, K, Schagen van Leeuwen, JH, van Roosmalen, J. Trends in maternal mortality: a 13-year hospital-based study in rural Ghana. *European Journal of Obstetrics and Gynecology and Reproductive Biology*. 2003:107;135-139
[36] C-section rates of up to 10% have been positively associated with decreases in maternal mortality and stillbirths. See for example McClure, EM, Goldenberg, RL, Bann, CM. Maternal mortality, stillbirth and measures of obstetric care in developing and developed countries. *International Journal of Gynecology and Obstetrics.* 2007:96;139-146. When C-section rates rise above 10%, the benefits are no longer as clear cut.
[37] Brown, HL. Informing the patient and the community about the implications of primary Cesarean. *Semin Perinatal* 2012;36:403-406
[38] Gregory, KD, Jackson, S, Korst, L, Fridman, M. Cesarean versus vaginal delivery: whose risks? Whose benefits? *Am J Perinatol* 2012;29:7-18

Ward	QMMH deaths as a % of admissions	QMMH % deaths within 24 hrs	QE II deaths as a % of admissions	QE II % deaths within 24 hrs
Private			0%	0
Pediatric Medical	8.3%	28%	22.0%	52%
Pediatric Surgical	1.5%	41%	2.0%	50%
Maternity	0.3%	44%	0.2%	0
Maternity w filter clinic maternity	0.2%			
NICU	31.7%	44%		
ICU	57.1%	42%		
Ward G (Step Down)	0.1%	**0%**		
Maternity ward cradles/neonates	13.7%	44%		
Total	**8.0%**	**29%**	**12.0%**	**35%**
Total including Filter Clinic Maternity	**7.1%**	**29%**		
Total including Filter Clinic Maternity and Excluding NICU & ICU	**6.3%**	**27%**		

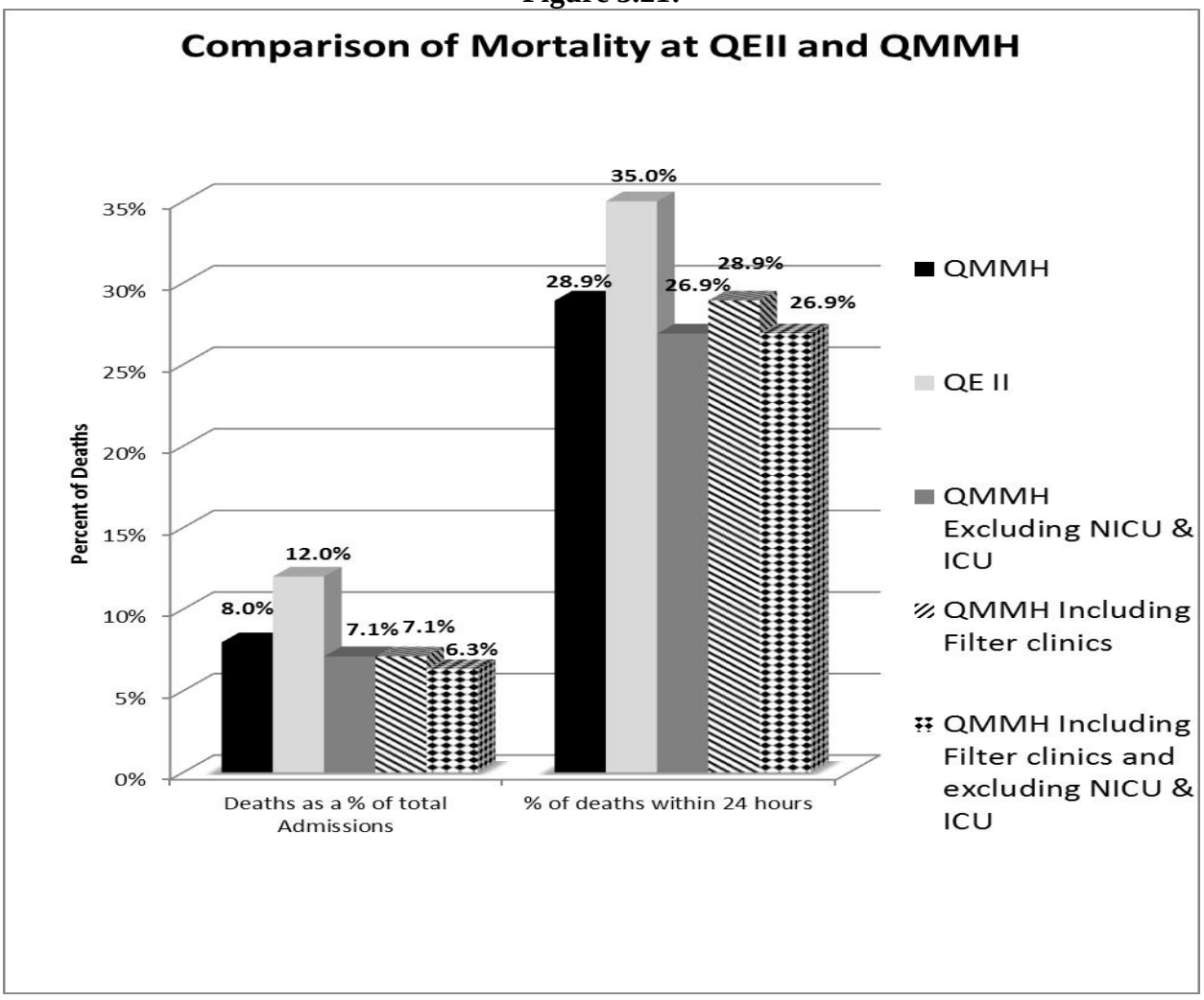
Pediatric mortality
Pediatric medical mortality decreased from 22% (QE II) to 8% (QMMH). Data from pediatric pneumonia cases showed the pediatric pneumonia deaths decreased from 34% (QE II) to 12% (QMMH) suggesting that reduced pediatric medical mortality may be related to improved management of pneumonia and other infectious diseases. Improved treatment of HIV in pediatric cases may also have significantly reduced pediatric mortality between 2007 and 2012.

It is unclear why some mortality rates increased (e.g. adult medical) while others decreased (e.g. pediatric medical). Staff-to-patient ratios and patient acuity, which are associated with mortality rates, may explain some of these differences, but this was not measured.

RECOMMENDATIONS:

(1) To better understand trends in mortality, patient acuity should be measured and tracked over time as coding of medical records improves. The hospital should continue to strengthen the coding skills of staff through training, supervision, and the provision of job aids.
(2) Several departments mentioned analyzing deaths by service on a weekly or monthly basis. If this is not being done systematically in all wards, the hospital might consider holding mortality rounds where each death is examined in order to assess where and how to improve care.

Figure 3.21:



(UQ10) Pneumonia in Children
Number and percent of deaths in children diagnosed with pneumonia.

Methodology: The total number of children diagnosed with pneumonia and the number of deaths of children diagnosed with pneumonia were collected through examination of electronic medical record data for the period January 2012 to December 2012. All pediatric cases with ICD10 codes of J15.XX-18.XX were selected (pneumonia), and discharge status of cases (survived or died) was reviewed. The percent of deaths in children diagnosed with pneumonia was calculated by dividing the number of deaths in children diagnosed with pneumonia by the total number of children diagnosed with pneumonia and multiplying by 100.

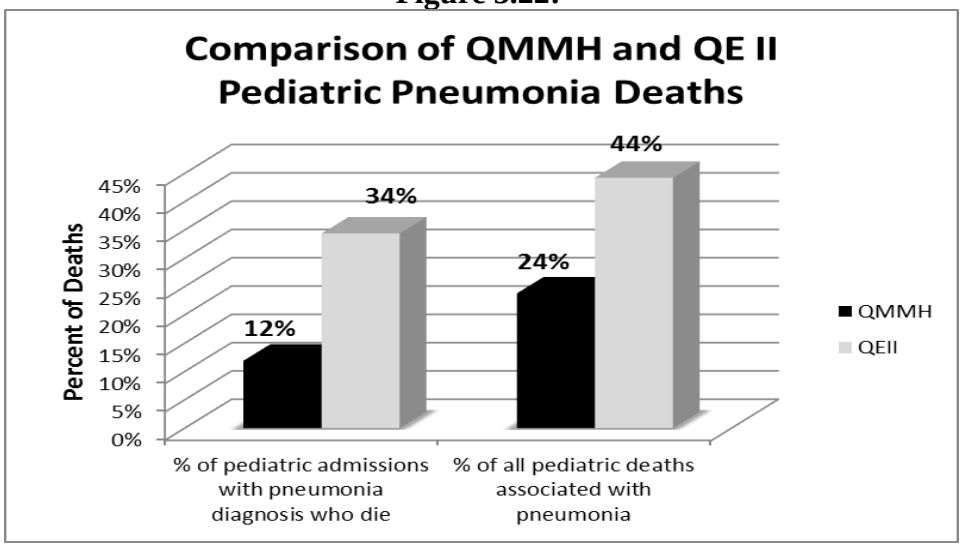
Findings: The number of all pediatric deaths associated with pneumonia and the percent of pediatric pneumonia cases who die decreased substantially in QMMH compared to QE II (16% vs. 44%, and 12% vs. 34%, respectively). This suggests that pediatric pneumonia cases are getting much better care at QMMH compared to QE II (Table 3.14). Since the baseline was conducted, the World Health Organization has published guidelines legitimizing more outpatient treatment of pediatric pneumonia

cases with antibiotics.[39] If these less severe cases are being treated on an outpatient basis now, the improved survival of pediatric pneumonia patients is even more impressive.

Table 3.14. Pediatric Pneumonia Deaths at QMMH and QE II.

	QMMH (2012)	QE II (2007)
Number of pediatric patients admitted with pneumonia as primary diagnosis	286	358
Number of pediatric patients admitted with pneumonia as primary diagnosis who died	34	123
% of pediatric admitted with pneumonia diagnosis who died	12%	34%
% of all pediatric deaths associated with pneumonia	24%	44%

Figure 3.22:



(UQ13) Caesarean Sections

Percentage of Caesarean section (C-section) births broken down by mother's HIV status (known HIV+, known HIV- and unknown status).

Methodology: The total number of births and the number of C-sections done was collected through computerized inpatient data from the period January 2012 to December 2012. The percent of C-sections was calculated by dividing the number of C-sections done by the total number of deliveries. In the process of calculating these rates, we discovered some issues of coding which created differences between the number of C-sections calculated using the maternity register reports, and the number of C-sections calculated from SAP data. The discrepancies were due to use of ICD-10 coding in one case (required for billing) and CPT-4 coding in the other. These discrepancies have been resolved, and the data presented are the most up-to-date according to hospital staff.

[39] Recommendations for Management of Common Childhood Conditions: Evidence for Technical Update of Pocket Book Recommendations: Newborn Conditions, Dysentery, Pneumonia, Oxygen Use and Delivery, Common Causes of Fever, Severe Acute Malnutrition and Supportive Care. Geneva: World Health Organization; 2012. 6, Evidence for recommendations for treatment of pneumonia. Available from: http://www-ncbi-nlm-nih-gov.ezproxy.bu.edu/books/NBK138320/

We show the data for QMMH alone, and for QMMH and filter clinics. The combined data set is more representative, since QMMH handles mainly high risk pregnancies based on referral, while lower risk pregnancies deliver at filter clinics. Filter clinics only do vaginal deliveries; if a C-section is indicated the patient is transferred to QMMH.

Baseline data for QEII-IN were collected through the MOHSW standardized Delivery Register, and were based on only 4 months of data (August, September, February, and March). At baseline, most deliveries occurred at the hospital; however, one filter clinic (Qoaling) had several maternity beds and these deliveries were included in the QEII data. Qoaling did not do C-section deliveries.

The indicator of C-section rates by HIV status was important at baseline because at that time C-sections were routinely indicated for HIV positive mothers. This has since changed. Now, HIV status is not an indication for a C-section at QMMH unless a mother has prolonged rupture of membranes. If an HIV positive mother is adherent to her HIV medication and her viral load is within acceptable limits, delivering vaginally is not contraindicated. We calculated the indicator at endline so that we could assess whether the rate of C-sections varies by HIV status at QMMH. We expected to find no difference in rates.

Computerized data on HIV status of maternity patients was not available, so we used sampling to determine HIV status among patients who had delivered via C-section. Records having ICD10 and Procedure codes of C-section (N=1,338) were sorted by PMI, and every 26th record was selected for a total of 50 records. One record could not be located, hence only 49 records were examined. From these records, the HIV status was identified. The percent of C-sections broken down by mother's HIV status was calculated by dividing the number of C-sections done for each maternal HIV-status category by the total number of C-sections done, and multiplying by 100. We also provide a narrative description of the protocols and indications for C-sections used by clinicians.

Findings:

C-section Rate: The C-section rate at QMMH is 26.8% including deliveries at the filter clinics (Table 3.15). Considering only the deliveries at the hospital, the C-section rate rises to 44.5%. These numbers are both considerably higher than the 7.2% rate at QE II, which was considered by the baseline research team to be low.

Table 3.15: C-Section Rates at QMMH and QE II.

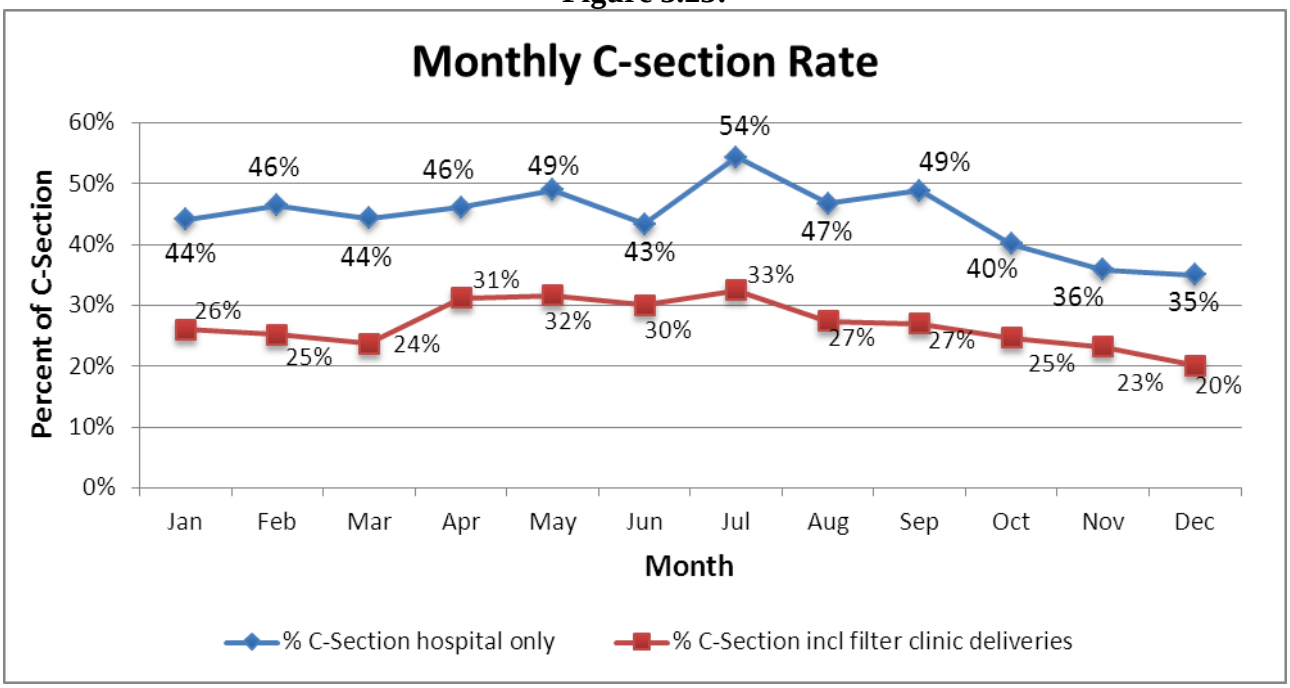
	QMMH (2012)	QMMH Including Filter Clinic (2012)	QE II (2007)
% Vaginal	55.5%	73.2%	92.8%
% C-section	44.5%	26.8%	7.2%
Total Deliveries	4,472	7,431	5,116

Data source: Total deliveries and C-section deliveries are derived from QMMH monthly activity reports, plus the deliveries reported at filter clinics (Schedule 24 report, "Filter Clinics Deliveries").

The C-section rate varied during 2012, with monthly rates ranging from 35% to 54% including only hospital deliveries, and 20-33% overall including filter clinic deliveries (Figure 3.23). Hospital staff observed that C-section rates in the first half of the year were considered high and there was an awareness to try to reduce rates without compromising patient outcomes. Thus the trend is decreasing.

These higher rates are related to a policy to do C-sections in all mothers who have had a previous C-section. Vaginal birth after Caesarean (VBACs) are not encouraged in Lesotho. Primary C-sections, therefore, are likely to be driving the C-section rate, as has been observed elsewhere.[40] In addition, the high rates may be related to interpreting results from cardiotocography (CTG) studies.[41] CTG studies are done to monitor fetal heartbeat and uterine contractions, usually in the third trimester. If fetal distress or any other complication is identified, a C-section is likely. Initially, in 2012, it was reported that clinicians may have been very conservative in their CTG interpretations and this may have increased C-section rates inappropriately. As the year progressed and clinicians gained confidence in CTG interpretations, fewer C-sections were performed.

Figure 3.23:



C-sections have been shown to contribute to decreased stillbirth rates,[42,43] however they are associated with increased maternal morbidity. One report found that 2.7% of women with planned Caesarean deliveries experienced severe morbidity compared to 0.9% for women with planned vaginal delivery.[44] Risks related to C-sections include hemorrhage, uterine rupture, anesthetic and surgical complications, thromboembolisms, and infections. In addition, subsequent pregnancies after having a C-section are at increased risk for complications (e.g. placenta previa, abruption, accrete, and uterine rupture).[45]

[40] Brown, HL. Informing the patient and the community about the implications of primary Cesarean. *Semin Perinatol* 2012;36:403-406
[41] King, TL. Preventing primary Cesarean sections: intrapartum care. *Semin Perinatal* 2012;36:357-364
[42] Darmstadt, GL, Yakoob, MY, Haws, RA, Menezes, EV, Soomro, T, Bhutta, ZA. Reducing stillbirths: interventions during labour. *BMC Pregnancy and Childbirth* 2009;9(Suppl I):S6 doi: 10.1186/1471-2393-9-SI-S6
[43] Goldenberg, RL, Kirby, R, Culhane, JF. Stillbirth: a review. *Journal of Maternal-Fetal and Neonatal Medicine* 2004;16:79-94
[44] Liu, S, Liston, RM, Joseph, KS, Heaman, M, Suave, R, Kramer, MS. Maternal Health Study Group of the Canadian Perinatal Surveillance System. Maternal mortality and severe morbidity associated with low-risk planned Cesarean delivery versus planned vaginal delivery at term. *CMAJ* 2007;176:455-460
[45] Silver, RM. Implications of the first Cesarean: perinatal and future reproductive health and subsequent Cesareans, placentation issues, uterine rupture risk, morbidity and mortality. *Semin Perinatol* 2012;36:315-323

Given the rising rate of Caesarean births in developing countries and the occurrence of non-medically indicated Caesareans, researchers have defined absolute and non-absolute indications.[46] "Absolute" indications define situations which are absolutely life threatening such as severe antepartum hemorrhage due to placenta previa or abruptio placentae, major cephalopelvic disproportion, transverse lie and brow presentation. Women who do not receive a Caesarean would be unlikely to survive delivery in these situations.

Maternal morbidity outcomes and indications for C-sections were not measured in our study, so we cannot draw conclusions about the medical necessity of Caesareans at QMMH-IN. Tracking the absolute and non-absolute indications for, and rates of, C-sections, as well as the rates of morbidity and mortality post C-section, may provide information to better assess the appropriate use of C-sections to optimize maternal and neonatal health. Hospital clinical managers should be sure that providers are well informed about the indications for C-sections and quality improvement efforts might be targeted in this area to identify possible modifiable factors to reduce the number of C-sections.

C-Sections and HIV status. According to the maternity ward records, 39% of deliveries were to HIV positive mothers, and in our sample 34.7% of C-sections were performed on HIV positive mothers. In contrast 66% of deliveries were to mothers who were not infected with HIV, and this group made up 61.2% of the C-sections in the sample. These data suggest that HIV status does not greatly affect the probability of a Caesarean delivery, which is what we would expect from current policy guidelines.

It is difficult to compare endline and baseline C-section rates by mother's HIV status because at QE II most mother's HIV status (60%) was unknown. At QMMH, in contrast, most mothers' HIV status was known (96%). See Figures 3.24 and 3.25.

Figure 3.24

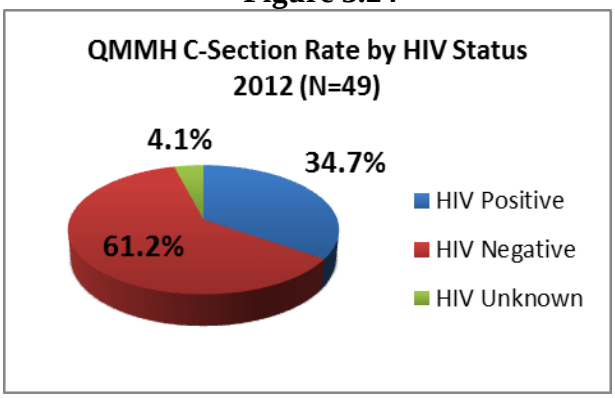
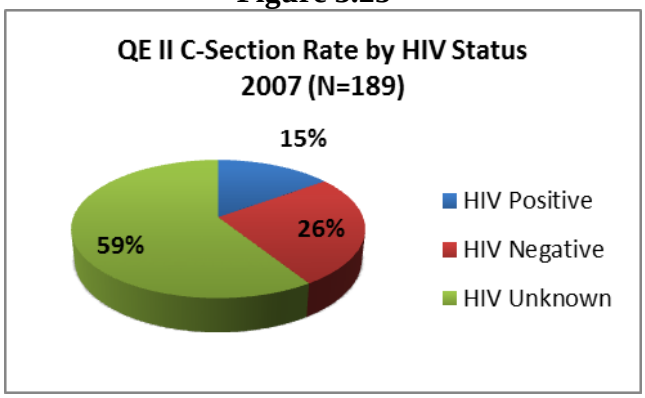


Figure 3.25



RECOMMENDATIONS:

(1) To better understand trends in C-section rates, absolute and non-absolute indications for C-sections and morbidity/mortality post C-section should be measured and tracked over time.

(UQ12) Stillbirths

Number and percent of total stillbirths (fresh and macerated). This indicator is measured at hospital-level.

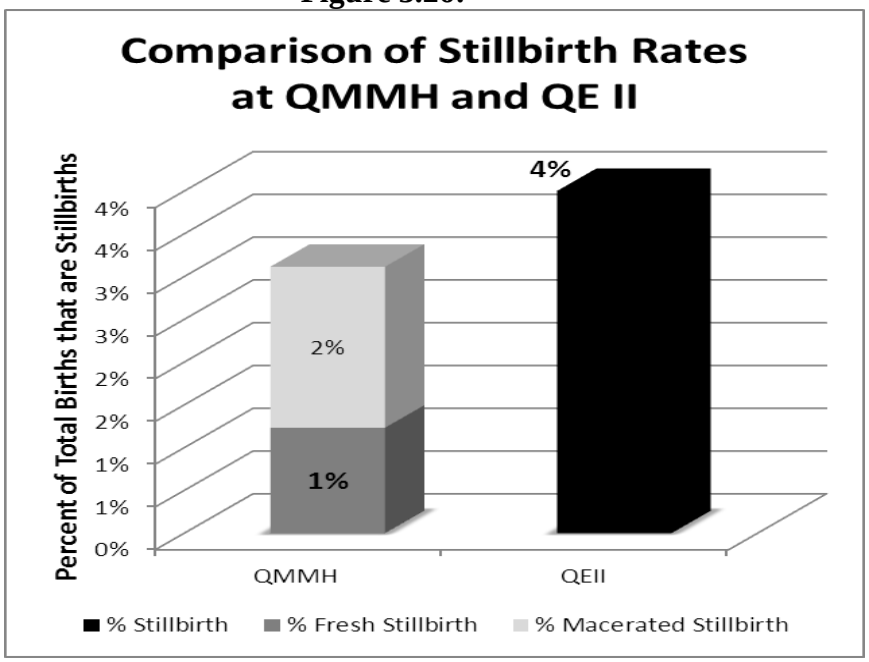
[46] Stanton C and Ronsmans C. Caesarean birth as a component of surgical services in low- and middle-income countries (letter). *Bulletin of the World Health Organization* 2008; 86:A.

Methodology: We obtained the number of total stillbirths and total births at QMMH hospital from January - December 2012 from the maternity ward monthly reports. The percent of stillbirths was calculated by dividing the number of total stillbirths by the number of total births and multiplying by 100. The maternity ward reports capture data to distinguish between fresh and macerated stillbirths. The percent of stillbirths that are fresh (that is, death occurred during or close to the time of delivery) was calculated by dividing the number of fresh stillbirths by the number of total stillbirths and multiplying by 100. Similarly, the percent of stillbirths that are macerated was calculated by dividing the number of macerated stillbirths by the number of total stillbirths and multiplying by 100.

There were 139 stillbirths out of 4,472 births at QMMH hospital in 2012 (3.1%), compared to 206 stillbirths out of 5,150 births[47] at QE II in 2006/7 (4.0%). If we add in the 2,959 births at filter clinics (there were no stillbirths at the filter clinics), QMMH-IN's rate of stillbirths is even lower (2.0%). Of the stillbirths at QMMH, about 40% were fresh and 60% macerated. Unfortunately, the records at QE II did not allow one to distinguish between fresh or macerated so a comparison cannot be made.

Stillbirth rates in developing countries range from 1 to 4%, and the proportion of macerated to fresh stillbirths varies greatly depending on the population served.[48] Lower stillbirth rates are associated with higher quality of obstetric care. In addition, higher C-section rates associated with lower stillbirth rates.[49] However, as described earlier, C-sections are also associated with increased maternal morbidity and hospitals should be careful to prevent C-sections which are not medically indicated.

Figure 3.26:



[47]The QE II Baseline report states that there were 4,915 inpatients in the maternity ward but also states that 206 stillbirths were 4% of all births indicating that there were 5,150 births. The total of births for QMMH in this indicator differs from the deliveries counted in order to calculate C-sections, because those data came from electronic patient records while these data are from the Maternity Register.

[48]Thembelihle, S. & Malangu, N. An Investigation of the Stillbirths at a Tertiary Hospital in Limpopo Province of South Africa. *Global Journal of Health Science* 4 (6);2012:http://dx.doi.org/10.5539/gjhs.v4n6p141

[49]McClure, EM, Goldenberg, RL, Bann, CM. Maternal mortality, stillbirth and measures of obstetric care in developing and developed countries. *International Journal of Gynecology and Obstetrics* 2007;96:139-146

4. FINDINGS: QUALITATIVE INDICATORS

This section of the report presents our findings with regard to qualitative indicators. These indicators fall into 5 main categories: Access and capacity indicators; Clinical quality of care; Equity and other output based aid principles; Perceptions of performance; and Management systems descriptions. As with the quantitative indicators, for each category we describe the methodology for data collection and data sources, followed by findings organized by sub-category. For a few indicators we also include recommendations.

4.1 Access and Capacity Indicators

Methodology & Data Sources: Quantitative data from computerized records and ward registries (see quantitative data indicators for specifics about methodology), key informant interviews, observations, and tours of the hospital were used to describe services and processes of care at endline. We used these data and historical reports to make comparisons between QMMH-IN and QEII-IN. Qualitative data were coded to identify processes and themes across interviews and data sources. Findings are presented in a narrative format organized by subheading.

Findings:

4.1.1 Overview of Services offered at endline

QMMH has 390 acute care beds, 24 filter clinic beds, 82% occupancy, and an average length of stay of 5.0 days, compared to Queen Elizabeth II which had 409 acute care beds, 8 filter clinic beds, 61% occupancy,[50] and an average length of stay of 5.94 beds. About 56 patients per day are seen in the QMMH Casualty Department, compared to 73 per day at QE II. Outpatient clinics on the grounds of QMMH (including Gateway clinic) see an average of 346 patients per day, compared to 265 per day for QE II.

Clinical Services

Similar to QE II, QMMH provides surgical services (general surgery, orthopedics, gynecology, ophthalmic), as well as medical services, pediatrics, and maternity. Neither hospital provided psychiatric services. Each ward is staffed by junior doctors, senior doctors, and consultants (specialists). For outpatient care, the hospital operates a new Gateway general outpatient clinic, specialty clinics,[51] and a casualty (accident & emergency) unit. In addition, the PPP included refurbishment of three urban filter clinics, each with 8 beds for uncomplicated vaginal deliveries.

New and improved services at QMMH compared to QE II include:

- Intensive Care Unit (ICU, 10 beds) with a full-time specialist doctor
- Neonatal Intensive Care Unit (NICU, 8 incubators including 3 new incubators added due to high volume of patients)

[50] The overall occupancy rate reported through the hospital's information system was 61%, although the baseline study also estimated 82% occupancy by examining ward registers for a sample of days. The occupancy rate was likely within this range.

[51] Specialty clinics include: audiology, dental, dermatology, gynecology, maternal & child health, medicine, occupational therapy, ophthalmology, orthopedics, pediatrics, surgery, physiotherapy, and radiology.

- Additional labor rooms for maternity patients. QMMH has 4 well-equipped rooms, whereas QE II had only 3 which were poorly equipped.
- Additional operating theatre capacity. QMMH has a fully equipped operating theatre with 9 rooms, compared to 2 rooms at QE II. QMMH operating rooms were built with laminar flow (air wall) which will allow the facility to do transplants or other highly specialized surgery in the future.
- Additional access to pharmacy and laboratory services. The pharmacy and laboratory operate 24-hours a day, 7 days a week including holidays. At QE II, this level of access was not realized in practice. For Laboratory services, even simple lab tests like electrolytes or liver function test were only intermittently available at QE II and, when done, results were often not available to clinicians or entered in patient charts. At QMMH-IN laboratory tests done in-house are available electronically, usually within 60 minutes.
- Improved facilities at bed-side. Every patient bed has an outlet for oxygen hook up, automatic suction, and an emergency alarm. This level of bed-side care was not available at QE II. QMMH also has emergency cylinders of oxygen available in all wards; lack of oxygen was a common factor in pediatric deaths at QE II.
- Additional and improved diagnostic equipment, including MRI and computerized tomography (CT). QE II had a CT scanner but it was out of service for months at a time. QMMH also has new mammography machine and better ultrasound equipment. Machines are covered by service warranties so that if one malfunctions, a repair technician is on site within 6 hours. There are two portable x-ray machines available 24 hours. The Casualty (Accident & Emergency) unit also has new equipment to allow better functioning and higher quality of care, including a moving x-ray (conforms to body).
- Hospital-wide emergency power is available 24 hours per day, 7 days a week, with monthly testing to assure access. If the main power supply fails, there are 4 large emergency generators which will come on. There is also back up emergency power supply based on continuously charged batteries that will fuel critical services such as ventilators, incubators, operating theatres, etc. for a few hours until patients can be evacuated. According to baseline data, QE II did not have working emergency power systems.

The following services were excluded under the PPP agreement and are not offered at QMMH: transplants (other than corneal); joint replacement (other than hip); chronic end stage renal disease treatment; elective cardiac and vascular surgery; chemotherapy and radiotherapy; advanced fertility treatment (including in vitro fertilization); plastic surgery; and cosmetic dentistry.

Another change in services, compared to baseline, is that QMMH does not maintain a TB unit in the hospital. (Management and referral of TB patients is explained in the next section.)

QE II operated 12 private beds, although occupancy rate was only 18%. QMMH is equipped with 35 private beds, but this ward is not yet open.

Infrastructure Improvements

Additional changes which distinguish QMMH-IN from QE II-IN, and which promote better access to care and medical education include:

- *Patient-friendly signage*. Wards are labeled with letters. Colored squares on the floor match the ward labels (i.e. blue, red, green) so someone who is not literate can find the ward.

- *Handicapped access*. The entire hospital is handicap accessible, with ramps and elevators.

- *On call rooms for doctors*. Each clinical service has designated "on call" room or rooms, with bed, table, light, bathroom. Adequate facilities for doctors on call increases staff satisfaction and motivation.

- *Training and conference facilities*. These include a library, computer rooms, classrooms and lecture theatres. There is video conferencing capability and full kitchen facilities.

4.1.2 Access to public health services: TB treatment

Management and referral of TB patients

Admitted patients with known active TB are isolated from other patients and housed in single rooms on the wards. TB patient doors are kept closed and marked with red so that staff know of the patient's TB status and can take precautions such as wearing anti-TB masks. Inpatient rooms do not have negative air pressure, an isolation technique used to prevent cross-contamination room to room, but key informants commented that for "regular" TB (i.e. not multi-drug resistant), this is not required according to WHO standards for treatment. Given the number of TB patients treated, however, it is a challenge to accommodate all TB patients' needs for isolation. Another challenge is obtaining anti-TB masks which are supplied by the MOH.

For suspected active TB patients, a diagnosis is made via X-ray or sputum test, and the patient is isolated and started on antibiotics. A consult is made to the MDR-TB (multi-drug resistant tuberculosis) clinic (Botsabelo Hospital) for an assessment but this can take days or weeks, during which time the patient remains an inpatient at QMMH. If the MDR-TB clinic's assessment shows that it is appropriate, the patient is transferred to the MDR-TB clinic for care. If the patient is being treated for some other reason, and does not have multi-drug resistant TB, they are treated for TB during their inpatient stay in addition to the condition for which they were admitted. At discharge they are referred to an outpatient TB clinic at a filter clinic or district hospital facility for ongoing management. For initiation of TB treatment of children, patients are referred to Senkatana, a clinic that manages pediatric TB cases, located close to the hospital.

TB drugs for inpatients are obtained from the MOH and are available at the filter clinics that provide ongoing management of patients with TB. The QMMH pharmacy also keeps a small supply of TB drugs for inpatients who have been previously initiated on treatment but do not have their drugs with them or need prescription refills during their stay. The hospital keeps records of medication use for resupply by the MOH. At times medicines are supplemented from the clinics if the medicines are not obtainable from the MOH.

We heard from some key informants that the general public may believe that QMMH is choosing not to treat TB patients; however, it is clear that QMMH is simply following government policy in this regard. It is important to inform the public of the limited role of QMMH in TB treatment.

RECOMMENDATION

(1) Tsepong and the MOH should enhance public information on TB policy to correct misunderstandings about the role of QMMH in TB treatment.

4.2 Clinical Quality Indicators

Methodology & Data Sources: We used key informant interviews, review of hospital accreditation documents, and analysis of accreditation agency web pages to describe the accreditation process in a narrative format.

4.2.1 COHSASA Accreditation process

As part of the PPP contract, the QMMH hospital must be evaluated for accreditation within 2 years of opening, or by October 2013. In preparation for this formal evaluation, the Council for Health Service Accreditation of South Africa (COHSASA), which assists facilities in the region to reach and maintain quality standards, came to the hospital and trained all heads of department on the standards they needed to achieve. At the time of our study, the hospital and clinics were planning for and awaiting results from COHSASA standards audit visits.

COHSASA evaluates standards in 41 domains, but not all pertain to all hospitals. For QMMH, 32 domains applied (e.g. QMMH does not offer psychiatric care or radiation oncology, so these domains do not apply). A few weeks after this initial meeting, COHSASA returned and did a baseline evaluation. COHSASA evaluated all the applicable standards in detail as being either 'compliant,' 'partially compliant,' 'non-compliant,' or 'not applicable.'

Standards are assessed based on a number of criteria. The criteria are designated as "critical" and "non-critical," and if one critical criterion is either non-compliant or partially compliant, the whole standard is marked non-compliant or partially compliant regardless of the scores of other criterion within the same standard. The seriousness of each criterion is also designated as mild, moderate, serious or very serious and this determines the weights of the score. The baseline is designed to give a hospital feedback about areas it needs to work on before the formal evaluation is done. It should be noted that many COHSASA standards require proof of audits over time. Newly opened facilities may have systems or procedures in place but no record of continuous implementation for the requisite amount of time to be fully compliant at baseline. Therefore baseline scores gathered from facilities that have been operating for only a few months may not reflect compliant scores at a full evaluation.

Accreditation Findings. QMMH Hospital received a report with the baseline evaluation findings. If a standard was evaluated as 'partially compliant' or 'non-compliant' a comment was also included. Results and comments were forwarded to relevant department heads. The overall hospital score for its baseline evaluation was 56% compliant. Filter clinics also go through COHSASA accreditation. At baseline they had scores of approximately 30%.

Baseline evaluation scores may appear low, but low baseline scores are to be expected in new facilities and do not suggest that the facilities are performing poorly or will not achieve full accreditation in a timely manner. In fact, we believe that Tsepong is making excellent progress.

In order to achieve full accreditation, facilities need a compliance rate of 80%, with all critical areas being compliant. Other accreditation outcomes are "not accredited" which would result if a hospital scored <80% and/or critical areas were not fully compliant, or "provisional accreditation" which would result if a hospital score was ≥80% but some critical areas were not fully compliant. In the case of provisional accreditation, COHSASA does an evaluation after 6 months focusing only on the domains that were assessed as partially compliant.

The Filter clinics have been opened longer than the QMMH and had their two year formal evaluation in April 2012. The three clinics each achieved a score of 89% or greater. However, because some critical areas were not fully compliant they were given provisional accreditation status. COHSASA returned in late February 2013 to do a focused evaluation and results are pending.

4.3 Equity and other Output Based Aid Principles

Methodology & Data Sources: This section relies on quantitative and qualitative data. Quantitative data from computerized records were used to identify the number of patients using fee waivers. In addition, we asked key informants for their opinions about equity and other principles of output based aid, especially focused on access to care by the very poor, ways in which the facilities are incentivized to serve the poor, and the verification/monitoring system (including the Independent Monitor). Finally, we drew on our own observations of facility operations and tours of the hospital and filter clinics to describe how equity is addressed. Findings are presented in a narrative format with recommendations following.

Findings:

User fee and fee waiver policies in Lesotho are established by government and are applied in all facilities including QMMH-IN. Nearly all key informants interviewed, including hospital and government personnel, did not perceive any problems with equity of access based on socio-economic status or any other characteristics. Most perceived that the poor are accessing care at QMMH in great numbers, and that referrals from districts have increased. No one perceived any disincentives for serving the poor, especially given that in principle the hospital is reimbursed for fee waivers granted. In addition, user fee revenue is not a major source of revenue for the hospital: currently 100% is returned to the government.[52] The hospital's most important source of operating revenue is the unitary payment through the PPP contract.

We found evidence that hospital personnel are knowledgeable about government guidance on user fees and exemption policies and that the hospital has systems in place to carry out policies for charging fees and for implementing fee waivers. All fee schedules are clearly posted at cashiers so that patients are also aware of them. Specific procedures are explained in Section 4.5.4.

To summarize, patients seeking general outpatient care at a health center do not pay anything for general consultations. This policy is in effect at the three filter clinics. Government policy does permit fees to be charged at hospital level (Gateway) and for specialist visits as well as for procedures such as X-ray, ultrasound, tooth extraction, etc. The fee for a specialist visit is 15 Maloti for adults, 7 Maloti for children. The specialist fee for an adult patient is about half of average daily per capita income in Lesotho.[53] However, if you compare the fee to the international poverty line ($1.25 per day, or 6.85 Maloti per day in nominal 2012 currency), the fee is twice the daily income per capita. These fees are

[52] The PPP contract allows Tsepong to keep 10% if they meet set standards for collection, but as of Feb. 2013 the hospital was returning all revenue to the government.

[53] $1,210 gross domestic income per capita in 2011 international purchasing power parity (PPP) dollars (World Bank) /365 days = $3.32 per day in 2011. Specialist fee of 15 Maloti is $1.83 (exchange rate 8.19 Rand per dollar, Dec. 2011), or about 55% of average daily gross domestic income per capita.

set by government and not the hospital, and the revenue collected by QMMH and other public hospitals charging these fees reverts to the government.[54]

The fee waiver policy allows patients who are eligible for social welfare benefits to access free medical care: in other words, to have all fees waived, even for specialist consultation, inpatient stay, and ancillary service exams. This process is described in more detail in section 4.5.4 (p. 104). According to hospital records, 1,001 unique patients across the hospital system received fee waivers in 2012.

A key informant from the Ministry of Social Welfare (MSW), the ministry that grants social welfare benefits, suggested that up to 30% of people in Lesotho who may be eligible for benefits are not registered for them, mostly because they are unaware that they exist and/or that they are entitled to benefits. This is a general problem with the welfare system in Lesotho.[55] When hospital staff identifies a patient who may be eligible for benefits, a hospital social worker may help the patient enroll for social welfare benefits. In the future, the MSW should work with the MOH and the hospital to expand outreach and educational activities to identify and enroll citizens who are eligible for free care benefits and to help them overcome barriers to accessing services.

As mentioned in Section 4.5.4, other patients are entitled to fee waivers as well, including prisoners, and patients with epilepsy or seeking treatment for TB or HIV/AIDS. Key informants seemed to feel these patients are accessing care, although we did not conduct interviews with patients to confirm.

Although not an issue of equity for patients, the hospital reported receiving complaints from family members about equity of hospital visiting hours: for the first year of operation, visiting hours were only scheduled during the day, making it hard for people who work full time to visit. The hospital responded to this complaint by introducing a third visiting hour at night (7-8 p.m.).

Another equity issue discussed by key informants was transportation costs.[56] The hospital is located some distance from the town, requiring patients and family members to take a minibus or taxi. For some key informants, this was a cost burden, although no one said they felt it would prevent patients from seeking care. Other key informants disagreed, and stated that the location of the hospital had actually increased access by patients located in other areas outside of Maseru. This is an issue worth examining further.

Monitoring:
Regarding the independent monitoring of the hospital, some key informants expressed concerns about the fact that performance indicators are always rated highly and do not show variation. We found instances where data in an IM report seemed to gather a smaller sample than expected, as mentioned earlier. On several indicators that we examined, we requested detailed data on the date of review so that we could confirm the IM findings, but we were not given these data.

The Joint Services Committee for PPP also serves as a forum to review performance of the PPP. At least one key informant thought the committee worked well, while another thought it was somewhat informal and could have a clearer role in reviewing and analyzing IM reports.

[54] As mentioned, according to the PPP contract, QMMH can keep 10% if they meet certain standards.
[55] This was also noted in the Lesotho Health Sector Expenditure Review 2009 (Washington DC, World Bank), p. 15.
[56] Transport costs were identified as a barrier to access in the Lesotho Health Sector Expenditure Review 2009, p. 30.

Cost Efficiency:
Another principle of output-based aid is cost-efficiency. See Table 3.3 for a comparison of the cost per inpatient day equivalent at QMMH compared to baseline, in constant 2012 Maloti. The table shows that the cost per IDE excluding taxes and capital costs is 1,130 Maloti or 22% less than the cost per IDE at QEII.

RECOMMENDATIONS:

(1) A more refined study, including a household survey, is needed to assess whether use of clinics varies by income level, and whether the very poor in Maseru district (or other areas) are choosing not to seek care at the hospital due to inability to pay for costs including any fees, transport, or other expenses related to care seeking. This study should assess whether the very poor understand the eligibility requirements for fee exemption (from Ministry of Social Welfare). Based on the study findings, the MSW should work with the MOH and the hospital to expand outreach and educational activities so as to identify people who are eligible for free care benefits but who are not coming to the hospital or following through on referrals due to lack of awareness.
(2) The Joint Services Committee should put in place a process for r**eviewing Independent Monitor reports** to assure accuracy of data. The MOH should engage in **deeper dialogue** with the IM investigators to discuss interpretation of current indicators, follow up actions, and new indicators for the future.
(3) A **cost study** should be conducted to examine the full cost of services (i.e. inpatient day, outpatient visit) at QMMH, gateway, and filter clinics. The cost data could enable projections to be made for other purposes, including differential cost analysis of alternative choice decisions (for example, to add or expand a service, or cost reduction planning).

4.4 Perceptions of Performance

Methodology & Data Sources: During the key informant interviews we asked people for their opinions of key differences between QMMH-IN and QEII-IN. We asked them how services varied, and how management and clinical processes differed. We also asked them to identify drivers of performance and challenges. Interviews were coded for themes related to differences, services, drivers and challenges. Similar codes were grouped under larger headings (domains) and iteratively refined. Findings are presented in a narrative format organized by subheadings and domains. Sample quotes are provided to illustrate concepts and themes within each domain.

Findings:

4.4.1 Differences between QE II and QMMH

Through qualitative interviews and observations, we discerned themes about key differences between QE II and Queen ‘Mamohato Memorial Hospital. These are summarized in the table below, and discussed in detail by domain.

Table 4.1: Domains of Perceived Differences, QE II and QMMH.

Domain	Sub-Domain
Infrastructure	Facilities
	Patient Rooms
	Cleanliness

Domain	Sub-Domain
	Equipment
Security	Safety
	Anti-theft
Clinical services	New services (hospital, filter clinics)
	Better access to care (hours)
	Referral as a barrier to access
	Perceived changes in patient mix
Volume/patient mix	Volume
	Patient mix and acuity
Support services	Waste management/sewage
	Food service/canteen
	Linens
	Transportation
Policies & standards	
Quality of care	Infection control
	Medication administration
	Nurse training
Communication and information	Departmental
	Cross-department, and through the hierarchy
	Patient - staff
	Computerized information systems
Organizational culture & work ethic	
Human Resources	Training and qualification of staff
	Compensation
	Discipline

Infrastructure. Almost all key informants (KI) mentioned the plant and equipment as an obvious and important difference between QMMH and QE II. Key informants observed that QE II was smaller, with aging buildings. They noted QMMH's modern buildings with ample parking, good patient flow, and handicap access. One informant explained how the design helped facilitate quality of care:

> *If you look at Casualty, and where the different services are in relation to each other, well it makes a whole lot of difference from the clinicians' perspective. The pharmacy is near the main exit and that makes a lot of sense, because people get their drugs as they are leaving. It wasn't like that at QE II. It was an old hospital and they were limited by space. But the layout and patient flow at QMMH is really good.*

Several KI mentioned the better facilities for patients in the wards: patient rooms have bathrooms, hot water, privacy curtains, and outlets for nurse call, suction, and oxygen.

Many described the cleanliness of the new hospital. While this is a support service and is also related to the infection control program, we mention it under facilities and equipment because this is how most informants perceived it, i.e. as a feature or characteristic of the hospital itself.

> *The cleaning company is outsourced now, and maybe that's why it's best. Before, an old woman would put her new mop in the bucket once, and would do the whole floor without changing it. If you talk to her, she says 'You do your job, I'm doing mine.'*

> *The cleanliness in terms of infection control has improved.*

People also observed the advantages of new equipment. Equipment at QE II was often broken-down or missing, and informants said that QMMH emphasizes preventive maintenance while QE II did not. Key informants noted the benefits of back-up systems for power and supplies of medical gasses. One informant said patients were often disappointed because equipment or supplies didn't exist or were broken at QE II, and this is no longer the case.

Several clinical staff mentioned changes in how equipment is maintained. They described how maintenance staff come to the departments daily to make sure things are operating properly. Clinical staff are also given schedules of which maintenance staff are on call so they can call for support at any hour.

> *If a window is broken it will be repaired within 4 hours. If you see a problem, you call maintenance and describe the problem. They give a job number, they come, and the clinic manager signs when the job is complete.*

> *At QE II, I never knew where the oxygen was coming from, I didn't know where to order it. Whereas here, the medical equipment company comes and does checks. They see you are low on oxygen and they order it before you even realize it is low.*

Table 4.2: Key Informant Comments on Facilities and Equipment.

Illustrative Quotes
The most important difference is in the equipment. When you are just out of school, you want to work and practice what you've been taught. But at QE II, you had nothing to use.
We often couldn't do a root canal at QE II. We would have to remove the tooth…because we didn't have the material to do a root canal. Here, we can do them. Here, patients can fill prescriptions.
Back then [at QE II] we were doing "breakdown maintenance." There was no preventive maintenance there, but here we do a lot of preventive maintenance.
Another difference is in the redundancy in certain systems. For example, the provision of medical gases. I have bottles, should there be a failure. I wasn't used to having any back up. It is completely new.
We never had the types of equipment we now have in the A&E unit (Accident and Emergency).
There are defibrillators on every emergency trolley. These are available on every nursing unit and nurses are trained in how to use them. We have had to use them in Pediatrics.
At QE II there was no upper and lower endoscopy: really, no scopes to do procedures. At QE II we would have to do an open operation instead. But now we have the equipment and we can do the procedures. People are very happy that they can stay in the country for treatment. We can also use scopes for diagnosis, whereas before we would have to do an open operation to see what was going on.

Security. Raising a related issue, informants mentioned the increase in hospital security to protect against theft, assault or robbery. One informant mentioned how security guards conduct patrols and are more responsive than before:

> *There is a sort of link between security and us [staff] now, they aren't just at the gate. I can call them for something, and they are obedient. At QE II they were just at the gate and we couldn't even talk to them.*

Another informant described how the process for security has changed:

> *You heard about a lot of incidents at QE II due to poor security; for example, large equipment disappearing overnight, stolen. At QE II you would hear that people used to steal property from patients. It seems like there aren't so many security incidents at QMMH. There are more controls. For example, we are supposed to declare things we move in and out. They search the bags of staff when we leave. We want to promote a secure environment: for the company, for patients, for staff. Everyone benefits.*

Security has been strengthened in the Pharmacy Department through the use of video surveillance, as well as administrative controls. One KI said that QMMH has not had an incident of theft of drugs since it opened. The informant compared this to prior experience at QE II:

> *At QE II we used to have this problem: it was regular. There were so many cases that they were taken to a higher court. I don't know why it has changed, maybe it was attitude. The security is also stronger. Not just in the pharmacy, but at the gate there are security measures.*

Changes in clinical services. When asked about differences between QE II and QMMH, in addition to the physical plant and equipment many people mentioned services. Several mentioned the addition of Gateway, the general outpatient clinic at the hospital which allows filtering of non-urgent cases and makes it easier to manage patient flow. Others mentioned added hospital-based specialty services, the addition of the ICU and NICU, increased number of Labor and Delivery rooms, and added capacity for diagnostics and services in the filter clinics (for example, filter clinics can now do deliveries, have eye clinics, and perform ultrasound & radiology).

Several key informants (KI) mentioned differences in access to care. One felt that access to care had increased because the filter clinics offer more services; however, another informant thought there was no difference in access. A third informant felt that at first, people were seen less quickly when they came to the facility, due to the change from QE II's manual registration system to a computerized system. Patients needed to be registered in the SAP computerized information system and get a PMI number. Even once registered, patients still need to check in for each encounter in order to get stickers which are put on each test order or result.

Waiting time for elective surgery seems to have decreased at QMMH, compared to QE II. One KI stated that "*when QMMH opened there was a 6-month long backlog for elective surgery. However, plans were made for backlog reduction, and now it is a 1 month wait with few exceptions.*" This informant did not believe that QE II ever had less than a 6-month wait. Several people remarked on increased hours, both at the filter clinics and hours for the pharmacy and laboratories at QMMH, compared to QE II.

> "*The pharmacy and laboratory are open 24 hours, 7 days a week including holidays*," said one clinician. "*At QE II, this was not the case. If you needed something on a weekend, they might technically be open, but you wouldn't get it*."

Yet, several informants observed that wait times are still long, especially at the filter clinics where patients may arrive at 4 a.m. to get in line for 7 a.m. opening. When we asked the hospital about this, the Operations Director responded that when filter clinics were under the MOH, the clinics had a policy of only seeing a set number of patients per day. This resulted in patients coming very early to

the clinic to ensure that they received service. This culture has not changed even though current policy is not to limit the number of patients seen. However we did hear accounts of instances where there were so many patients at a filter clinic that some were asked to return on the following day to be seen.

One clinician mentioned the triage system as an important difference between the new and old hospitals. She observed that waiting is a problem.

Some informants commented specifically on changes in pharmacy and laboratory management. The pharmacy system is explained in more detail in Section 4.5.3. Informants highlighted the new ordering and recording systems for patient medications and observed how these systems reduce the risk of theft:

> *We used to have huge losses of medications at QE II. Now the pharmacy is not ordering such large boxes but instead is ordering very often, regularly. Everything that goes to the ward is recorded. Now you charge whatever you are using for the patient, and the pharmacy can see when stocks are low and reorder. That has really reduced theft. Another thing that never happened at QE II is stock taking. That happens 2 times per year now.*
>
> *Inpatient medication is per person, not for the entire ward. When it was for the entire ward, at QE II, that's why a lot of people were selling drugs on the side. Now that is not easy to do because there is a stock count, and when the medicines come in or are distributed, they are recorded.*

Some mentioned how the laboratory has been outsourced: services are now provided by AMPATH laboratories, a private lab. This was perceived to have increased efficiency.

> *At QE II the turnaround time was slow partly because of the manual systems. Things were manually labeled and samples were manually pipetted. Now at AMPATH we use MediTech LIS systems. The lab receives and puts bar codes on the samples, then they scan everything. The sample might be separated and sent to different areas. Results are entered in the system as they are available, so the doctors can get the results from one test before the other results are ready.*

Lab personnel are also seen as partners in the care process: "*Even if you didn't mark [the request] as urgent, if the lab sees something alarming they will call immediately so we can find the patient*," said one clinician.

Yet, some informants expressed dissatisfaction with changes. One hospital staff member complained that clinics now do not do as much follow-up with patients as before. The informant believed that the primary health care department at QE II was able to do more follow-up. Another informant preferred how QE II would schedule outpatient clinics on different days for different types of patients (i.e. adults versus pediatrics). This informant felt that QMMH was too much like a "supermarket"—everything in one, too small, location. "*It made it easier to work when there are [specific] days*," the informant explained, "*especially for education because you can do big group educational sessions. Now there is education for a big group of people, but they have lots of different problems*." An MOH informant complained patients had easier access to physical therapy and dental services at QE II without having to get a referral (the Operations Director clarified that one does not need a referral to access dental services). Both hospital and MOH informants mentioned that TB and ART services used to be

provided at QE II but due to a change in MOH policy these services are not provided at the hospital. Instead, the current policy is for TB and ART patients to be treated at filter clinics. (Discussions are underway to change this government policy to allow QMMH to initiate ART treatment, see section 3.2, indicator CS18.)

Changes in volume and patient mix. Many informants described the changes in volume, including an increase in patients coming to QMMH, and an increase in major surgeries ("*At QE II, there were 900-1,000 major surgeries, but at QMMH there are 1,600 for major surgery*"). Clinical staff reported how the hospital had increased specialty clinics to cope with the increased volume: "*In order to accommodate the high number of patients, we have clinic on Tuesdays and Thursdays for chronic hypertension and diabetes.*" For the hospital laboratory, testing for CD4 counts has decreased since this is now done at clinic level and not at QMMH.

Several KIs mentioned that the case mix at QMMH has changed, with an increase in very sick patients, malnourished children, and very premature and low birth weight infants (580-600 grams) from referrals from the districts. Unfortunately, it is not possible to measure differences in acuity through empirical data as we do not have sufficiently detailed diagnostic codes from QE II data.

Changes in Support Services. Key informants also mentioned differences in support services such as waste management, food and linens, and transportation. According to one KI, the sewage system is better managed. At one clinic, the septic tank is emptied regularly instead of being allowed to overflow as at QE II. This may result in less risk of water contamination. In addition, the hospital has implemented a waste management system as part of its infection control program. An informant from a filter clinic explained:

> *I don't think it was a big issue for government; you didn't separate waste in different bins. Now we are linked with the hospital and the infection control person at the hospital works with the clinic, so hand washing and infection control is enforced. Even the patients know waste management: there are two bins and the red one only gets blood.*

Several informants mentioned improvements in food service compared to QE II. They were especially happy with the canteen for staff. "*QE II had a canteen, but no one went there. It wasn't clean, and the dishes weren't washed well. QMMH has a nicer canteen*," said one informant. At QMMH staff can purchase coupons for meals which are subsidized by the hospital. For 7.5 Maloti (less than USD $1.00) staff can purchase a hot meal with meat, carbohydrate, and vegetable. "*Meals at QE II cost 20 [Maloti] at the cafeteria*," one informant recalled.

Linen service was also observed to have improved at QMMH compared to QE II. "*At QE II, patients were not given robes, so there was always laundry hanging around*," said one clinician. "*They had to wash their own robe. Now, laundry is washed by the hospital and patients get clean clothes every morning*." Another informant noted that QMMH outsources laundry and linens are replaced daily.

A few informants mentioned changes in the transportation system. One informant said that QE II outsourced ambulance services, whereas QMMH has its own transport and staff. "*Before, the ambulance would come with his own nurse [who] might not know what is going on. Now, our own nurse knows exactly what to do as she has managed patients here before.*" Another informant regretted that QMMH does not provide transportation for nurses except at the filter clinics. QE II provided

transportation to nurses to and from the hospital at the end of shifts. QMMH provides this service but only to nurses at the filter clinics.

Policies and Standards. Another difference mentioned by many key informants is that QMMH has more clearly defined roles, and has established hospital-level policies and procedures for most functions. More importantly, these policies are consistently communicated to staff. "*It is not that there were no policies and procedures at QE II*," said one nurse. "*But here, we have access to them in how we do work*." Another manager observed:

> *Here the policies are clear. I have to make sure people have read them and understand them. Everything now you write it down: those that attend the meeting, the policy presentations—they sign for it. There is a bit of transparency.*

One example of a hospital policy involves the use of entrances to the Casualty unit. The unit now has one entrance for STAT emergencies where the patient is taken directly to the resuscitation room, and another entrance for ambulatory patients who are not as serious. The policy related to use of these entrances was explained to all staff, and signs are posted as reminders for patients. "*Now they are not just doing whatever they want*," said one nurse, "*They are not going in whichever way they please*."

Informants talked about work being done "*in a more structured way*" at QMMH. Many functions are tracked, including attendance at meetings, training received, maintenance requests, and security guard rounds. Staff are expected to follow procedures, and managers are given authority to discipline employees if they do not. "*There is an expectation that everyone should be compliant with policies and use standard operating procedures*," explained a KI. The BU research team also noticed that many people interviewed would refer to policies and standards. This seemed to be a different orientation to work than at QE II. Several informants observed that staff appreciate the policies and standards because they know what performance is expected of them. They like having guidance and understanding expectations:

> *Whereas in the MOH, policies were not known to staff, here we are made to be part of the policies, and asked to adapt them to be relevant to our situation. The policies are made known to staff. We disseminate them to all teams, so they know how they should conduct themselves.*

Quality of Care. Many people commented that patient quality of care has improved. One reason quality is perceived to have changed is because QMMH has an infection control program, whereas QE II lacked adequate equipment and supplies to control infections. Cleanliness (discussed earlier) is obviously related to reducing risk of infection. Key informants perceived that patients had less risk of nosocomial infections at QMMH compared to QE II. Moreover, staff cross-check medication orders for very sick patients, as a safeguard against medical errors.

> *We never had an infection control program at QE II, or someone dedicated to infection control. Now we have a nurse responsible for making sure it is working properly, organizing infection control trainings, liaising with the services. We have hand washing stations, cleaning, and waste management.*

> *[Surgical] infection rate has been reduced in half. The length of stay has decreased and we can discharge patients when we want to now. This is because the risk of hospital-acquired infection has decreased.*

> *Here we always have soap, but at QE II they struggled to provide soap, and everyone used the same towel.*

Other factors which informants perceived were related to improved quality of care included increased nurse training, better management of drug supply which reduces stock outs and assures that medicines are not expired, and faster turn-around times for lab tests and diagnostics, which allows patients to receive faster and more appropriate treatment. The following quotes support perceptions of increased quality of care.

> *Care has improved at QMMH due to increased nurse training. They are able to provide better nursing care even though the patient load is heavier.*

> *Drugs used to be out of stock, or they didn't know what they had sometimes [at QE II]. Now we have better records. We move stock around if it is about to expire. Every time they take a drug out, it says how many are left so we can order before it gets to zero.*

> *The lab is now more efficient, more automated, and we get results faster. We always have reagents and we are never out of stock. In government labs there are a lot of stock outs because the bills from NDSO aren't paid. Here, there are managers to track indicators.*

Communication. Several KIs mentioned that communication is better at QMMH compared to QE II. This increased communication is between staff within a department, between clinical and service departments, between department heads and senior management, and between patients or families and hospital personnel.

Key informants described how structures were created at QMMH to facilitate communication, especially committees. "*We have an audit committee, management committee, infection control committee, and others. There may have been committees at QE II, but they were not active*." Other informants discussed Quality Improvement (QI) teams working at the departmental level. These very inclusive teams help the departments determine areas to focus efforts on. They often focus on achieving objectives set by the government as priorities: e.g. eliminating maternal mortality, or reducing perinatal mortality.

One informant mentioned that communication is more structured and written down: "*We do a lot through email. That is best because then there is always evidence. If we disagree later, we can go back and see. Back then [at QE II], the communication wasn't written.*" The informant described the advantages of better communication, using maintenance scheduling as an example.

> *The structure makes it easier to interact with departments…if I had a contractor coming at QE II, I don't remember liaising with the department concerned. You just came and did the work, even if it might disrupt the department. Here, you communicate beforehand about the inconveniences you are going to cause them.*

In the Pediatrics and Surgery Departments, managers discussed how staff meetings are used to discuss important or unusual cases and analyze mortality, as shown in this quote.

> *Every Friday, the Surgery Department has a meeting to discuss what is happening in the department. We have a case presentation or discuss mortality. There is also a program with Accident & Emergency, an interdepartmental meeting once a month, and this includes all staff including sisters (nurses). At QE II, they had meetings with doctors only, and there were no other department meetings or coordination with sisters. So staff didn't know what other departments or nurses were doing.*

Key informants mentioned that hand over of patients during shift changes is better at QMMH. Another area of increased communication was the sharing of patient feedback and complaints. In addition to getting quantitative results of patient satisfaction surveys, the Public Relations Office shares patients' answers to open-ended questions with the relevant departments. Managers said they liked to get feedback as it can help them to put in place needed changes.

> *Sometimes a patient will complain about staff, and we may have to confront the staff, like a patient who says that the nurse told the patient to bathe herself, one day after abdominal surgery.*

> *We see improvement over time. We attend to the things they have complained about, so it is less now.*

Another aspect of communication is information systems. Several KIs mentioned that QE II had no computerized patient registration or record system, whereas QMMH has electronic data systems to help personnel track, share and analyze data. The changes in availability of data are coupled with more empowerment of staff for problem-solving, as explained by one informant below:

> *I know the Ministry was trying to get facilities to appreciate how to use data. But people didn't have a lot of things to <u>do</u> with data. Here, data is readily available, they get it, they can absorb it and it helps them to realize things. They draw conclusions, for example, about staffing and how they can cover the service better by moving a nurse from one area to another. People appreciate the data. They know they can use it.*

Informants did not mention any specific changes, positive or negative, in communication between the hospital and the MOH. A few people mentioned efforts which had been made to improve guidance for district hospitals on referrals, but it seems as though communication between districts and QMMH is not very different from when QE II was open.

Organizational culture and work ethic. At least 7 key informants mentioned culture and work ethic as areas in which the new hospital diverges from QE II. This is closely linked to the introduction of policies and standards, and the growth of a 'compliance culture.' Staff at QMMH were described as being more disciplined, actually doing the job they are supposed to do. Staff are increasingly becoming internally motivated, willing to take initiative and become problem solvers. Several informants mentioned the ongoing implementation of a "balanced scorecard" system, which will serve as a performance management tool. They also mentioned receiving an annual performance evaluation. The table below includes some illustrative quotes showing how the organizational culture and work ethic are perceived to have changed:

Table 4.3: Comments from Key Informants on Organizational Culture and Work Ethic.

Domain	Quote
Accountability	A culture of accountability in the staff has been created. They have pride in their work. At the old QE II, we were doing what we wished. People were doing their work, but were going away at any time they wanted….There are some that have gone back to government because there they can open clinic at 7 and close at 3 and nobody cares. Now you either walk or run, there is no in-between….People here are very disciplined, which I think is because of management. In government, people do whatever they want, whenever they want. There are no controls. But here, there are lots of controls. There is a clock-in system, and disciplinary systems are implemented. I cannot say that disciplinary procedures did not exist in government: they did, but they weren't implemented. When we come to work, we are not allowed to use just any entrance. There are clock machines at the staff entrance. You put your hand in and key in your employment number. And when you clock out, it will show how many hours you worked…For some nurses, this was too much [at first], but now they know the system. Now, if I see them outside, I can ask the clerk to see the clock, and if they have not clocked out I can deduct funds. At first they thought it was a joke, but now there are less people trying to cheat. I can immediately see on the machine who came after 8, and I can talk to the people who are late and see what is happening. At QE II, you could come 30 minutes late and be considered early. Here, they say that the work is more. People had small businesses that they were running outside before, because they didn't have to be here [at QE II] completely. Now they can't run a side business because they have to be completely here when they are here. At QMMH, duty rosters are created by each department. If there is a problem, you go to the department team leader. This results in more accountability because people are solely responsible for their department.
Focus on quality	Quality improvement, it was not done at QE II. But here, we really sit down and see what is wrong and what we can improve. Even to stand in front of others to present your case, and the others are there not to criticize, but to tell what could have been done better so we can learn from our mistakes. That was not done at QE II.
Motivation	Back then, we were civil servants and we worked like civil servants. You only do something if someone is pushing. But here you have a role, you know what to do. You can't just sit. At QE II it was difficult to get the nurses to do anything…Sometimes a nurse working at night would not look in on her ward, she would just close the door. In the morning, some patients might be alive and others dead. Not all were like this, of course, but some were. Now the nurses are really doing nursing. [Before,] doctors came and went as they wanted. Now they are in the office and at work.

Human resources management. Several areas of change were mentioned in how human resources are managed. These include: training and qualification of staff, compensation and working conditions, and discipline.

Several informants mentioned important changes in upgrading of staff qualifications, and sometimes in numbers of staff as well. "*There are now nurses who specialize in surgical theatres, more nurses who have been sent for training in South Africa. This has improved their skills and knowledge*," said one informant. Another informant noted the addition of neonatologists, anesthesiologists and other specialists. A pharmacist noted that the number of people working in the Pharmacy Department is greater than at QE II: "*We have 12 pharmacists and 26 technicians at QMMH. I don't remember*

seeing more than 7 pharmacists at QE II, and when I left there were maybe 4. The number of technicians, I don't remember, but it wasn't like this."

Several people who had worked at QE II in the past mentioned receiving additional responsibilities or having their role expanded at QMMH. Often people perceived this positively and felt empowered by the new responsibilities and ability to participate in decision making. The quotes below illustrate how people perceive the change:

> *At QE II my role was limited to [a smaller department]. I wouldn't take on big decisions such as planning if things needed to be changed, or developing the budget. But here, I am involved with budgeting, recruitment of staff. It is a serious shift, responsibility-wise.*
>
> *Nurses are more empowered now, they can refer and do deliveries.*
>
> *QE II was ruled by people politically…here, I can talk to anybody and we can see how to address things. Before, I couldn't.*

Informants described an increased emphasis on orientation of staff, continuous education, and competency testing. Staff explained how at QMMH staff are given intense orientation for new responsibilities:

> *The orientation for a new job, the induction I was given, was never done when I was promoted by the Ministry of Health. They would give you a promotion, but they didn't help you to learn your new responsibilities. [By contrast], I knew what was expected of me by the time I started at Tsepong.*
>
> *When we came here, we had orientation to familiarize people with the environment and the technology: the alarms that alert you to issues, access controls and so forth. Everyone needed to be oriented to how they work.*

Informants mentioned how physicians are sent to conferences or different specific trainings in laparoscopy, pediatrics, or gynecology, whereas this was less common at QE II. One department manager described hosting "clinical day" when university lecturers would come to speak, others discussed integrating educational activities into regular staff meetings.

Several people connected the training opportunities to an increased emphasis on competency testing. "*Nurses take exams to make sure they are suitable for different areas of specialty, for example to be an operating theatre nurse*," said one informant. Another KI saw advantages in the testing: "*We write tests to determine our skill level, and the trainer gets the results. They can help you learn more in the areas where you are struggling or need more knowledge*." Several informants highlighted the hospital's strategic approach to training for universal skills, ones that everyone should have, e.g. all clinical staff are trained in intubation (at QE II only anesthesiologists knew how to do this), infection control, cardiopulmonary resuscitation (CPR) and customer care.

Five key informants specifically mentioned compensation and working conditions as a key difference between QMMH and QE II. These staff noted that the hospital has a system of giving an end-of-the year bonus to employees, as well as ward level bonuses based on patient satisfaction survey results (see Section 3.4). One informant observed, "*Bonus check? We never had that before. We didn't even*

know what that was." Other key informants mentioned the policies for overtime, night shifts, and weekend work as being clearer, fairer and more generous than under QE II. This leads to greater satisfaction expressed by many informants, and possibly to greater retention of staff.

> *At government labs there was no overtime. Here we work 40 hours per week, but the lab is open 24/7. So if we work nights or weekends, we get 1.5 time for Saturday, double time for Sunday, and something for night shifts.*
>
> *Working conditions here are better. For example, [at QE II] if you are a nurse and you are working over your normal hours, because people are late or have a problem and can't get in, we weren't getting overtime for that. Now, you do, and if you work night shifts you get an extra allowance.*
>
> *Doctors at QE II could be on duty during the day, then they would have to be on duty at night, and then be on duty the next day too. A doctor sometimes would be on night duty and on call at the same time. For this, they received only a 150 Maloti supplemental. They might have to do 5-6 nights a month, and on call time and night duty were not counted as regular work hours. No wonder they sometimes went home or slept during night duty. It is too much to ask.*
>
> *Well, I'm happy. Compared to what I was earning before, I'm making more, and I'm learning to be a technologist.*
>
> *There is a program to prevent the brain drain. This type of program did not exist at QE II. Every two years I was seeing new people, but now it seems like this is changing, and QMMH is retaining these people. In two years' time, there is a big drop [in turnover] I can see.*
>
> *Personally, I feel I can now actually help patients. So job satisfaction is going up.*

One staff member observed that the increase in compensation is not just about the money: it is about the feeling of being appreciated and thanked.

> *Before, some people did good nursing, but they weren't appreciated. No one ever said thank you before. Now they are appreciated and awarded. They might get "best ward" award and all will get a voucher (to use to buy things in shops). Or even the best ward clerk might get an individual reward. And there are personal rewards. Now they see the tiny babies who would have died before, being saved and going home. And they come back, the mothers with their babies, to say hello. That is rewarding.*

Several people mentioned increased discipline of staff, and how the enforcement of rules and willingness to discipline or even to fire staff has increased individual accountability. People referred to the clock-in system as a mechanism to enforce discipline (see section on Organizational Culture and Work Ethic). Managers also said that the Human Resources Department supports them in holding employees accountable, a notable change from QE II where civil service rules made it more difficult to take disciplinary action.

With discipline, we get a lot of support from HR. At QE II, if you discuss with a person a problem you are having with them, they would give you the 'eyes of fire.' Now HR gives you support on what to do, and you don't have to fear that they will sue you.

A lot of discipline has taken place, disciplinary inquiry. [People are told] "if you do this, it is not tolerated here, and we will follow disciplinary procedures." It is a tight knit community, so that when this is done a few times, people hear about it and are deterred.

There were problems with the disciplinary process at QE II. There was a break down in discipline. Even if you wanted to do something about it, with the civil service rules our hands were tied. [In one incident,] a patient was supposed to get an intravenous antibiotic…[but] the nurse wouldn't give the IV. She said that once before she had given IV penicillin and the patient had died, so she wouldn't give it, even though the patient wasn't allergic to penicillin. Here, you can immediately take care of something like that with disciplinary action. Discipline was a big problem [at QE II]; now discipline is much better.

4.4.2 Drivers of Performance

We identified important drivers of performance at Queen 'Mamohato Memorial Hospital. These are summarized in the table below and discussed in more detail by domain.

Table 4.4: Domains of Performance Drivers.

Domain
Infrastructure and resources
Information technology and exchange
Procedures and policies
Consistency of leadership message and timely decision making
Acknowledgement and inclusion of staff
Training and staff development
Empowerment of managers
Performance feedback
Transparency

Infrastructure and resources. Many informants stated that access to functioning equipment, to well-equipped and pleasant work spaces, and to adequate supplies of medicines, consumable and non-consumable stock, and other supplies allowed them to do the jobs they were trained for, and also motivated them to do their jobs well.

We have proper equipment. With this we are able to perform at higher levels.

Environment is also a factor. If you have been in QE II, you know it was always dirty, always 'no this, no this.' It is clean here. And you know you have the equipment you need in order to apply your skills. There is medication. Having these things makes people relaxed in their minds. For someone who wants to exercise the skills she has, it is really motivating and changes your intentions. You want to do your work.

Information technology and exchange. Information is available to track pharmaceuticals, and monitor stock, access patient records, or limit access to information to ensure privacy and confidentiality. There are also clearly defined channels of communication within and across departments, and regular venues that allow information to be shared.

> *If something is not available at one [clinic], I look on system and I can see that it is available somewhere else, another clinic. Can move it quickly in a day. If we don't have an item, they might.*

> *I feel that here I have more interaction with management. The meetings we have, the communications.*

> *We have a monthly meeting with managers. This includes nursing, finance, support services, HR, pharmacy, clinical services, PRO, etc.*

Procedures and policies. As mentioned in the Differences Section, procedures and policies touching on all aspects of hospital work give clear guidance to employees, resulting in consistency of how things are done, and setting standards and expectations for employee work and performance.

> *[There is] clear guidance on what you are supposed to do. SOPs [standard operating procedures]. An SOP is like a recipe. It tells you exactly what you have to do. For example, this is how you admit a patient, these are the steps. It is clear, so I know I'm doing the right thing if I follow this. It gives you an ease, because you know what you are supposed to do. Of course, you may still have areas that are uncertain, but when you encounter these, you can talk to your supervisor. Then you can sit down and make another SOP.*

> *The hospital makes [the policies], and they are distributed down. There isn't resistance. Clinic staff like the guidance and they know what to do now.*

Consistency of leadership message and timely decision making. Leadership communicates expectations and goals clearly and consistently, and is able to make decisions in a timely fashion. They discipline staff if they do not meet standards. Monthly reporting and adherence to protocols are enforced.

> *[Here we have] an ability to have final decisions fast. This is another factor which drives performance. In government, it might take a long time to get a decision. There is so much red tape that you have to deal with. But here we know the decision will get made. If it has to, it will go to [the Operations Director], and a solution will come in good time. You can trust that you'll get feedback, an answer.*

> *Here you can immediately take care of things with disciplinary action.*

Acknowledgement and inclusion of staff. The flip side of discipline is acknowledging performance that is above expectations. Units are given acknowledgement for achieving high patient satisfaction scores. Teamwork is acknowledged. Staff are included in decisions that affect them.

> *Each month we pick a winning ward….This is done to show that it takes teamwork to achieve high performance. I have noticed that once a ward receives the award, then they keep performing high. It has changed their motivation, they want to show they can keep performing.*
>
> *You sit down with the ones doing the work to get their opinion. For example, we are now introducing a new service of transporting referral patients to Bloemfontein (before this was done by government). Drivers are going to be involved in this, so I want them to air their views. I know the boundaries of what is possible, and I make the final decisions. But I give them the opportunity to explain how they think it ought to work.*

Training and staff development. Skills development is an important objective within the hospital. Staff receive training on use of new diagnostic equipment and new medications, and implementation of best practice protocols. This allows them to function at a higher level and deliver better quality care. All staff also receive customer care training.

> *Before the hospital opened, I was taken to SA to one of the Netcare hospitals in Pretoria for on-site training. For 3 months I worked with Nursing Manager of a very large hospital. I got a lot of induction into processes of how Netcare operates.*
>
> *There is a lot of continuing education. We recently hosted "Pharmacy Week" with TV, radio, newspaper, interesting activities. We also had "clinical day," when universities gave lectures.*
>
> *Unit managers were trained as trainers in customer care. Before this, training on customer care was done in South Africa. Now all staff are trained on customer care.*

Empowerment of managers. The hospital has an organizational structure that empowers managers at lower levels to be accountable for their unit's performance, and they are allowed to discipline staff.

> *Looking after business, they [managers] are becoming interested in the business and problem solvers.*
>
> *We [managers] get a lot of support from HR.*

Performance feedback. A data culture is developing, with managers responsible for collecting and examining data through monthly reports, the independent monitor visits, and accreditation process. Staff are encouraged to problem solve when data reveal an issue.

> *We record the clinics' calls for ambulances so that we can analyze if it took longer than 30 minutes to respond to a call. I make the staff put together the report with our data.. People care more about using the data if they have analyzed it themselves.*

Transparency. Monthly reports are shared. Staff are made aware of policies and procedures. Staff are also encouraged to identify and solve problems.

> *We make a quarterly compilation of maternal mortality statistics & result of team meetings to review factors.*

The [patient satisfaction] feedback we get are maybe people are satisfied or maybe you should improve this and this, and when patients have concern. Meetings are held to discuss their concerns and what can be done about it.

4.4.3 Challenges

QMMH has done a remarkable job in improving access, quality of care, and health outcomes through improved facilities and equipment, as well as better management and organization of care. Yet, these achievements have not come without challenges, some of which were observed by the BU team and others related to us by key informants. Some of the most important challenges the hospital has faced have included:

- Patient volumes and staffing
- Work culture, attitudes and expectations
- Interfacing with other facilities
- Clinical records and coding
- Equipment and supplies
- Initiating TB/ART
- Timeliness of payments

Earlier sections of the report have described some of these issues, while others are new. Each challenge is described briefly below.

Patient volumes and staffing. Higher than expected volumes have challenged the hospital. Spaces have needed to be modified to accommodate higher patient numbers, and high occupancy rates in some wards have necessitated placing patients in beds in other wards and, in some cases, upgrading the beds in order to do so (e.g. stable NICU overflow patients are in upgraded nursing beds). This makes it difficult for nursing and physician staff who must now care for patients across wards. In addition, with higher occupancy rates it is more challenging to accommodate the needs of patients who require isolation in single patient rooms (e.g. TB patients). With such high patient volumes there is a danger that not all patients will get the care they need. We heard anecdotally that some sick patients could not immediately be admitted, or operations were delayed, because there were no beds available.[57]

High patient volumes at the filter clinics and hospital outpatient clinics also pose challenges by increasing patient wait time and contributing to provider burnout. Patient wait times were cited often as being a concern and one of the most commonly cited reasons for patient dissatisfaction.

There are long waits at the filter clinics, at Casualty and OPD clinics. We get the waiting times on a monthly basis. There is only Casualty on the weekends and it is very crowded.

At Mabote there is a long wait to be seen by the doctor. There is also one clinical nurse. They close the clinic when all or most patients are seen, but the day before, a few were asked to come back.

[57]According to the Operations Director, if ward beds are not immediately available, patients are admitted into the admission ward in the Accident & Emergency Department, awaiting beds in the ward.

A related challenge is staffing and the challenge of attracting and retaining qualified staff. It is difficult to have appropriate staffing levels to meet the increased demands of high patient volumes. We heard differing information from key informants. Some stated that the hospital was adequately staffed, but others felt staffing was not high enough to allow staff to do educational outreach (e.g. about the referral process) or conduct exchange programs at district hospitals, or other similar projects. Some worried that they might be stretched to the limit if a staff member called in sick.

In addition, the hospital has had to do a lot of training to bring less experienced staff up to the levels of competence needed. This is due in part because some of the more experienced staff from QE II elected to stay within the government system in order to keep pension benefits, and, as a key informant noted, because of initial difficulties in attracting senior clinicians. As a result, the new hospital has had to invest in training of junior nurses and physicians. The hospital has overcome this challenge to a large degree. "*Now QMMH has become the facility of choice for clinicians*," said one informant. "*We have a queue of clinicians who want to work here*." Moreover, the hospital now routinely does clinical assessments of nurses before hiring and of doctors before renewing contracts. This assures that the staff who are brought on board and kept on payroll are the most capable.

> *Before opening, we estimated how many doctors are needed to function…We need that many to be successful, so we couldn't send one away [on an exchange program with district hospitals]. If MOH could place an extra doctor in each department, and use them for rotation, then it would be possible; otherwise we would be too short staffed.*
>
> *We also need more senior staff. We have plenty of junior staff, but we need senior doctors. We have some senior staffs coming one is a urologist, and other is coming for general surgery.*

A broader system level challenge is that the hospital may compete with district hospitals for qualified staff. Given QMMH's facility and resources, staff may be more attracted to working at QMMH, and this may lead to "brain drain" in the districts. On the other hand, we heard accounts of nurses and physicians who received training at QMMH who then left for other jobs.

Work culture, attitudes, and expectations. A major challenge has been the old culture and attitudes among some staff. It has been difficult for some employees to meet expectations for higher performance, and to adjust to using new processes and procedures (e.g., electronic medical records, ordering and tracking stock, etc.). Some employees have resisted the pressure to be accountable for their work, and the shift to having a quality improvement and customer care focus.

> *The staff was not exposed to a structured environment previously (not used to hard deadlines). We have had casualties along the way. There are people that it just doesn't work for.*
>
> *Our people here are not used to being disciplined, people are used to doing as they wish. There are some that have gone back to government, because they can open clinic at 7 and close at 3 and nobody cares.*

Patient expectations of QMMH were very high. We heard reports that many patients were confused and considered QMMH to be a private hospital. As a result patients thought there would be no wait time, etc. It has been challenging for the hospital to educate patients about new policies and

procedures, and what patients should expect (e.g. new registration and referral procedures). Because they have high expectations of QMMH, some patients seek care at QMMH rather than at their local clinics. For example, we heard reports that women came to QMMH to deliver rather than deliver at a filter clinic because they thought the care was better. This may add to the hospital's high patient volumes.

> *They think that because it is a new hospital, it's all going to be great. Like if you go to a nice 5-star hotel, you expect 5-star treatment, whereas if you go for the backpackers' hotel, you expect backpacker treatment. So they had lower expectations before, but now they are high.*

> *A big challenge is the expectation from the patient side. I want to meet their need 100%, as a physician, but I can't meet 100% all the time. Now people are having higher and higher expectations, people want things done even quicker, like next day surgeries.*

In addition, we heard other reports that many patients were unhappy that QE II had closed and they had negative impressions of QMMH. Negative patient perceptions and experiences--in many cases, upon investigation, unfounded-- have sometimes led to negative press regarding the hospital. For example we heard about a woman whose baby died who claimed that her baby was alive but switched at birth. According to one informant, the story was carried by talk shows and the newspapers even though DNA evidence showed that her baby had not been switched. Hospital managers have to spend time investigating these patient claims and addressing negative publicity.

Staff expectations and perceptions likewise have been challenging. The hospital experienced strikes in October and November 2012 (each lasting 1-2 days), in part driven by perceptions that staff, especially nurses, were underpaid. We heard that many staff expected pay to be on par with what other Netcare hospitals offer in South Africa, and that trade unions promised nurses 51% increases in pay if they joined. The hospital has communicated average compensation details to show that compensation, including pay and benefits, is higher in the PPP than in MOH facilities. Nonetheless, addressing staff expectations regarding compensation continues to be a challenge.

> *People think its private, they don't understand it's both public and private. Since they hear private companies pay a lot, they think they should be paid more.*

Interfacing with other facilities. Clinics and district hospitals refer patients to QMMH for care. We heard reports that the referral process is not always working well and that some inappropriate referrals are made (e.g. delayed referrals, non-clinically based referrals, etc.). We also heard reports that telecommunication systems are often down and district hospital cannot communicate directly with QMMH to make them aware of referrals. A key informant stated that some facilities 'dump' patients on QMMH. It is a challenge for the hospital to educate referring facilities about appropriate patient referrals and the processes to make a referral. Furthermore, we heard reports that it is challenging to discharge stable patients to referring district hospitals because they refuse to accept them and/or don't have the supplies or resources needed to provide for the patient's follow up care.

> *We see too many referrals, and many inappropriate referrals. If a district clinician wants to refer a patient, they are supposed to phone the department at QMMH and tell them the plan. But that seems not to be working. They don't call or tell you what*

> *they've done in terms of prior tests or treatment. Or it is not in the record. To try to remedy this, we have come up with a form that on one side lists the procedures on how they should do the referral, and the other side asks for the information they need to send to us. But they should still call ahead.*
>
> *Crowding,[is] in part due to inappropriate referrals from the districts (dumping). But also some referrals are too late. We are trying to get the district clinicians involved in training, to make sure they understand how to refer.*

It is important for referring clinicians to be notified of outcomes of referrals so that they can appropriately offer follow up care if necessary. However, there is no system in place to notify referring clinicians if their patients were admitted to QMMH or seen at one of the hospital's outpatient clinics, or what the outcome was. Clinicians only know this information if they see the patient again and the patient tells them, or a note is written in the patient's Bukana (a paper booklet in which medical information is recorded and which stays with the patient).[58] In some cases staff at filter clinics call patients to see if they made and kept appointments but this is done in an ad-hoc way. A key informant at a district hospital stated that they got no information from QMMH about their admitted patients post discharge. It is a challenge to track and relay outcome information to referring physicians, especially for referrals made out of district.

> *There is no written report for referrals. If a nurse went with the patient she may know what happened, or the driver. If a physician does not follow up he will not know what the outcome was. Or he waits until the patient comes back and looks at the patient's Bukana. There is no formal post referral letter.*

Clinical records and coding. There are three medical record systems that are used by QMMH-IN. A patient's electronic medical record contains patient information, information about medical visits in the PPP system, and some medical data; the patient's paper medical record is made up of forms filled out by clerks, nurses and physicians that outline management and care of the patient during a patient's clinic visit or hospital stay; and the patient's Bukana contains notes relating to a patient's medical encounters. It is a challenge to maintain three systems and to have consistency of information across all systems; however, given that the Bukana is used throughout the Lesotho health system it needs to be implemented in QMM-IN also. In addition, women in Lesotho may change both their first and last names when they marry. This poses an additional challenge to managing medical records that are linked to a person's name.

In the electronic medical record system, ward and billing clerks input ICD and Procedure codes based on information on forms filled out by nurses and physicians during the patient stay. Coded information can be used for tracking trends in medical management and is an important adjunct to quality and performance improvement. It is a challenge to train clerks to consistently and appropriately input accurate codes. Medical coding is relatively new at QMMH-IN and will likely improve and expand to include more detailed clinical information, if made a priority.

Equipment and Supplies. We heard from a key informant that buying and maintaining hospital equipment is challenging. All equipment is purchased outside of Lesotho. Challenges relate in part to approved service technicians not offering services in Lesotho, and having delays at the border. The

[58] Bukanas are used throughout the Lesotho health system and are the main patient medical record for many facilities.

hospital is trying to hire a full time technician and has made arrangements with border staff to reduce delays.

> *The problem is getting parts across the border; there is no local supplier. Also I can't keep large amounts of stock on everything because I don't have space. I ordered a fan about two months ago for fluid warmer to heat up IV sets. The guy sent me the part, but I never got it. I then found out there was a strike at the post office so it never got through. We sent a courier only to find out it was the wrong part. Luckily there aren't a lot of job orders backing up.*

> *At the moment we get equipment within months due to border issues, but we've sorted that out. In the past, the Lesotho Revenue Authority said that the invoice would include VAT, but now it needs to be paid from us, and we couldn't always run to the border to pay it. This caused delays, but we just started an account that is paid monthly so it will save months of time.*

Delays in drug supply are also a challenge, especially HIV test kits and TB masks.

> *The problem that is still to be dealt with is TB patients and management of TB. We are still having a problem of obtaining the anti-TB masks for our staff. Hassle to get them.*

TB/ART patients. As mentioned earlier, QMMH is not accredited to initiate patients on ART or TB medications. The Ministry of Health has signaled its intention to change the policy so that HIV+ and TB patients who are not yet on treatment but identified at the hospital can begin treatment as soon as possible. While QMMH and the Ministry both seem to agree that this change is needed to increase continuity of treatment and quality of care, it is a challenge to implement.

> *The Hospital has to do some work related to ART. If someone comes in with a broken leg, and blood work is done and the person is shown to have HIV, then they [patient] have to be put on treatment…But we haven't finalized this process, and discussions are taking too long.*

Timeliness of Payments. QMMH-IN relies on the Ministry for prompt payment of the Unitary Payment and for payment of services rendered at Bloemfontein for patients who are excluded under the PPP agreement. We heard from a key informant that Bloemfontein may no longer accept QMMH-IN patients because of delay in Ministry payment of invoices. In addition, delayed payment of QMMH-IN's invoice for the Unitary Payment creates risk of default on the DBSA loan and a strain on hospital operations.

4.5 Description of Management Systems

Methodology: Because management systems are often a driver of performance in integrated hospital systems, we were interested in obtaining a detailed understanding of management systems at QMMH-IN. Key informant interviews, hospital data, and observations were used to elicit information about key hospital management systems and processes. These include human resources management; facilities and equipment management, pharmacy system; patient registration, fee collection/waiver, and medical records system; data collection and reporting system for maternity statistics; referral system to QMMH from other facilities; referral system from QMMH to Bloemfontein.

We then used this information to write up descriptions of the management systems. The written descriptions were sent by email to key informants in the relevant departments, who corrected misunderstandings or provided additional details or examples. The descriptions were edited to incorporate feedback. Findings are presented in a narrative format organized by management system.

Findings:

4.5.1 Human Resources Management

An important driver of hospital performance is human resources. In this section, we discuss the Human Resource (HR) management functions of recruitment, training, supervision, and compensation of staff. Staff are discussed in two categories: physicians and allied health care providers (including pharmacists, dentists, physical therapists, audiologists etc.), and nurses and other workers.

As shown in Tables 4.5 and 4.6, QMMH had 882 staff as of December 2012, including 70 physicians and 284 registered nurses (RNs). This is 37% more than the 642 staff at QE II (Table 4.7), with most of the additional staff in clinical and allied health positions. Most staff are locally hired (90%) and female (76%). Of the executive team (administrative cadre), 7 out of 12 are local (58%). Detailed staffing information is found in Annex E.

Recruitment of physicians and allied healthcare providers
When the hospital first opened, physician and allied healthcare worker staffing requirements were based on recommendations of the 2009 Boston University Baseline Study. Positions were posted within Lesotho. In this first round of hiring preference was given to hiring Ministry of Health staff, with priority given to QE II staff. Physicians were interviewed by the Hospital Manager and other hospital clinicians.

After completion of this first round of hiring, the PPP contract allowed the hiring process to be opened to other candidates. As patient volumes increased, additional physician and allied healthcare staff were recruited. The packages for physicians, pharmacists and dentists may include furnished housing and other benefits. There are standard benefits packages for each category of employee. Expatriates receive flight tickets to their country of origin and a lump sum payment of 25% of their basic salary at the end of their 2-year contract. Local clinicians receive a local retention allowance, medical aid and a pension fund, as well as a 13th check, to create equity in terms of remuneration. The focus now is on the recruitment of specialists. International applicants are interviewed by phone. If an offer is made and accepted, a contract is sent. Special efforts are made to recruit Basotho clinicians who now account for 20% of total physicians on staff (see below). If any Basotho medical students complete their education and want employment, the hospital will hire them even if a position is not open at the time. This is seen as one way to create a core of invested staff and to reduce turnover. Expatriates are hired on a two-year contract with an initial three month probation period. Prior to contract renewal clinicians undergo a clinical skill review. Those with poor skills are not renewed. The first such evaluation will take place in June 2013.

Recruitment of nurses and other staff
Staff needs are assessed by managers who submit requests for additional staff to the Human Resources Manager. Managers must justify these requests using data; for example, to request an additional nurse, a nursing manager must document increased patient volume and current nurse-to-patient ratio etc. Positions are initially posted internally, and, if not filled, then are posted externally, including

internationally. Local postings are published in the newspaper or are announced on local radio programs. Applicant nurses, as well as some others, do an Occupation Specific Competency Evaluation (OSCE)--a skills assessment-- and only if they pass are they considered for an interview.

Table 4.5: Staff by Category: December 2012.

		Local		Non-Local	
		Female	Male	Female	Male
Administrative	12	6	1	2	3
Physicians	70	6	8	13	43
Dentists	5	1	0	1	3
Nurses (RN and above)	284	258	26	0	0
Allied Health Professionals	29	17	6	3	3
Clinical Support Services	21	13	8	0	0
Radiology	12	1	2	1	8
Pharmacy	37	25	12	0	0
Support Staff (including Ward Clerks)	121	82	39	0	0
Catering	37	31	6	0	0
All Other	149	122	26	0	1
TOTAL	882	652	142	22	66

Table 4.6: QMMH Staff by Origin and Gender (as of December 2012).

	Origin					
	Local	%	Non Local	%	Total	%
Female	652	82.1%	22	25.0%	674	76.4%
Male	142	17.9%	66	75.0%	208	23.6%
Total	794	100.0%	88	100.0%	882	100.0%

Table 4.7: Comparison of Staffing, QMMH and QE II.

Staff	Number of QMMH Staff	Number of QE II Staff	% Difference
Total	**882**	**642**	**37%**
Sub-Categories			
Clinical Nature	**563**	**345**	**63%**
Physicians	70	57	
Dentists	5	6	
Registered Nurses	284	130	
Nursing Assistants	98	71	
Other Clinical (i.e. Lab, Radiology etc.)	106	81	
Non-Clinical Positions	**319**	**297**	**7%**
Administrative Management	12	18	
Support Staff	121	244	
Catering	37	2	
All Other	149	33	

Training

All new employees attend a general two day QMMH orientation introducing new staff to the facility, the various departments, and general policies and procedures. In addition, specific departments hold more focused one-day orientations specific to their work. For instance, new nurses attend three orientations: the hospital-wide orientation, general nursing orientation, and nurse ward orientation. The hospital orientation is offered monthly. The departmental and ward orientations are offered shortly after a new employee starts.

For non-clinical support positions (e.g. food service) many are trained on the job. It was reported that approximately a third of staff hired by QMMH for these positions were unskilled and unemployed prior to being hired.

Additional training is done based on hospital needs and individual requests. For instance twelve nurses working in the Casualty unit were sent on a 6 months trauma course in South Africa and also did a 3-day brief Advanced Trauma Life Support (ATLS) training so that they would be better trained to deal with Casualty patients. Similarly nurses working in the ICU and theaters received 6 months additional specialized training. In addition, the hospital has three clinical facilitators in-house who train nurses and others in various skills (e.g. hand washing). Clinical facilitators also provide clinical competence evaluation process. Recently 126 staff members, including ward clerks went through this evaluation. Clinical facilitators work closely with nursing staff and others (e.g. ward clerks) to identify gaps and tailor curriculum to address them. Training is not done at scheduled intervals, but when a need is identified.

Furthermore there are regular in-service trainings every two weeks where specialists present on various topics. For instance, pharmacy presented information about new medications that they now have in stock: uses, contraindications, side effects, etc. The roster for presentations is filled on a first come first serve basis, but if there is demand more frequent presentations are scheduled.

Professional skill development for physicians is also an ongoing, needs-based process and challenging given the diversity of training of the physicians on staff. Junior physicians rotate through each clinical department to improve their skills, and a range of training has been provided depending on the needs of the individual physician, from intubation training, to rotations at hospitals in South Africa (i.e. Bloemfontein and Johannesburg). In June 2013 the clinical competence of all physicians will be assessed and contracts will likely not be renewed for those who do poorly.

While not a legal requirement, the hospital requires that physicians maintain CME credits. The hospital is in negotiations with the Medical Council to be able to offer CMEs for approved educational content. Currently, however, they host invited speakers from South Africa, who have been approved for CMEs in South Africa. These presentations/sessions are open to all, however are not widely publicized outside of the hospital.

Registered Nurses do not currently need to maintain Continuing Education Credits in Lesotho. The Nursing Council of Lesotho is reviewing the issue, however, and within the next year it is likely that Continuing Education Credits will be a requirement.

The Human Resources Department keeps a record of all trainings a person receives in their individual personnel file.

Compensation

Salary, not including overtime or other benefits, for employees of QMMH is better than what the Ministry of Health was paying at QE II and comparable to what Partners in Health pays its workers, although less than what Netcare pays its workers in South Africa. At the time of transition from QE II to the PPP, QMMH was required to pay individuals at least what they were being paid by the Ministry of Health in their previous positions. Yet, the hospital faced a problem of pay disparities. For example disparities existed between expatriate and local workers, and between workers within the same job category related to some having received supplementary pay from a Global Fund grant or for working in a rural region. QMMH developed a system of pay scales and benefits based on years of service which has mitigated most pay disparities, making pay more equitable within and across job categories, with the exception of a few outliers. The initial pay scales at the hospital were benchmarked to Ministry of Health pay at the time the contract was drafted. Percentage increases in pay are determined by a formula outlined in the PPP contract and is inflation linked.

Table 4.8: Tsepong Remuneration Compared to Equivalent Offered by Government (Rand).

Job band	Tsepong	Government	Variance
Pharmacy technicians <1yr	80,600	77,964	+3.4%
Pharmacy technicians >19yrs	143,577	108,024	+32.9%
FSA. Menu Coordinator, Stores Assistant	19,857	14,076	+41.0%
Porter	20,143	14,076	+43.1%
Pharmacy Clerk	25,169	16,872	+49.2%
Basic Ambulance Assistant, Driver	30,867	24,144	+27.8%
Physiotherapy Assistant	50,358	36,432	+38.2%
Billings Manager	129,411	90,420	+43.1%
Nurses <1yr	83,200	77,964	+6.7%
Nurses >19yrs	143,963	108,024	+33.3%
ENA <1yr	41,600	36,632	+13.6%
ENA >19yrs	66,300	53,148	+24.7%
Ward Attendant <1yr	26,000	16,872	+54.1%

Note: Data are from a report assembled by QMMH and shared with MOH. They are intended to illustrate the top and bottom end of the MOH salary scale as matched to QMMH. QMMH has more salary grades than the MOH.

A comparison of QMMH salaries to MOH salaries shows that QMMH is paying 3.4% to 54% more depending on the job category. It is important to note that the Tsepong salary scales listed above include only basic salaries and do not include other fringe benefits such as pension fund contributions, medical aid contributions and variable pay such as night duty allowances, overtime and special unit allowances. If these additional financial benefits are included, Tsepong remuneration compares even more favorably to MOH. The hospital also rented and furnished housing units to provide accommodation for doctors, radiographers, dentists, and pharmacists because these job categories are considered scarce skills. However, the government is in the process of regarding civil service employment categories, with potential salary increases of up to 80%, which means the comparisons in Table 4.8 are subject to potentially significant change.

Fifty-one percent of employees at the hospital and filter clinics are unionized. The categories of workers who are outside of the bargaining unit include heads of departments, unit managers, medical officers (physicians), medical consultants, and the following allied health professionals:

physiotherapists, radiographers, pharmacists, audiologists, clinical psychologists, social workers, nutritionists, occupational therapists, dental therapists, orthopedic technicians, and dental technicians. Two strikes occurred in October 24-25 and November 16, 2012. The first lasted two days and the second less than a day. The strikes were resolved quickly by reaching agreements with the union, and the Human Resources Department states that relationships with the unions are currently good.

The first strike resulted in a Recognition Agreement which recognizes a trade union's representation. The first strike concerned working conditions, in particular pay scales with the trade union demanding 400% increase and the same night duty allowance for lower category staff that was paid to registered nurses. They also wanted to change the 12 hour shifts to 8 hour shifts. The parties agreed to pay the same night shift allowance of M60 ($7.50) to all the staff working night duty--what had been previously paid. In addition, parties agreed to employee contract addendums to not participate in unlawful strikes. The second strike took place while the negotiations were still in progress and the Trade Union denied involvement in this action. There are no Lesotho guidelines regarding union recognition. The hospital agreed to use South African guidelines to recognize and engage with unions having membership of 50% plus 1 (majority membership), excluding managerial employees, heads of departments, unit managers, medical officers, medical consultants and a number of allied health professionals.

Supervision

Supervision systems define how work will be overseen by others. At QMMH there is a clear hierarchy of staff, so that each staff member knows who is overseeing his or her work. Job descriptions and standard protocols define the scope and tasks of work in most units. For instance unit nurses are overseen by a shift leader, and all nurses in the unit are overseen by a unit manager. The Nursing Service Manager, in turn, oversees all unit managers. Shift leaders observe and work closely with unit nurses, and meet with unit managers daily. Unit managers meet daily with the Nursing Service Manager.

Units review monthly reports of their performance and have a unit score card. Unit performance reviews may be used to identify gaps in skills and organize training to fill these gaps. Currently there are no individual performance reviews.

Another tool for supervision is the Kronos "hands-on" time and attendance system that manages hours worked and ensures attendance. It also interfaces with payroll and ensures efficiency in terms of human resources deployment.

Balanced Scorecard

QMMH is putting in place a Balanced Scorecard system for management control. This business strategy is designed to help organizations align activities with goals, and improve strategic focus and performance. Currently members of the executive team and unit managers are identifying performance measures and goals for themselves and their units. For example, the Support Services Manager, who oversees Food Services, has a performance measure based on cost per meal compared to budget. The balanced scorecard may eventually be tied to annual bonuses.

Disciplinary systems

An important aspect of human resource management is maintaining discipline. If an employee has committed a transgression or somehow failed in his or her duties, the employee is notified in writing of the reasons for the disciplinary notice, and the notice outlines a date and time of a disciplinary hearing.

The hearing proceeds according to guidelines and both parties have the opportunity to state their cases. The hearing results in decisions about disciplinary action(s) which are guided by previous decisions and guidelines regarding appropriate actions for different offences. There are about four cases per month, across the hospital and filter clinics, that reach the level of having a disciplinary hearing, and there is about one dismissal per month, also across the hospital and filter clinics.

Similarly there is a process for employees to report grievances. The employee raises the issue with his/her manager in writing and the manager has three days to respond, also in writing. If this does not resolve the issue it escalates and proceeds according to written processes. If it continues to be unresolved it eventually reaches the Human Resources department or the Operations Director.

Encouraging and Motivating Staff
Each month a unit is rewarded for having the highest patient satisfaction score or having the largest number of patient satisfaction surveys submitted. In some months, the unit with the most improved score is chosen. All staff on the winning unit are given a gift certificate (100M or $12) to Pick n Pay (a local supermarket).

In addition, as previously mentioned, executive team members and unit managers are identifying performance measures for themselves and their units. Achieving set goals may eventually be tied to annual bonuses.

Year-end bonuses to staff are given, if the hospital is financially able, but these are currently not tied to individual or unit performance.

Unit performance data is used to identify gaps in skills, and training is organized to fill these gaps. These trainings may involve clinical facilitators doing in-services, or having staff sent for more formal training elsewhere. Staff are enthusiastic about these training opportunities and, in some cases, compete to participate in them.

4.5.2 Facilities and equipment management

Facility Management
Facility management is subcontracted to Botle, a private company. Facility management includes maintaining and managing the physical structures, air conditioning, plumbing, power, and water.

Major system differences between QMMH and QE II include power and water management. The QMMH is powered by a high tension electricity supply. The hospital receives high voltage power which is then transformed into low voltage for consumption. This system allows the hospital to have more control over access to power. In addition, they have four standby generators, two of which are large enough to individually supply the hospital. The two others, which are smaller generators, are for use as back up should the larger generators fail, in critical areas (i.e. ICU and theatre). Regular testing of the power system is done. Weekly no load tests and once a month run full load tests are done. If there is a power failure, the generators kick in. They have been needed three times since the hospital opened when the municipality did maintenance work on the power system.

The QMMH also has its own electrical hot water generation plant. Given the plant's reliance on electricity and the hospital's access to reliable power, there has never been any shortage of hot water. In contrast, QE II used a coal-fired and then diesel boiler system to generate steam. Because of leakage

and other issues it was not a reliable system, and often hot water or steam (for autoclaves) was not available.

Scheduled preventive facility maintenance, as outlined by written policies and procedures, is done routinely, and many systems have redundancies built in (e.g. have back up bottles of medical gases, back-up generators, etc.). For regular maintenance work the facility manager liaises with the ward manager to schedule a good time so as to minimize disruptions to the ward. Non-scheduled maintenance jobs are initiated by staff reporting a problem to the facility management department, or facility maintenance staff identifying a problem as they do their routine facility walk-throughs.

To report maintenance problems staff are encouraged to send an email to the facility management department. Some may require a supervisor's help in accessing email. Alternatively, staff can report problems by phone. The preference, however, is to have problems documented in writing (email) so that the facility manager can more easily track them. When a department makes a request, a manual work order is filled out by the technician and returned to the department when the job is done, at which time the job is logged into the system. Jobs were reported to be initiated or completed within hours of requests being filed, and a technician is on call 24/7.

Challenges include having staff identify and report problems, especially in cases in which the problem doesn't affect the person directly. For example, a staff member might see that a door handle is broken in a hallway, and not report it. To address this issue, the hospital explains to new employees that reporting facility problems is each staff member's responsibility.

There are estimated to be 100 facility maintenance requests per month for the QMMH and 20-30 requests per month at each of the filter clinics. Most maintenance jobs are identified during the daily regular maintenance walk-throughs of the facilities by maintenance staff.

The Facility Manager receives monthly patient satisfaction results and comments related to facility maintenance. However, many patients' comments are not detailed enough to act on. For example, a patient might say "the room was cold" but not indicate which room.

Equipment Management

The hospital is preparing to move to an SAP equipment management system which is used in all other Netcare facilities for tracking equipment servicing and maintenance. In preparation for the move a complete inventory of equipment is being done during March 2013. The system can be customized to the hospital's needs and once functional it will electronically track equipment and equipment maintenance. For instance, it will automatically produce reports listing daily or monthly service needs for regularly scheduled servicing of equipment.

Currently, however, equipment maintenance and repairs are tracked on the On-Key electronic system and presented in the form of an Excel spreadsheet. The spreadsheet is checked regularly to identify when preventive maintenance is due and then information about the equipment in question is located (e.g. who the supplier is, the contact information of an approved service provider, etc.). Regarding the use of technicians, QMMH tries to use suppliers from a list pre-qualified by Netcare (to assure quality). The hospital prefers to use the original supplier to service equipment because they always have the latest software updates. However, sometimes the original supplier will not prioritize service requests from Lesotho due to the inconvenience. Equipment purchased in South Africa may include a

preventive maintenance contract, but responsiveness can be an issue. Sometimes the hospital may use another technician if s/he is located in closer proximity.

For non-scheduled repair of equipment staff report equipment problems by email or phone to the equipment management department. In new staff orientation, which is done each month, employees are informed of the system, how to contact the equipment management department, and are encouraged to report equipment problems. A job card is created and then the technician fixes the problem and the technical clerk closes the job card. If the request is to replace (rather than fix) broken equipment or a device, the request must be accompanied by information justifying why the equipment cannot be fixed. For example, the dental suction pumps at all the clinics were faulty and the supplier could no longer source spare parts. These were replaced as they could not be repaired.

New equipment needs are identified by staff members (e.g. physicians) who discuss the new equipment with the Hospital Manager and Equipment Manager. If approved, the Equipment Manager then requests quotes from 3 suppliers that are approved by the Operations Director after the doctors have confirmed that the equipment meets the operational requirement. Standardization is taken in consideration when procuring new equipment, and since there are often problems with getting equipment serviced by a supplier, the ability to service equipment in Lesotho is also factored in. In some cases, the hospital may decide to pay a higher purchase price for equipment because a vendor makes servicing available in Lesotho. New equipment is purchased on the CAPEX budget, and orders are placed electronically. Typically orders are received within 4-6 weeks. However, it previously took much longer because of delays encountered at the border related to inefficiencies and the payment of VAT. The hospital now has a border account which is paid monthly, thereby speeding up the process.

All equipment is bar coded, and informal inventories are done. In addition the trunks of all cars are searched when vehicles leave hospital grounds. Theft of equipment is reported to not be a problem. With additional staff (the department is hoping to add two new staff), more formal standard inventories are planned. Most equipment, with a few exceptions (e.g. incubators that travel to theater and portable x-ray machines), stay in their ward. If equipment is borrowed from one ward for another, it is tracked in a book in each ward.

4.5.3 Drug Supply Management System

Selecting and procuring medicines and supplies
According to the PPP contract, 80% of purchases at QMMH must be made through the National Drug Service Organization (NDSO) of Lesotho. All drugs on the Essential Medicines List are purchased from NDSO. NDSO does not deal in equipment consumables, so the hospital purchases these items from other sources (including other Netcare hospitals). In addition, if an item is not stocked by NDSO or it is out of stock, the hospital can purchase it from another supplier.

In the past, if NDSO didn't have a medicine the hospital wanted to purchase, the hospital (QEII) would supply three quotes and request permission to outsource it. This process took time. The hospital now copies the Ministry of Health Director of Pharmacy Services on emails from NDSO stating that they cannot supply the medication the hospital would like to order. In this way, it is much faster for the Director of Pharmacy Services to approve the purchase through alternative channels. This is often done for medications that NDSO never had to procure before, for example those related to new specialty services such as the NICU.

The hospital often purchases equipment consumables from South Africa, where the equipment itself was purchased. For pharmaceuticals, the hospital often uses Tri-pharm, a pharmaceutical wholesaler in Lesotho. This allows them to avoid cross border issues, and the hospital has found that the prices are as good as or better than in South Africa. If a medicine is not available in Lesotho, a South African supplier is used. These suppliers send lists of out of stock drugs so the pharmacy is aware of availability.

The Pharmacy Manager negotiated with NDSO to make purchases weekly or monthly, rather than quarterly as was the custom before. These orders are placed via an online order system. If the hospital places an order on a Friday, and the drugs are in stock at NDSO, they receive their order by the following Wednesday. Pharmacy can often get stock within a day, if needed. With the ability to purchase more often there are fewer stock losses, less breakage, and more flexibility to meet purchasing needs. This is especially true as new specialists are hired who have new pharmaceutical requests, or if a doctor replaces another and prefers using different drugs or supplies. With the ability to purchase more frequently and purchase from suppliers other than NDSO (if appropriate), the pharmacy can quickly adapt to the changing needs of the hospital. While stock outs still occur, they occur less frequently and do not last as long.

If a physician has new requests for medication or supplies he/she discusses them with the Pharmacy Manager. If the request is for an expensive medication, less expensive options are explored when possible.

When stock is delivered from a supplier, every box is opened and checked for expiry dates, damaged stock and quantity matching the invoice before it is put on the shelf. The pharmacy storage is made up of storage shelves, back shelves where bulk supply is kept, and a cold room. It also has security cameras and procedures to track supplies; there is a bi-annual stock count where the theoretical count (from computerized records) is compared to the physical count in pharmacy and all wards/clinics. Pharmacy staff routinely do inventory counts and check for expired stock for in-house supplies.

Storing and Distributing
The hospital, Gateway and the three filter clinics are all part of an integrated pharmacy management system, part of the SAP system. In this system every drug has its own code and you can search the system to identify stocks. Stocks are listed as single units or individual doses. Managers within Netcare can determine the stock available in any Netcare facility, using the facility's plant number and the product code.

Within the system there are 78 pharmacy staff: 35 ward clerks, 12 pharmacists and 22 technicians. At each clinic (including Gateway) there is one pharmacist and 3 pharmacy technicians.

Using an integrated electronic pharmacy system allows pharmacists at any site visibility on the availability of stock throughout the system, and helps track stock in the pharmacy and on the wards. If an item is not available at one site, a pharmacist can look on the system and see if it is available elsewhere and then request it or direct the patient to where it is available. The system also records slow moving stock, so stock that may be rotated to a site where it will be used more quickly. Schedules to record expiry dates are done for each department and stock is checked monthly.

Ward Supplies
On the hospital wards and in the clinics, routine pharmacy supplies are stocked in three locations. The wards/clinics have some general stock of medical supplies in a lockable store room close to the nurses' station; some pharmaceuticals are kept in emergency crash carts located in all wards; and controlled drugs are kept under lock and key in a cabinet on each ward. (Medications for individual patients are handled separately as explained in the next section.)

In each location, ward clerks accept and sign for supplies the ward has received from pharmacy. The ward clerk can track routine ward supplies in SAP and when running low can put in an order. The order is sent to pharmacy and the ordered supplies are issued to the ward on the SAP system and delivered by the delivery clerks. When a supply is used staff note it on a pharmacy supply sheet (Charge sheet). This then goes to the ward clerk who captures the information in SAP. Nurses do twice daily inventories of crash carts, and pharmacy staff periodically audit routine stocks, replace expired medications and do "negative stock checks" (where the system shows that more stock was used than was allocated, usually related to a busy ward not yet updating SAP). In addition, full stock audits are done every six months. If there is a discrepancy between what is physically in stock and what is recorded in the computer, the pharmacy will notify the ward. Together they will try to figure out what happened, and to reinforce the need for good documentation. In addition, the pharmacy tracks types of drugs and volumes used at the ward level. If higher/lower volumes than usual are used, or drugs are used that seem inappropriate for the ward, pharmacy staff investigate.

Medications for Individual Patients
Ward clerks capture medical supply items/ward stock that are used in the wards on the computer form charge sheets recorded by the nursing staff. When a doctor orders a medication, a paper prescription is sent to pharmacy. Pharmacy staff enter the prescription into the SAP system. The staff member will affix the patient's label sticker to the back of the prescription and send it back to the appropriate ward with the medication attached.

This process is used to issue injectable medicines (daily) and oral medications in 3-day supplies. Patient prescriptions are kept in the medicine room on the ward in cubicles that correspond to beds. The pharmacy has two delivery people who deliver medications and supplies and pick up any stock that needs to come back to the pharmacy on an hourly basis. If a prescription is urgent (STAT) a nurse/ward clerk will come to pharmacy and wait until it is filled. There are over 300 prescriptions filled each day, and pharmacy gives priority to filling ICU prescriptions.

Outpatients can fill their prescriptions at any of the filter clinic or QMMH pharmacies. As mentioned, if a medication is not in stock at one pharmacy, the pharmacist can look to see if it is in stock somewhere else in the system and either direct the patient to where it is available, or request that it be sent. When no stock is available in the system, the pharmacist can make a substitution after consultation with the prescriber or he/she records the patient's name, contact information and drug in a "to follow" book. When the medication is back in stock the patient is called to notify them where it is available for collection. For stock outs of medications used for inpatients, alternative medications are prescribed.

Filter clinic pharmacies also order drugs to have at the filter clinics. Filter clinics have Maternity and Primary Care sections and each are responsible for their own drug orders. Orders are submitted to the filter clinic pharmacy which forwards them to the hospital pharmacy where they are filled, recorded on SAP, and sent back. Generally orders placed on Monday are received on Thursday or Friday. For

urgent orders, staff go directly to the hospital pharmacy, wait for the medication to be issued and return to the clinic. Sometimes the ambulance or patient transporter is used for transporting medications in these cases.

Rational use of medicines and control of medication errors
There are systems in place to reduce medical errors and promote appropriate use of medications. For instance, a second signature is needed to fill prescriptions for ICU patients, to double check issued medication and directions, as the patients are sometimes severely ill. At all pharmacies pharmacists and/or pharmacy technicians discuss medications with patients, educating them on how to take the medicines and what to do if they experience side effects. At the time that discharge medication is collected by the patient or the patient's caregiver, the patient or caregiver is also counseled regarding side effects and medication use. The pharmacy is open 24/7 so there is always access to obtain medication, should a patient be admitted at night or a new medication is added to a patient's chart as a doctor conducts rounds. Ambulatory patients seen in Casualty (A&E) can have their prescriptions filled before returning home without having to come back the next day.

The pharmacy also analyzes use of antibiotics to promote rational use, especially surgical prophylaxis in theatre and prolonged intravenous (IV) use of antibiotics at ward level. After 72 hours of IV use, the prescriber is requested to change to oral medications. One pharmacy staff member presented to the anti-microbial committee on antibiotic use, describing changes seen after interventions to reduce inappropriate antibiotic use. Senior pharmacists are members of the infection control committee of the hospital, and contribute to decisions related to medicines use.

Pharmacy staff lead educational activities for pharmacy students. Training by representatives of pharmaceutical companies are scheduled monthly for pharmacy and nursing staff.

4.5.4 Patient registration, fee collection/waivers, and medical records system

There are many entry points for patients to register into the SAP system (System Analysis and Program Development), the electronic record system used by QMMH. The hospital and affiliated filter clinics (QMMH, Gateway, Mabote, Qoaling and Likotsi) are part of an integrated electronic record system. Patients registering for the first time at any entry point are given a unique lifetime hospital identification number, the Patient Master Index number (PMI), in addition to a visit number which corresponds to that particular visit (Case Number). Once a patient has been initially registered in SAP and has a PMI, registering for individual visits is less time consuming. The process to register first time patients is about 5 minutes and about 1 minute for subsequent visits.

At all ambulatory entry points (Gateway, Mabote, Qoaling, Likotsi, and OPD clinics) there is a common patient registration and fee collection process:

1. First time patients fills out Registration Form and present it to Reception (for OPD clinics the patient must also have a referral letter). Nurses, porters and clerks at reception help patients who need assistance with filling out forms. Patients who already have PMIs do not fill out any forms. They just present at Reception to register.
2. Reception inputs patient information into SAP and generates a PMI (if it is a first visit ever) and/or a Case Number (for all visits). Stickers (labels) with the patient's PMI are attached to the patient's Bukana and can be scanned at subsequent visits to speed process.
3. Reception prints patient labels for the visit and gives them to the patient.

4. The patient pays at the cashier for services that have fees, or presents a Ministry of Social Welfare (MSW) letter if fees are waived. The cashier keeps MSW letters and these are returned to the Ministry for reimbursement.
5. Patient is given a receipt from the cashier.
6. Patient presents the receipt at the point of service and is seen.
7. A patient record for the visit is created at the point of service and the receipt becomes part of this record.
8. The patient visit is captured on forms that are added to the patient's record and the physician, nurse or clerk also writes information about the visit into the patient's Bukana.
9. The ward clerk inputs patient visit information into SAP from the patient record.
10. After the visit the patient's record is filed at the clinic, the Bukana is returned to the patient.

Filter clinics (Mabote, Qoaling, Likotsi)
Filter clinic services are free of charge except for x-ray, ultrasound, minor procedures, lodging, maternity and tooth extractions. If a patient has any of these services he/she goes through steps 4-6, otherwise the patient goes directly to the point of service and is seen after registering (steps 1-3).

QMMH OPD clinics
QMMH charges the standard MOH fees for all services. At the OPD clinic, the patient pays the cashier 15 Maloti for adults and 7.5 Maloti for children for office visits, and additional fees for other services: X-ray 15 Maloti, etc. Patients of private doctors, who come to the hospital only for some diagnostic services (i.e. for X-rays), pay double the fee.

The QMMH offers many clinics and sees 220 patients each day on average in the OPD. At 7 a.m., when OPD opens, there may be 180-200 patients waiting. The hospital's target is that by 9:30 a.m. all patients are registered and by 10 a.m. all have cleared the cashiers.

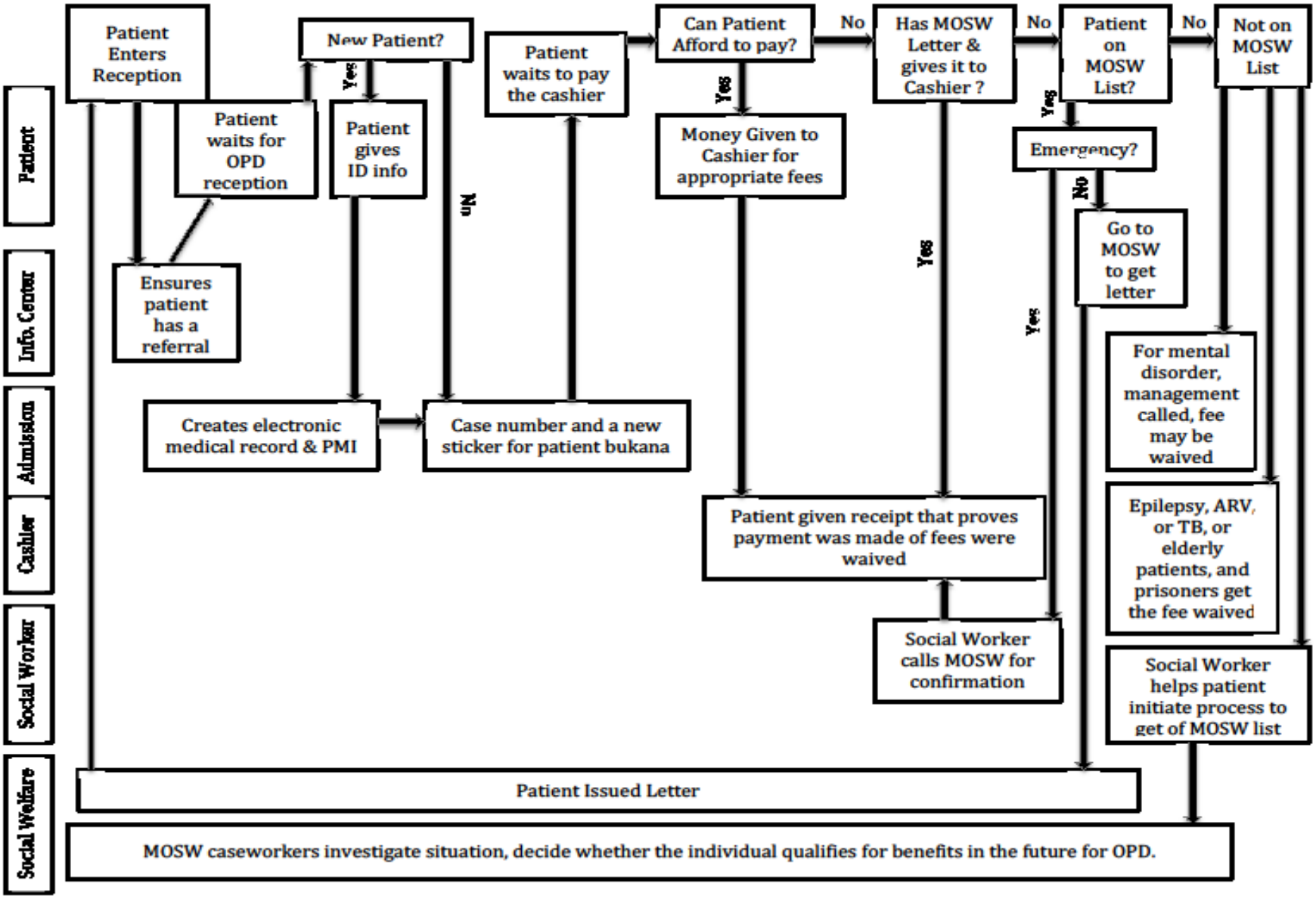
Inpatient Department
If patients are admitted to the hospital through Casualty, they are first registered by registration clerks in Casualty in a process similar to what occurs when registering patients for OPD clinics (steps 1-4). Casualty staff call the ward to see if they can accept the patient. If so, then Registration staff record the admission of the patient in SAP to the receiving ward. A patient record for the visit is started by the ward clerk. The ward clerk then inputs information into SAP from the patient's paper medical chart as it is filled out during the patient's stay by attending physicians. The patient is billed at discharge and the receipt is included in the patient's record. The patient record is then filed in medical records.

Patient records that are requested and removed from Medical Records are noted in a registry that has information about when the record left medical records, who requested it, where it went, and when it was returned.

If a patient is in active labor, she goes directly to the antenatal ward (Ward J) and the clerk there fills out the registration form and sends it to Registration to be inputted into SAP and to get patient labels, which are put on all patient forms that go into the patient's record. For maternity ward patients the patient record is the Lesotho Obstetrical Record (LOR), a booklet that contains information about the patient and her prenatal care which she brings with her. When the patient began prenatal care an LOR was created and all the patient's prenatal visits and management are recorded in it. After delivery the ward clerk inputs additional information from the patient's LOR (i.e. diagnoses and procedures) into SAP. The patient is billed at discharge, the receipt is included in the LOR, and the LOR is given to

medical records to be filed. Information about the visit is also written in the patient's Bukana which is then returned to the patient.

Figure 3.27: Process Map of Patient Registration and Fee Collection.



If a patient has a scheduled admission, he/she registers (steps 1-4), and is taken to the admitting ward. At discharge the ward clerk inputs information from the patient's record into SAP and the patient's Bukana. The patient pays, the receipt is put into the patient's record, and the record is filed in medical records. The Bukana is returned to the patient.

Waived Fees

In order to be eligible for waived fees, a patient must have filed an application at the Ministry of Social Welfare (MSW) and have a letter from the MSW that includes their social welfare registration number and states their eligibility for services on that day. The patient presents the letter to the cashier. The cashier retains and stamps it, and gives the patient an exemption form with the amounts of all of the services that were covered by the letter. The patient shows the exemption format the point of service and sees the doctor. The MSW letters are then returned to the MSW by QMMH for reimbursement. If the patient does not have a letter he/she is referred to the MSW to get one.

If a patient does not have a MSW letter but is registered at the MSW and it is an emergency, the QMMH social worker calls the MSW to get verbal confirmation that the patient is registered and to obtain approval for the visit.

If the MSW letter is dated within 2 days of the day the patient presents, the QMMH accepts it. Some patients travel far and the dates of their letters may not exactly correspond to the date they arrive at QMMH. If the date is greater than 2 days, the patient is asked to go back to the MSW and get a new letter. This does not occur often. The MSW offices in Maseru can generally provide a letter within the same day.

According to billing records in SAP, 1,001 unique patients across the hospital system received fee waivers in 2012. The hospital has not received reimbursement for the fee waivers, but this revenue would be turned over to the GoL in any case.

In order for a patient to be eligible for social welfare benefits (which includes free medical care) a patient's application must be approved by the MSW. The application contains letters from the village chief and others stating that the patient meets eligibility criteria. The application also includes information about the patient's income and assets, and living situation. After the application has been filed, the MSW conducts a home assessment. According to key informants at MSW and QMMH, up to 30% of people who may be eligible for benefits are not registered, mostly because they are unaware.

If a hospital staff identifies a patient who has not registered for social welfare benefits but may be eligible, the social worker is called. She helps the patient request a Social Welfare file and get approval for services. If there is not enough time to register a patient for social welfare benefits and get approval for services before the patient is discharged, the hospital waives charges and at discharge refers the patient to the MSW to become registered.

Apart from patients who have social welfare benefits, other patients may also have all or some of their fees waived. For example, epilepsy patients do not pay for services related to treating epilepsy, and TB and HIV/AIDS patients do not pay for TB or ARV treatment. In addition, prisoners in police custody do not pay for medical services. Similar to patients with social welfare benefits, the patient provides a letter which is kept by the hospital and is given a receipt which he/she presents to document what services were exempted from payment. In addition, if a patient has serious mental illness, a Reception

clerk may call the social worker to assess whether the patient is eligible for social welfare benefits. If so, she then would start the process to get the patient registered with the MSW.

4.5.5 Data Collection for MOH Maternity Statistics

We were interested in understanding how QMMH collects statistics related to maternity patients, and how the hospital complies with Ministry of Health reporting requirements for all regulated facilities.

Women in active labor are admitted to the Antenatal Ward (Ward J) directly. The admission paperwork is filled out at the ward and then sent to Admissions where they input the data into the hospital software system (SAP) and issue patient stickers (bar coded to track ancillary service requests, such as diagnostic tests or pharmacy) for the patient's hospital records. In addition, a patient record is started on the Ministry of Health Maternity Register. The Health Maternity Register is made up of large pages where each row represents a patient and columns relate to information that is being collected. A nurse in the Antenatal Ward begins a patient's listing by inputting the patient's name, patient identification number, admission date, age, and other information. She gathers this information from the patient, the patient's Bukana, and the patient's Lesotho Obstetrical Record (LOR), a paper booklet in which information about the patient's pregnancy and prenatal care is recorded. During her pregnancy the patient brings her Bukana and LOR to her prenatal visits. During the patients admission to the Antenatal Ward, the patient's LOR is used to record all the patient's delivery and clinical management information. It becomes the patient's hospital record and is filed in medical records after the patient is discharged.

Once the patient delivers, the rest of the information for the Maternity Register is added by the nurse in delivery and the nurse in the Labor ward (e.g. status of the newborn, type of delivery). A hospital form is also filled out by nurses and/or the physician at delivery (if the patient delivered by C-section) to include diagnosis and procedures performed; this form goes into the patient's LOR.

From the completed Maternity Register sheets, the Unit Manager of the Antenatal Ward & Labor ward compiles statistics in an Excel spreadsheet, including tallies of number of deliveries, delivery outcomes, patient HIV status, and other data. The statistics are used to create Monthly Maternity Activity Reports which are sent to the Operations Director for review. After inputting the data into the spreadsheet, the ward clerk sends the Maternity Registry sheets to the Finance Department. The Ministry of Health through the District Health Management Team (DHMT) come to QMMH to collect the completed Maternity Register sheets.

In a parallel process, information recorded in the patient's Lesotho Obstetrical Record/hospital record is inputted by the ward clerk into the SAP system. The ward clerk inputs ICD and CPT codes based on the diagnosis and procedure(s) written on the form the nursing staff and/or the physician filled out at delivery. To aid the ward clerk, a list of commonly used codes for diagnoses and procedures specific to the ward is provided. The Billing Department is also available should ward clerks have any questions about how to input information. The carbon copy of the form the nursing personnel and/or physician filled out at delivery goes to the Billing Department, where they audit/review the information that was inputted into SAP by the ward clerk.

Challenges include illegible or incomplete information on forms, not having complete data at the time the Maternity Registry is sent to the Ministry of Health (e.g. an admitted sick newborn's/premature babies outcome would be pending when the Maternity Registry sheets are sent to the Ministry of

Health), difficulty keeping up with high volumes of patient information (especially in the maternity ward), and ability to audit/review all information that is inputted into SAP by the ward clerks.

The Ministry of Health requires that the Maternity Registry information be collected monthly, seven days after the close of the month, but most reports are late, about three months after the deadline (see Table 4.9 below). The process is for the MOH staff to collect the reports themselves.

In addition, the Ministry of Health statistician who we spoke with had some concerns about the validity of the data submitted. For example, the records might show that women without HIV were given HIV treatment, or vice versa (this may be due to HIV status being reversed on report). Data quality issues were rated by the Ministry of Health as not serious, but not minor either. It was unclear who is responsible for following up on and correcting data discrepancies.

There are quarterly review meetings which are scheduled during which the Ministry of Health is supposed to report overall results to QMMH; however according to the Operations Director QMMH has only been invited to the review meeting once.

Table 4.9: Record of Completeness and Dates of Submission of QMMH Maternity Registry Information for 2012 (MOH)

Month (2012)	Complete yes/no	Submission Date
January	NO	January 2013
February	NO	March 2012
March	NO	June 2012
April	YES	January 2013
May	YES	January 2013
June	YES	September 2012
July	YES	November 2012
August	YES	November 2012
September	YES	November 2012
October	YES	January 2013
November	YES	January 2013
December	YES	January 2013

4.5.6 Referral System to QMMH

Filter clinics, district hospitals and other facilities making referrals to QMMH should follow a set of standard procedures. The process appears to be marginally better defined and more routinized than in the past, when referring facilities would just send patients to QE II without prior notification or discussion with the hospital.

Filter Clinic Maternity Emergencies
Maternity referrals to QMMH from filter clinics are initiated by nurses in the Filter Clinic Maternity Ward, as there are no regular doctors in these wards. In emergency cases, the QMMH is called and an ambulance is dispatched. Clinic staff prepare the patient for transport (e.g. insert catheter or IV line and a nurse explains to the patient what is happening). The nurse also speaks with a hospital physician in the ward that will be receiving the patient to transmit patient information, get guidance on patient management, and confirm that the case is an emergency. There is always a doctor on call for this purpose. Ambulances usually arrive within 15 minutes. There are two QMMH ambulances that

regularly serve the three filter clinics; if both are in use, a third ambulance that is on standby for Bloemfontein transfers is also available if it is in the country. A nurse from the clinic who is familiar with the case goes with the patient to QMMH and the patient is admitted directly to the maternity (or other appropriate) ward. After the nurse hands off the patient, she returns to the clinic.

Filter Clinic Non-Maternity Emergencies In a non-maternity emergency case, the patient is seen in the primary care section of the clinic. When the patient arrives, a triage nurse assesses his/her condition, and if the case is designated a priority 1, 2 or 3 (cases in which care should be rendered immediately, within 30 minutes and within 60 minutes, respectively he/she is assessed by a doctor. In some cases the porter identifies the emergency when the patient arrives and notifies the physician who is on the roster as being on call for emergencies. If the doctor considers the case to be an emergency an ambulance is called and the Casualty or other receiving department is notified to expect the patient. A nurse from the clinic accompanies the patient and after handing him/her off, returns to the clinic.

There is no formal system for relaying information about referred patients back to the filter clinics, although some filter clinics call QMMH to follow up on patient outcomes.

Filter Clinic Non- Emergencies For non-emergency filter clinic maternity and primary care referrals, the patient is first seen by the primary care section of the clinic. A nurse midwife (in the case of maternity patients) or a nurse (in the case of non-maternity patients) initially assesses the patient and discusses the case with a physician. If appropriate the physician will then initiate the referral by writing a referral letter and making a note in the patient's Bukana. The patient is then instructed to go to a specific clinic at QMMH on a particular day, or to make an appointment in the appropriate clinic. Some filter clinics keep a list of patients who have been given referral letters in order to follow up on whether the patient was seen by the specialist at QMMH. Others do not track referrals and would only know if the patient saw a specialist if the patient comes back to the clinic and the appointment is noted in the patient's Bukana.

Referrals by Other Institutions (e.g. District Hospitals)
Facilities referring patients to QMMH are instructed to call the hospital to discuss the case with a physician. This call notifies QMMH to expect the patient, and also confirms that a doctor is available to treat the patient and that there is a bed for the patient, if needed. Referring physicians fill out a form: on one side of the form lists directions for making a referral, while the other side asks for information needed by QMMH to receive the patient. The referral process is not always used by all facilities making referrals to QMMH. In some cases referred patients show up without prior hospital notification. This is often because cellular networks are down. If telecommunications are not working, referring physicians send emergency cases without prior discussion with QMMH but with a referral letter.

Referrals from facilities other than the filter clinics are sometimes inappropriate. We heard reports of patients being referred too late (e.g. a child with hepatic failure was referred by a district hospital two weeks after bilirubin test results showed serious illness; the child died), for non-clinical reasons (e.g. the referring hospital had stocks outs or no supplies to treat the patient; and example is a referring facility that did not have adequate blood supply and sent a patient for a blood transfusion), or for the convenience of staff (e.g. a women requiring a C-Section arrived at the facility late in the day and she was referred to QMMH because staff didn't want to stay to perform it). There were also concerns of patient dumping. District hospitals work under a budget and have incentives to send costly patients that they are otherwise able to care for to QMMH for cost reasons. In addition, referrals of cases that are

normally managed at the district hospital may be made during times when the district hospital is overwhelmed. For instance, if a district hospital is doing four C-sections and another woman presents needing a C-section, the hospital will refer her to QMMH.

Educating referral facilities about appropriate referrals and the referral process is a challenge. Some referring facilities were hostile to feedback about problems with their referrals, and training physicians about making appropriate referrals would take specialists at QMMH away from their clinical duties.

4.5.7 Referrals from QMMH to Bloemfontein

For specialist services that are not provided at QMMH, such as radio- and chemotherapy, patients are referred to Bloemfontein. The PPP contract excludes neurosurgery, oncology, and cardiothoracic and vascular surgery. In addition, patients receiving certain specialty services such as urology are routinely referred pending recruitment of these specialists at QMMH.

As more specialists are hired at QMMH (e.g. a urologist is joining the hospital in May 2013) the hospital expects to make fewer referrals related to that specialty. However, as mentioned in the Baseline analysis, it is also possible that with improved diagnostic capabilities, specialists may identify previously overlooked patients who would benefit from a referral to Bloemfontein. For example, more thorough assessment by a trained cardiologist may result in increased referrals. With a changing mix of specialists and specialty services being offered at QMMH it is too early to make definitive statements about referral rates and trends in the future.

Most referrals to Bloemfontein are scheduled outpatient appointments (estimated to be about 90%). If a physician would like to refer a patient to Bloemfontein he/she must fill out referral documentation (referral letter and form), call the Bloemfontein physician to notify him/her of the case, discuss patient information, and have the referral signed off by a senior clinician on staff with signing powers. The referral letter has a unique referral number on it for tracking. Each time a patient visits a physician at Bloemfontein, a new referral letter with referral number is required. An appointment is then made. On the appointment date, the patient is directed to a registration desk at QMMH specifically for Bloemfontein referrals. A “pre-referral trip checklist” is used to confirm that the patient has all required documentation (referral letter, referral form, investigation results, referring doctor’s name and contact information, receiving doctor’s name and department, patient’s and care giver’s passport and passport of nurse accompanying the patient, if a nurse accompanies). The patient is then transported to Bloemfontein using hospital transport. Transport is also arranged to bring the patient back to Lesotho after the visit.

5. CONCLUSION

The purpose of this study was to collect data at the end of the initial implementation phase of the new PPP hospital and compare this to baseline. The study period is rather early in the life of the PPP’s operational phase. New hospitals will often take more than six months for their operations to stabilize, and PPPs of this scale also routinely suffer from start-up problems – for example, as gaps in the specification of services or contract terms are identified. This should be considered when interpreting the findings. We also sought to highlight key areas of difference from baseline and to offer explanations for these changes.

QMMH-IN delivered significantly more services and services of higher quality in 2012 than at baseline. The number of admissions increased 51%, outpatient visits more than doubled, and the hospital and filter clinics assisted 75% more deliveries than at baseline. Some of the growth may be related to changes in the environment (i.e. population growth), but the figures indicate high use of services. Average length of stay for an inpatient admission was 16% lower than at QE II indicating higher efficiency and throughput of patients.

QMMH achieved impressive patient outcomes: a 41% reduction in the overall hospital death rate, a 10% decline in maternal deaths, a 65% reduction in pediatric pneumonia death rate, and a 22% decline in the rate of stillbirths compared to baseline. The hospital also had a high survival rate for very low birth weight babies: 70% of these infants survived, whereas without a neonatal intensive care unit (as was the case in QE II) virtually all of the babies weighing less than 1.5 kilos would likely have died. Patient satisfaction at QMMH was also higher compared to QE II.

Table 5.1: Comparison of Overall Statistics

	QMMH-IN	QEII-IN	% Diff
Hospital beds	390	409	-5%
Filter clinic beds	24	8	200%
Total beds	414	417	-1%
Inpatient admissions (hospital)	23,341	15,465	51%
Inpatient Days (hospital)	116,648	91,808	27%
Outpatient Visits (incl. filter clinics)	374,669	165,584	126%
Deliveries (incl. filter clinics)	7,431	5,116	45%
Average length of stay (hospital)	5.00	5.94	-16%
Hospital occupancy	82%	61%	33%
Death Rate (incl. filter clinics)	7.1%	12.0%	-41%
Maternity death rate (incl filter clinics)	0.21%	0.24%	-10%
Pediatric pneumonia death rate (hospital)	11.9%	34.4%	-65%
Still birth rate (hospital)	3.1%	4.0%	-22%
Survival of very low birth weight infants (<=1,500 gr)	69.8%	NA	NA
C-section rate (incl. filter clinics)	26.8%	7.2%	272%
Patient satisfaction rate (incl. filter clinics)	86%	70.7%	22%

Notes: See main text for detailed definitions. Beds: 10 Casualty beds are included for QMMH because the hospital admits patients to these beds temporarily while awaiting admission to another ward. They are included in calculation of hospital occupancy. Casualty beds were not counted for QEII. Filter clinic beds are only for deliveries. At baseline, Qoaling filter clinic had beds, but the number is not recorded in the baseline study. We assumed it is same as current beds, i.e. 8 beds. Occupancy: Other data sources put baseline at 82%, in which case QMMH is equal to baseline. Survival of very low birth weight infants: QE II data not available. We assume that QEII-IN data on deliveries included 345 deliveries at Qoaling filter clinic. Overall death rate and maternity death rate include maternity inpatients at filter clinics. Methods to measure patient satisfaction vary substantially between baseline and endline, as explained in text.

Process indicators give some indication of how QMMH was able to achieve these outcomes. Systems are largely compliant with MOH policies and protocols, including infection control, clinical treatment protocols (e.g. PMTCT, newborn treatment), medical recordkeeping, and the availability of emergency equipment. Clinicians are better able to treat patients and comply with protocols because of a well-functioning pharmacy system which has reduced drug stock outs and theft, and a laboratory system which provides most test results within an hour of order. Waiting time for elective surgery has been significantly reduced. Support systems keep the hospital clean and equipment functioning at all times, and key informants consistently mentioned the existence and implementation of hospital-level policies

and guidelines that strengthen hospital operations by outlining and setting standards, and requiring discipline and accountability. The hospital is undergoing accreditation by COHSASA, to be completed in fall 2013.

While most performance indicators were impressive, some indicators suggest areas where improvements can still be made, or systems that are not yet fully developed. This is understandable in a hospital which was only operating for 17 months at the time of evaluation. We noted that the triage system in Casualty did not work as well during shift changes, suggesting a need for further staff training, patient information, and process analysis. Lab turn-around times, while good on average, showed variability at the individual test level. The hospital C-section rate varied throughout the time period evaluated and should be examined more closely. Waiting times at filter clinics are reported to be long and a cause of patient frustration, while time to surgery for some procedures (such as femur fracture) may be unduly long because of delays in patient preparation and testing. We are confident that the hospital has the management information systems and staff in place to diagnose and analyze problems like these, and is committed to continuous improvement of operations to promote higher quality of care.

6. RECOMMENDATIONS

The endline data show substantial improvements in clinical quality, use, and patient satisfaction compared to baseline. Yet, there appears to be a lack of understanding about the overall PPP hospital among stakeholders and the general public. For example, some people seem to believe that QMMH is a "private hospital" rather than a public private partnership. Others seem to believe that quality of care, patient experience, and outcomes at QMMH are not much different from baseline and yet the GoL is paying a great deal more. These beliefs are unfounded and need to be dispelled.

Our recommendations suggest areas for improvement in the PPP strategy and the operation of the integrated network in Maseru. Some of the recommendations are specific to the hospital system (e.g. actions to increase clinical quality), while others are meant to help improve monitoring and oversight of the partnership and to inform GoL/MOH policy development for the future. (Recommendations related to individual indicators have been included in the relevant section of the report and are also repeated here for easy reference, grouped by category.)

Transparency and Public Information

1. Public support for the PPP going forward will depend on increased **transparency and access to information** about the improvements in quality of care and patient outcomes at QMMH-IN compared to baseline. Findings of this report should be disseminated at MOH staff meetings, donor coordination events, and to the public. In addition, Tsepong and the MOH should enhance public information to correct possible misunderstanding about the role of QMMH in providing ART and TB treatment services.
2. The World Bank should consider supporting the development of a **detailed case study** on the pharmacy management system for other countries struggling with drug theft, wastage, and inefficiency. The tracking of individual patient prescriptions at ward level, and the ways in which QMMH has developed collaborative relationship with NDSO to reduce the medicines pipeline, are very important lessons which will be of broad interest. A second management case study on changes to bring discipline to personnel management also would be of great interest to external audiences.

Clinical Quality Improvement

3. Appropriate triage improves efficiency of care in the Casualty unit and patient outcomes. Steps should be taken to continue to improve **triage timeliness** and quality. All RNs in Casualty should be formally trained in triage. Ideally, the front desk should always have a triage-trained RN on duty. If staffing levels will not permit this and triage-trained nursing assistants will be used, the policy should be adjusted and supervision systems adapted to assure triage decisions are appropriate. It may also be useful in the Casualty unit to measure time to being seen by a physician, especially P1 patients. This would help identify the extent to which doctors are a bottleneck affecting patient flow and timely treatment in Casualty.
4. The Hospital should continue to invest in training, staffing, and supervision needed to improve the consistency and **accuracy of medical coding of diagnoses and procedures**, especially in light of the data driven nature of hospital decision-making and its reporting requirements.
5. Several analyses could provide information useful for **quality improvement and efficiency**. For example:
    a. It would be useful to assess if patients used recommended outpatient services post discharge and/or if they were readmitted for reasons related to their hospitalizations. This information would give context to length of stay data and help assess if LOS is associated with quality of care. MOH and QMMH should track discharged patients' follow up care and hospital readmissions within a month of discharge.
    b. The MOH and QMMH should try to isolate the effect on LOS from mothers who stay in the hospital because their infants have been admitted to the NICU.
    c. As coding of diagnoses and procedures improves, the hospital should measure patient acuity to better understand mortality trends and how they relate to diagnosis and severity of illness.
    d. To better understand efficiency of filter clinics, it is useful to track and report on trends in occupancy for maternity inpatients admitted to the clinics.
    e. Increased analysis of mortality events may be helpful. Several departments mentioned analyzing deaths by service on a weekly or monthly basis. If this is not being done systematically in all wards, the hospital might consider holding mortality rounds where each death is examined in order to assess where and how to improve care.
    f. QMMH should investigate how NICU patient medical records are stored, especially deceased patients. By documenting standard procedures and conducting periodic audits, the hospital may be able to improve the process by which records are retrieved.
6. To better understand trends in C-section rates, indications for C-sections and morbidity/mortality post C-section should be measured and tracked over time as coding of medical records improves.

Evaluating Access and Patient Satisfaction

7. Access and use of services at the QMMH-IN is high. At the same time, a more refined study, including a **household survey**, is needed to assess whether use of clinics varies by income level or patient origin, and whether the very poor in Maseru district or other areas are choosing not to seek care at the hospital due to inability to pay for costs including any fees, transport, or other expenses related to care seeking including waiting time. This information is important to evaluate whether additional initiatives should be added (above and beyond the PPP) to assure access to care for all Basotho. The study should assess whether the very poor understand the eligibility requirements for fee exemption (from Ministry of Social Welfare), and explore barriers to seeking the fee waiver. The study should also examine transportation barriers in more detail. Based on the study findings, the MSW should work with the MOH and the hospital

to expand outreach and educational activities to enroll more eligible citizens and develop strategies to overcome other barriers to access.

8. To reduce possible bias in patient satisfaction data, the MOH and hospital should consider surveying **patient satisfaction after discharge**. Alternative methods might include sending research assistants to patients' homes, or using patient cell phone numbers to text them a brief patient satisfaction survey that they can text back. In addition, getting additional information about patients' age, gender, income level, education level and general health would allow analysis to control for these patient characteristics and to identify disparities. The Joint Services Committee should consider whether it might be useful to periodically conduct an independent evaluation of patient satisfaction. As waiting time is a key aspect of patient satisfaction, the Joint Services Committee might specifically consider issues around waiting time and how to change the cultural practice of most patients arriving very early in the morning due to fear they will not otherwise be seen.

Integrated Network Planning

9. If increases in ambulatory visits continue, the PPP hospital system, including Gateway and the filter clinics, may run out of capacity to handle volumes. The MOH and QMMH should closely track **trends over time in the use of ambulatory services**, especially at the filter clinics, and develop better projection models. This will inform space planning and district-wide decisions about service delivery.
10. The MOH should formalize the policy to allow QMMH to **initiate ART**, and should promulgate guidelines for the ongoing treatment of these patients. The MOH, together with the hospital, should develop measurable indicators and a timeline to help monitor progress toward full implementation of these guidelines as quickly as possible. (See also recommendation #1, on keeping the public informed about the role of QMMH in ART and TB treatment.)

Referral System

11. Activities to **improve appropriate referrals** to QMMH and post-referral communication and accountability should be supported, For example, it may be helpful to develop a referral letter to notify referring physicians of the outcomes of their patients who were seen at QMMH, or to set up a courier system between QMMH and district hospitals to facilitate communication between the district hospitals and QMMH (in light of other communication options being unreliable).
12. **Trends in Bloemfontein referrals** should be monitored over time. Referral information needs to be discussed in light of hospital plans for and progress in recruitment of specialists. While it is likely that most referrals are justified, the Joint Services Committee should consider conducting an analysis of referral patterns and reasons for referral to better inform health system planning for the future. In addition, rates of referral as a proportion of admissions or ambulatory visits should be analyzed to evaluate changes over time. Finally, an analysis of referrals by income level may help evaluate questions of economic barriers to access.
13. **Expenditures on Bloemfontein referrals** should be analyzed to quantify the burden on the health care system. This could inform decisions about whether some of the current excluded services that are referred to Bloemfontein should be brought into the contract with Tsepong. It is possible that the MOH could take advantage of Tsepong's economies of scale to cut the costs of treatment.

Monitoring and the role of independent monitor

14. The Joint Services Committee should put in place a process for r**eviewing Independent Monitor reports** to assure accuracy of data. Reporting errors do happen, but they need to be quickly corrected and a new report submitted. The Joint Services Committee for the PPP should determine if the IM is correctly sampling indicators. In the event that the IM chooses a random date on which to analyze discharges, the hospital financial manager should independently report the actual number of discharges on that date, to provide a control that an adequately sized sample has been drawn. The MOH should also engage in **deeper dialogue** with the IM investigators to inform interpretation of current indicators, follow up actions, and discuss how new indicators might be developed in the future. For example, the indicator on availability and completeness of medical records might be revised in the future to test for retrievability of electronic medical records if they contain information comparable to paper records. The dialogue should involve a detailed examination of the role of the OBA outputs.

15. In this report, we only addressed about half of the 74 quantitative indicators in the baseline study, and our evaluation was conducted while QMMH-IN was still in a "startup" mode (i.e. not all specialists on board, not yet accredited). After the hospital has been operating for 2-3 years, another evaluation should be conducted to be able to draw more definitive conclusions on efficiency and effectiveness. At that time, **additional indicators** should be collected, analyzed, and compared to inform area-wide planning decisions. For example, it would be helpful to compare indicators such as waiting time, staff satisfaction, and additional clinical indicators which require detailed review of medical records (complication rates, time to C-section, other outcomes). The independent monitor should be more involved in subsequent evaluation activities from the start. More data collection that includes the filter clinics should be pursued. Not only are the filter clinics, we suspect, possibly serving a different demographic than the referral hospital, but the differences in demographic makeup could be useful in projecting needs and outcomes for the entire health system.

Sustainability

16. A **cost study** should be conducted to examine the full cost of services (i.e. inpatient day, outpatient visit) at QMMH, gateway, and filter clinics. The cost data could enable projections to be made for other purposes, including differential cost analysis of alternative choice decisions (for example, to add or expand a service, or cost reduction planning).
17. As hospital clinical care operations become settled, Tsepong should turn its attention to expanding other mission-related functions such as **research and training**. In addition to contributing to Lesotho health system goals, these endeavors could bring in revenue to contribute to fixed costs. For example, the hospital might become a clinical research center and scientific partner in HIV/AIDS research, acting as a site for epidemiological studies or vaccine trials sponsored by the International AIDS Vaccine Institute (www.iavi.org) or other similar institutions. In the shorter-term, the hospital might organize fee-based study tours for international experts seeking to better understand how a PPP hospital operates in a developing country, or design tuition-based short-term training programs for South African or international MPH students to learn quality improvement, operations management, or logistics management techniques. Financial analyses may be needed to determine investment costs and to set targets for indirect cost contribution from such activities.

ANNEX A

Terms of Reference
LESOTHO HOSPITAL PPP PROJECT
Consultancy for Endline Study for the Implementation Completion Report

BACKGROUND

Transition from Queen Elizabeth II Hospital to Queen 'Mamohato Hospital: The International Finance Corporation (IFC), part of the World Bank Group, advised the Government of Lesotho on the feasibility, structure and competitive procurement of an innovative Public Private Partnership (PPP) in health sector. Under this project, Lesotho's national referral hospital, Queen Elizabeth II (QE II), was replaced with a new 425 bed Queen 'Mamohato Memorial Hospital (QMMH). Government's objectives included: (i) improved public access to a wider range of higher quality medical services; (ii) better value for Government's money spent on health services for the hospital and related clinics; (iii) use of the new hospital as an improved training resource to benefit the wider health sector; and, (v) reduced reliance on costly cross-border referrals for medical services not currently offered in Lesotho; (vi) create a tertiary level hospital. Tsepong consortium, headed by Netcare and comprising significant local ownership, won the bid for the project. Tsepong has designed and constructed the new hospital and renovated three filter clinics (opened in 2010) under an 18-year PPP agreement, and started hospital operation in October, 2011.

The project was supported by technical assistance funds from the governments of the Netherlands and Sweden. It has been awarded a grant of US$6.25 million in IFC funds through the Global Partnership for Output Based Aid that has been used for the initial delivery of services at the new facilities. This grant is administered by the World Bank (WB) on behalf of GPOBA (a multi-donor trust fund with funding from IFC, Sida, among others). The GPOBA grant is now coming to its end and a team (the "ICR team") which includes representatives from the WB, GPOBA and IFC is responsible for reporting on the efficiency and effectiveness of the GPOBA grant as reflected in the services provided at the QMMH and clinics.

Baseline-survey: Prior to the transition, a comprehensive baseline study was conducted in 2006-07 to determine availability, quantity, and quality of services at Queen Elizabeth II hospital; a second baseline study documented the state of the nation's health system by examining service volume and quality at all hospitals, as well as the volume and amount of cross-border referrals.

OBJECTIVES OF THE CONSULTANCY

The objectives of the Consultancy are to

(i) design and carry out an endline study using measures for which there are baseline data, to allow comparison of relevant aspects of the old QE II hospital and clinics with the new QMMH and refurbished clinics that make up the health PPP network. Sources of data will include administrative data which are computerized and readily available (including medical records data, and admissions, discharge and transfers data), chart review, direct observation, and interviews with hospital staff and other stakeholders;

(ii) perform a before and after analysis comparing the results of the baseline survey and endline survey.

SCOPE OF SERVICES

The Consultants will work closely with the Bank and IFC team in carrying out the activities detailed below.

A) Designing and implementing an endline survey

The consultants will design and carry out endline survey that will help the Bank understand key improvements in service delivery at the new referral hospital and its filter clinics compared to the old Queen Elizabeth II hospital prior to the PPP as well as challenges and lessons learned from the inception of the project up to current – including package of services offered at the original Queen II and the PPP hospital and filter clinics. In this context, the consultant will also explain how the OBA grant performed under the overall PPP framework. Due to budgetary and time constraint, the endline survey will not be as extensive as the baseline survey. However, it will establish current situation with availability, quantity, and quality of public health services at Queen 'Mamohato and three filter clinics based on service and cost overview data at Queen 'Mamohato Hospital.

Table 1, attached, summarizes measures for which there is a baseline and for which endline data exist or could reasonably be obtained within the schedule and budget. Clinical quality indicators should use existing data from the PPP external reviewers where available. Indicators may be dropped or additional indicators may be added only if the data are available and they can be collected within budget. The indicators, key informant interview outlines, and data collection plan will be finalized in January in consultation with the ICR team, MOH and Tsepong.

Specific activities may include:

- Conducting qualitative interviews to refine proposed data collection plan;
- Developing descriptions of patient services offered at endline and identifying changes compared to baseline where known;
- Documenting key management systems including human resources and staff development, pharmaceuticals management, equipment management systems, and fee collection at endline and identifying changes compared to baseline where known;
- Gathering existing data and collecting data at QMMH and the clinics in order to allow measurement of indicators in Table 1, including abstracting of data from administrative and medical records systems, chart reviews, and direct observation.
- Conducting qualitative interviews with approximately 20-25 key informants to gather perceptions on current performance and changes since baseline, factors affecting performance, challenges, unintended positive and negative effects of the PPP, and lessons learned.
- Conducting qualitative interviews with key informants to gain a qualitative evaluation of Output-Based Aid principles/drivers (please refer to Annex I) and their contribution to current performance and changes since baseline, and to formulate lessons learned. This will incorporate issues related to contract management, incentive framework, and sustainability.

B) Before and after analysis

Once data are collected, the consultants will conduct an analysis comparing the results of the endline survey and information gathered from qualitative interviews to the results of the baseline survey. The analysis will include comparative tables and narrative describing services, systems, improvements, challenges, drivers of performance/non-performance and lessons learned so far.

C) Report writing

Once data are analyzed, the consultants will summarize all the findings into a report and produce a PowerPoint presentation summarizing the key points. This presentation will be made to the ICR team and Government and a separate presentation may be requested to the WB/GPOBA/IFC. It is assumed that the presentation will be made in Washington, and can be conducted via teleconference if needed. The Report will include an executive summary, comprehensive result and analysis of the endline survey. The Report should not exceed 125 pages.

DELIVERABLES

The consultancy firm will provide the following set of deliverables:

	Deliverable
1.	An inception report which includes endline survey design, method, questionnaire and schedule.
2.	Gather input from the MOH and Tsepong for the questionnaire
3.	Data from endline survey on a CD
4.	Draft summary report.

The schedule and budget are predicated on immediate access to administrative data, other source data, and opportunities to do direct observations and interviews, as described in Table 1. If immediate access is not possible, the scope of indicators and/or budget may need to be modified.

DURATION OF CONSULTANCY AND STAFF REQUIREMENTS

The consultancy will be for the period from December 2012 to June 2013. The consultants draft report is required no later than end of April 2013.

QUALIFICATIONS

The consultants will mobilize a strong team of medical and public health professionals who have strong experience with research of public health/hospital issues in developing countries and specifically familiar with public health issues. Familiarity with Lesotho PPP issues is plus

The team must have:

- Professional staff experienced in survey design and execution;
- Constant presence (office) in Maseru, Lesotho;
- Previous experience with evaluation of Lesotho public health system;
- Ability to conduct interviews in both English and Sesotho languages;
- Excellent knowledge of Lesotho's public health and administrative systems;
- Demonstrated experience in dealing with insufficient data;
- Readiness to stay in Lesotho for extended period of time required to design and conduct the surveys.

SUPERVISION

The Consultants will work under the guidance and supervision of the World Bank TTL, and in consultation with the project task team (including the GPOBA project adviser), the IFC PPP advisory team, MOH and Tsepong. Consultants will liaise and work closely with all the entities including but not limited to the Queen 'Mamohato Hospital and its filter clinics, other major hospitals in and out of

Lesotho for the referral study, MOHMOH and patients. All deliverables will be submitted to Kanako Yamashita-Allen, the team leader for the WB administration of the GPOBA project, Leslie Villegas, Project Adviser (GPOBA), and Catherine O'Farrell, the IFC counterpart for the QMMH PPP project.

Annex 1; OBA Principles and Aspects

A: Intermediate outcomes and questions that are important to GPOBA.

 Cost efficiency and effectiveness: service costs and out-of-pocket expenses for clients.

 Equity: socio-economic inequities in the utilization of health care services at the population/household level.

B. Questions related to the OBA model:

 Subsidies are targeted to the poor
 Transfer of risks to the service provider and their accountability
 Transfer of risks and to the service provider and enabling innovation
 Incentivizing Facilities to Serve the Poor
 Verification and Monitoring
 Sustainability of the Scheme and of its funding

C. ERR -- economic rate of return (economic cost-benefit analysis)

ANNEX B

DETAILED METHODOLOGY FOR INDICATORS

QUANTITATIVE INDICATORS

ACCESS AND CAPACITY
(SP1) MOHSW Payments: All payments per year to QMMH as a percent of total MOHSW expenditures.

Methodology: Payments associated with QMMH and the filter clinics (numerator), and the total MOHSW expenditures for the time period under analysis (denominator), were collected from the Ministry of Health. VAT (14% of payment amount) was excluded from the payment for QMMH based on estimate from Netcare. MOH was unable to supply payment data for the months of May, August and September despite numerous attempts, so we estimated payment for these months based on the amount paid in the month before and after. Payment totals do not include additional payments to QMMH for services over the maximum contracted amount, as these amounts had not been estimated or billed at the time of our analysis. The figures also do not include any interest paid by the MOH due to late payments, or payment penalties related to QMMH not meeting performance indicators.

For the total MOHSW expenditures (denominator), it should be noted that the Ministry of Health split from the Ministry of Social Welfare during Fiscal Year 2013. FY2012 budget (for our purposes, calendar months January-March 2012) definitely did include social welfare expenditures; however, it is unclear whether the FY2013 figures (calendar months April 2012-December 2012) include the social welfare part of the budget. If it did, then the denominator used in our calculations may be slightly larger than actual MOH budget, and the percent expenditure on QMMH may be a slight under-estimate.

(BD1) Total Operational Beds: Total number of operational beds by ward, and maternity beds in the filter clinics.

Methodology: Total number of operational beds were gathered from computerized data at QMMH. Included in the count are beds for TB patients waiting for MDR assessment. We did not count 3 new incubators now operating in the NICU but which were not operational in calendar year 2013, the period of analysis; 35 private beds which are fully equipped but not yet in use; observational beds located near the Casualty unit; mortuary beds; or maternity ward cradles.

QUANTITY AND USE
(SP2) Admissions and Patient Days: QMMH admissions and patient days.

Methodology: Admissions and patient days (referring to the total number of days of inpatient stay by admitted patients) were gathered from computerized inpatient data reported monthly from January to December 2012. We show the data on an annual basis, and by ward. The Step Down Ward East (Ward H) is the Orthopedic Ward at QMMH. At QMMH this is a mixed gender ward, not male only as it was at QE II. TB Ward does not exist at QMMH because TB patients are referred to other government TB treatment facilities. The few cases admitted at QMMH go into the medical wards while they wait to be transferred. The Private Ward at QMMH is not yet open, so no admissions or patient days are counted

here. At QMMH a person may first be admitted to Step Down ward, and admissions and patient days are captured here. These are not double counted even if a patient is later moved to a different ward.

(UQ2) Average Length of Stay (LOS): Overall for QMMH and by ward

Methodology: The total length of stay per patient at QMMH was collected through examination of monthly computerized inpatient data reports for January 2012- December 2012. The monthly data reports the total number of patient days and the total number of admissions for each month for each ward. The average monthly LOS by ward was determined as follows: we summed monthly admissions for each ward over 12 months, summed the monthly patient days for each ward over 12 months, and divided the total annual number of admissions by the total annual number of patient days reported for each ward. Average overall length of stay for QMMH was determined by dividing the total number of all admissions across all wards by the total number of patient days across all wards.

(HW4) Percent Occupancy: Percent occupancy by ward is based on the total number of available beds per ward and the total number of patient days per ward.

Methodology: Percent occupancy by ward was calculated by dividing the total number of patient days for the 12 months in a given ward by the total number of "bed days" for the 12 months. The total number of patient days was collected through examination of monthly computerized inpatient data reports for January 2012-December 2012. The monthly data reports the total number of patient days by ward, the total number of beds per ward, and the total number of "bed days" per ward. "Bed days per month" is a measure of total capacity: total number of beds multiplied by the total number of days in the month. Percent occupancy can be over 100% because the patients are admitted to particular ward and overflow patients are placed in other wards (but counted in the ward they were admitted). Overall percent occupancy for QMMH as a whole was calculated by dividing the total number of patient days summed across wards for the 12 months, by the total number of bed days across wards for the 12 months.

(SP3) Ambulatory Visits: The number of ambulatory visits at the three filter clinics (Mabote, Likotsi, Qoaling), plus Gateway, Casualty, and QMMH outpatient clinics (OPD) as a percent of all PPP ambulatory visits.

Methodology: The total number of ambulatory visits per year (January 2012- December2012) was obtained from an examination of monthly computerized reports of ambulatory visit data. The number of total PPP ambulatory visits was calculated by summing all ambulatory visits at the three filter clinics, Gateway, Casualty, and all QMMH OPD clinics across 12 months. This number counts patients who attended the clinic in order to receive a medication refill. The percent of ambulatory visits of each filter clinic, Casualty and QMMH OPD clinics was determined by dividing the yearly number of ambulatory visits to the clinic by the yearly total number of PPP ambulatory visits and multiplying by 100.

(CS18) ART for Patients: Availability of antiretroviral treatment (ART) drugs 24 hours per day, 7 days a week for inpatients and Casualty patients who are on treatment.

Methodology: Information about availability of ART and treatment of inpatient and Casualty patients on ART treatment was gathered through key informant interviews of Pharmacy and Casualty staff

during the months of February and March 2013. We used these data to determine if ART drugs are available 24/7 (yes/no). Policies and procedures related to ART are described in the qualitative indicator section of the report.

CLINICAL QUALITY

(IC2) Hand Washing Stations: Availability of effective hand washing stations (running water and soap, or hand sanitizing chemical) within 10 meters of ward beds and bassinets.

Methodology: We measured this indicator using two sources of data. First, we used the Independent Monitor's report, which collects an indicator A2: Infection Control Measures. This includes "compliance with hand washing infection control standards and protocols." During quarterly visits they examine 100 hand washing stations for "appropriate soap, water, and/or hand sterilization solution, and paper towels." We reviewed the reports of the Independent Monitor for the period Jan.-Dec. 2012. We noted the change in the definition of the indicator, which helps explain results in the Independent Monitor quarterly data. Secondly, we also did spot checks of 7 wards (27 rooms) over 4 days to determine if hand washing stations were within 10 meters of ward beds to evaluate this indicator.

(OB2) Preventing Mother to Child Transmission: Percent of known HIV+ women admitted to the Labor ward who receive PMTCT.

Methodology: We intended to measure this indicator through review of monthly statistics reports of the maternity ward for the period Jan.-Dec. 2012. Unfortunately, these data appeared to have inconsistencies. Therefore, we relied on the data collected by the Independent Monitors to evaluate indicator A3: Prevention of Mother to Child Transmission ("compliance with national protocol for the prevention of mother to child transmission"). The IM was to draw a sample of at least 100 records or 10% of all women admitted who gave birth, and examine the records for compliance with the applicable intra-partum protocol based on the charted status of mother and child in the quarter under review. The number of applicable cases for review is all HIV+ women delivering. We observe that the IM annual total of 1,263 applicable cases for review is much less than the 2,918 HIV+ women delivered, as reported on the Monthly Maternity Reports in 2012.

(PD1, PD2) Newborn Protocol Vitamin K and Eye Treatment: Percent of newborns who receive Vitamin K by injection and antibiotic or silver nitrate for the prevention of opthalmia neonatorum.

Methodology: We used the data collected by the Independent Monitors to evaluate indicator A4: Newborn Protocol ("compliance with national government protocol for newborns"). Newborn protocol requires recording of birth weight; skin, eye, and cord hygiene; administration of silver nitrate and Vitamin K, and other best practice measures. The IM states that they request retrieval of all records of discharged patients on a randomly selected day each quarter. The numbers of charts requested for the first 3 quarters appeared very low for a 390 bed hospital. IM was contacted on March 22, 2013 to clarify numbers of records reviewed. They originally reported reviewing 4 records in Jan-Mar period, and 3 records in Jul-Sept period, which seemed too low. After checking, the IM stated that the number of records reviewed from January -March was 44 (rather than 4 records as originally reported), and 35 records were reviewed from July- September (rather than 3 records). The IM did not provide updated information on the number of records in compliance, so we have assumed the compliance levels reported earlier are still valid. We tried to confirm these assumptions but IM was not responsive. The

IM also did not respond when asked what days were randomly selected so that we could verify the number of discharges on those days.

(CS16) Retrievable Medical Records: Percent of discharged patients who had a retrievable inpatient medical record.

Methodology: We used the reports of the Independent Monitor to evaluate indicator A8: Medical Records: Availability ("medical records that are available"). They assess whether medical records are available three months after discharge by examining a random sample of records.

(CS14) Medical Records Completeness: Complete set of vital signs and physician's note in file for non-obstetric patient medical records.

Methodology: We will use the reports by the Independent Monitor to evaluate indicator A9: Medical Records: Accuracy and completeness ("medical records that are accurate and complete"). Medical records, obtained 3 months after discharge, contain two indicators of completeness: complete set of vital signs at least once per day except in obstetrics (a nurse-run service), and a physician's note at least once per day (excluding obstetrics). Although the baseline gathered additional data (i.e. charting of vital signs up to 4 times per day, and various levels of partial vital signs), these two indicators provide an adequate comparison to baseline. The IM stated that they request retrieval of all records of discharged patients on a randomly selected day. The numbers of charts requested for the first 3 quarters appeared very low for a 390 bed hospital. The IM was not responsive when asked what days were randomly selected so that we could verify the number of discharges on those days.

(MS17) Emergency Equipment Supplies: Availability of a fully equipped crash cart; and crash cart retrievable within 4 minutes.

Methodology: We requested a list of the quantity and types of items expected to be on a fully equipped crash cart at QMMH. We obtained the list from the Pharmacy Manager (for consumables) and Equipment Manager (for small equipment). Then, an inventory of the crash carts was done using direct observation against this list in the Casualty, and Surgical and Medical wards (A, B, E, and F). We compared the total items observed to be on the cart with the total items expected to be on the cart, and calculated a percentage of items found on cart. For equipment that was only partially in stock on the cart, the percentage that was present was recorded. For example, 2 syringe catheter tips are expected to be on each cart. If a cart had only 1 unit, we recorded 0.50 (50%). Retrievability of crash carts was done by direct observation.

(CY1) Triage: Percent of patients who are triaged by an appropriately trained nurse within 5 minutes of arrival at the Casualty ward.

Methodology: Triaging methods in the Casualty ward were determined through direct observation for several hours on 4 days in March 2013. Observations took place on a Tuesday, Wednesday, Thursday, and Sunday. Two observations were during a shift change (e.g. 5 p.m. to 7 p.m.). Based on key informant interviews with Casualty staff, we describe the type and coverage of nurse training to appropriately triage patients.

(MD2) Availability of Thrombolytics: Availability of thrombolytics for use in the treatment of acute myocardial infarction (MI).

Methodology: The availability of thrombolytics was determined by interviews with the intensivist (physician) and pharmacy informants and reports of medicines in stock. We describe how the hospital developed protocols for use of these expensive drugs, and training given to staff. We discuss the procedures in place to be sure thrombolytics are available.

(SG3) Rapid Treatment of Femur Fractures: Femur fractures operated on within 24 hours of admission as a percent of total operated femur fractures.

Methodology: Treatment of femur fractures was chosen as an indicator on prompt surgical care. The total number of femur fractures from January to December 2012 was obtained through review of operation logs. The medical records of these patients were reviewed to record time of admission and time of anesthesia administration. We subtracted the admission time from anesthesia time to determine hours until surgery. We counted the number of patients with hours to surgery under 24 and under 48. The percent of femur fractures operated on within 24/48 hours was calculated as the number of patients with femur fractures operated on within 24/48 hours divided by the total number of patients with femur fractures. We also determined the average days until operation for all cases.

(PD4) Neonatal birthweight and survival: Percent and survival rate of neonates in the NICU unit with birth weight under 1,000 grams.

Methodology: This is an indicator of clinical quality, as it is difficult to treat infants with very low birth weight. Birth weight for neonatal admissions is recorded on the patient chart but is not entered in the electronic medical record. We listed all neonates admitted in four months (Jan, April, Jul, Oct). From this listing of PMI (patient master index) numbers, we drew medical records and recorded birth weight and discharge status (survived or died). Records were grouped into birth weight under 1,500 grams, and over 1,500 grams. For each group of neonates, we determined the number who survived to discharge. The percent of neonates with birth weight under 1,500 grams was calculated by dividing the number of neonates under 1,500 grams by the total number of neonates in the sample. Survival rate was calculated by dividing the number of neonates who survived in each birth weight group by the total number of neonates in that group.

(CS9) Laboratory test turnaround time: Actual time elapsed from when a test is ordered to the time the results are available.

Methodology: We measured this indicator in two ways. First, we asked for Independent Monitor report data. The IM's indicator Provision of Laboratory Services measures whether 90% or more of laboratory results are received within 60 minutes from the time the specimen is logged into the lab to the time the test result is reported out from the lab. The tests monitored by the IM are: 1) urea, electrolytes, and creatinine; 2) glucose; 3) neonatal bilirubin; 4) beta HCG; 5) full blood count plus platelets; 6) cerebro-spinal fluid cell count; 7) HIV screening; 8) CD4. Results may be reported electronically, by telephone or by lab result slip delivery. The IM was contacted to get more information about the number of lab tests that were measured for their indicator but they were not responsive.

We also measured this indicator using the monthly activity reports produced by the laboratory. These reports contain data on the range of tests given, the volume, and other descriptive and quantitative data. We were only able to obtain 9 months of data (Jan-Sept 2013), as Meditech, the group contracted to

run laboratory at QMMH, could not locate the remaining 3 months of data. We obtained data on 7 tests: 1) CSF (cerebrospinal fluid); 2) FBC (full blood count); 3) Glucose (measures amount of the sugar glucose in a sample of blood, for diagnosing pre-diabetes or diabetes); 4) Glucose fasting (more definitive test for diabetes, with sample taken 8-12 hours after eating); 5) HCG (Human Chorionic Gonadotropin, a pregnancy test); 6) HIV test; UE (Urea and Electrolytes, a screen for kidney function). We collected data on total number of tests run during the period and turnaround time per test. For CFS and FBC testing a random sample of 2.5% of tests were evaluated. For all other tests, all tests were assessed. The overall turnaround time was weighted based on how frequently a test is run.

(RF1) Referrals to Bloemfontein: Percent oncology cases referred to Bloemfontein broken down by adult and pediatric cases.

Methodology: We reviewed computerized patient data to collect the total number of patients referred to Bloemfontein and the total number of oncology patients referred to Bloemfontein broken down by adult and pediatric cases. For each age group (adult, pediatric), the percent oncology cases was calculated by dividing the total number of oncology cases referred to Bloemfontein by the total number of cases referred to Bloemfontein. Descriptive data is included to put the quantitative data in perspective. We discuss how changes in diagnostics and availability and training of specialists may be related to patterns of referral. We also discuss efforts by the hospital to manage referrals.

PATIENT SATISFACTION
(PS1) Patient Satisfaction: Percent patient satisfaction, combining inpatient and outpatient

Methodology: We used the reports by the Independent Monitor to evaluate C1: Patient and Family satisfaction. This indicator measures overall patient and family satisfaction with outpatient and inpatient services at the facility level. Outpatient and Inpatient data are combined. Patients indicate satisfaction on a 5-point scale. In accordance with the Independent Monitor (IM)'s instructions, the hospital calculates percent satisfaction by adding the top two categories of response (100% satisfied and 75% satisfied) and dividing this total by the total patients who filled out the survey minus the patients who were indifferent (indicated 50% satisfaction, i.e. neither satisfied nor unsatisfied). We were unable to compare ward level detail, as it was not made available.

OUTCOMES
(UQ4) Death Rate and Deaths Within 24 Hours: Death as a percent of admissions hospital-wide and by ward, and the percent of deaths within 24 hours of admission hospital-wide and by ward.

Methodology: The total number of admissions, the total number of deaths and the total number of deaths occurring within 24 hours of admission by ward were collected through examination of monthly computerized inpatient data reports for January 2012- December 2012. Death as a percent of admissions was calculated by dividing the total number of deaths by the total number of admissions hospital-wide and by ward. The percent of deaths within 24 hours of admission was calculated by dividing the total number of deaths within 24 hours by the total number of all deaths hospital-wide and by ward.

(UQ10) Pneumonia in Children: Number and percent of deaths in children diagnosed with pneumonia.

Methodology: The total number of children diagnosed with pneumonia and the number of deaths of children diagnosed with pneumonia were collected through examination of medical records for the

period January 2012 to December 2012. We listed all children diagnosed with pneumonia. From this listing of PMI (patient master index) numbers, we drew medical records and recorded discharge status (survived or died). The percent of deaths in children diagnosed with pneumonia was calculated by dividing the number of deaths in children diagnosed with pneumonia by the total number of children diagnosed with pneumonia.

(UQ13) Caesarian Sections: Percentage of Caesarian section (C-section) births broken down by mother's HIV status (known HIV+, known HIV- and unknown status).

Methodology: The total number of births and the number of C-sections done was collected through examination of computerized inpatient data from the period January 2012 to December 2012. The percent of C-sections was calculated by dividing the number of C-sections done by the total number of deliveries. We show the data for QMMH alone, and for QMMH and filter clinics. The combined data set is more representative, since QMMH handles mainly high risk pregnancies based on referral, while lower risk pregnancies deliver at filter clinics. Filter clinics only do vaginal deliveries; if a C-section is determined to be needed, the patient will be transferred to QMMH.

Computerized data on HIV status of maternity patients was not available, so we used sampling to determine HIV status among patients who had delivered via C-section. We created a list of all Maternity patients based on ICD and Procedure codes of C-Section. We sorted this list by PMI (patient medical index number). Every 26th record was selected to obtain a sample of 50 PMIs. From these records, the HIV status was identified. One record could not be found, hence only 49 records were examined. We also provide a narrative description of the protocols and indications for C-sections used by clinicians.

(UQ12) Stillbirths: Number and percent of total stillbirths (fresh and macerated).

Methodology: We obtained the number of total stillbirths and total births at the QMMH from January 2012- December 2012 from the maternity ward monthly reports. The percent of stillbirths was calculated by dividing the number of total stillbirths by the number of total births. The maternity ward reports capture data to distinguish between fresh and macerated stillbirths. The percent of stillbirths that are fresh (that is, death occurred during delivery) was calculated by dividing the number of fresh stillbirths by the number of total stillbirths.

QUALITATIVE DATA

ACCESS AND CAPACITY

Services: Description of services offered at endline compared to baseline will be obtained from interviews with key informants. We will focus on medical/clinical services offered, and changes in hospital "hotel" services (patient rooms, food service, etc.).

ART for Patients: Description of management and referral of patients who are known or suspected HIV+ will be obtained from interviews of key informants.

TB Treatment: The standard procedures for managing known or suspected active TB inpatients will be collected through key informant interviews with the QMMH Clinical Services Director, physicians and nurses in Casualty and general medical wards, and laboratory staff during the months of February and March 2013.

CLINICAL QUALITY

Triage: Description of the triage process in Casualty will be obtained from interviews with key informants and/or observations of the Casualty department.

PATIENT SATISFACTION

Patient Satisfaction: Through interviews with the Public Relations Officer and hospital management staff, we will describe of the process the hospital uses of assessing patient satisfaction and the use of results will be obtained from interviews with key informants.

MANAGEMENT SYSTEMS

Human Resources: Description of systems for recruiting, training, compensating and supervising staff will be obtained from interviews with key informants. Where data are available, we may include nurse to patient ratios, number of doctors broken down by specialty, total staffing, average wages by category for clinical staff, and a description of fringe benefits.

Equipment and Facilities: Descriptions of systems for procurement and maintenance of equipment and facilities; and availability of emergency power (CS1) will be obtained from interviews with key informants.

Drug Management: Description of systems for selecting, procuring, distributing and using medications (including availability of PEP (post-exposure prophylaxis) (indicator IC3 in baseline) will be obtained from interviews with key informants.

Patient Registration and Fee Collection: Description of systems for registering patients, collecting fees and managing medical records will be obtained from interviews of key informants.

Referral System: Description of system for referrals to QMMH from filter clinics and District hospitals, and from QMMH to Bloemfontein will be obtained from interview of key informants.

EQUITY

Perceptions of User Fees and Other Equity Concerns: Themes from qualitative interviews of key informants will be used to describe perceptions of user fees and other equity concerns. We will also describe the fee exemption policy of the MOH and procedures used at QMMH for those who cannot pay.

PERFORMANCE, DRIVERS & CHALLENGES

Perceptions of Performance Drivers, Challenges, and Unmet Needs: Themes from qualitative interviews and patient satisfaction data will be used to describe perceptions of performance drivers, challenges and unmet needs. Another performance dimension that will be explored is the generation of tax revenue by the new hospital.

ANNEX C

LIST OF PEOPLE INTERVIEWED

Last Name	First Name	Employer	Position	Gender	Nationality
Busisiwe	'M'e	Tsepong	Social Worker	F	Basotho
Chowdhury	Ashim	Tsepong	General Surgeon	M	Bangladeshi
Claassen	Stephan	Tsepong	Financial Manager	M	South African
Cooper	Dr.	Tsepong	Chief of Internal Medicine	M	Basotho
Edward	Kori	Tsepong	Pharmacist	M	Basotho
Mahabofanoe	Fosa	Tsepong	Clinical Manager, Qoaling	F	Basotho
Grobler	Liana	Consultant	Human Resources	F	South African
Leaooa	Ntate	MOH	Economic Specialist, PPP Office	M	Basotho
Letsie	Dr.	MOH	PPP Office	F	Basotho
Makatjane	Makatleho	Tsepong	Nursing Services Manager	F	Basotho
Makhakhe	'M'e	MOH	Director, PPP Office	F	Basotho
Mantoa	'M'e	MSW	Ministry of Social Welfare	F	Basotho
Maqache	'M'e	Tsepong	Nurse, Casualty	F	Basotho
Maqhama	Peter	MOH	Financial Controller	M	Basotho
Matla	Dr.	Tsepong	Physician, Casualty	M	Basotho
McPherson	Dr.	MOH	Director, Clinical Services	M	Basotho
Mohapi	Zondy	Tsepong	Support Services Manager	F	Basotho
Molapo	Moipone	Tsepong	Reception Manager	F	Basotho
Moliehi	'M'e	Tsepong	Human Resources	F	Basotho
Mpholo	Mabitso	Tsepong	Nurse, Gateway	F	Basotho
Mpholo	Bellem	Botle	Facility Manager	M	Basotho
Muluken	Dr.	Tsepong	Physician, OB/GYN	M	Ethiopian
Nkonyana	John	MOH	Head of Disease Control	M	Basotho
Poka	Mobothile	Tsepong	Clinical Manager, Likotsi	F	Basotho
Prins	Karen	Tsepong	Operations Director	F	South African
Raletsuba	Lintle	AMPATH	Lab Technician	F	Basotho
Rantsatsi	Dr.	MOH	Statistician, Maseru DHMT	M	Basotho
Scholtemeijer	Herman	Tsepong	Equipment Manager	M	South African
Schumacher	Rudolph	LeBoHA	Family Practice Physician, Motebang District Hospital	M	German
Seabane	Nthabi	Tsepong	Clinical Manager, Mabote	F	Basotho
Sefuthi	'M'e	Tsepong	Nurse, Gateway	F	Basotho
Seholoholo	'M'e	Tsepong	Nurse Manager, Antenatal Ward	F	Basotho

Last Name	First Name	Employer	Position	Gender	Nationality
Seeiso	Limpho	Tsepong	Public Relations Officer	F	Basotho
Van den Berg	Anna	Tsepong	Pharmacy Manager	F	South African
van Utterbeeck	Martine	Tsepong	ICU Director	F	Belgian
Wariyar	Unni	Tsepong	Clinical Director	M	British

ANNEX D

INVENTORY LIST FOR FULLY EQUIPPED CRASH CART

AED or Defibrillator (1)	Water for injection 10 ml (5)
Emergency Suction Pump-Electric (1)	Sodium Chloride 10ml (2)
O2 Regulator(1)	Gloves Examination powder (10)
Resuscitator Bag-Adult (1)	Gloves Sterile Size 7 (2)
Resuscitator Bag-Pediatric (1)	Syringe 2.5 ml (2)
Resuscitator Bag-Neonatal (1)	Syringe 5ml (2)
Handle (1)	Syringe 10ml (2)
Mac 1 (1)	Syringe 20ml (2)
Mac 2 (1)	Syringe Catheter Tip (2)
Mac 3 (1)	Needle 18g (2)
Mac 4 (1)	Needle 20g (2)
Mil 00 (1)	Needle 21g (2)
Mil 0 (1)	Needle 23g (2)
Mil 1 (1)	Xylocaine Spray (2)
Mil 2 (1)	Lubricating Jelly Tube
Mil 3 (1)	Airway size 2 (1)
Mil 4 (1)	Airway size 3 (1)
Patella Hammer (1)	Airway size 4 (1)
Stethoscope (1)	ET Tubes Size 5 (1)
Torch (1)	ET Tubes Size 6 (1)
Swab Holders (1)	ET Tubes Size 7 (1)
Clamp (1)	Alcohol Swabs (10)
Adrenalin (5)	Tape Microscope 25mm
Atropine 0.05 (2)	Set Admin Blood 10/19 drop (2)
Aminiphyllin 250mg (2)	Set Admin Solution 20 drop (2)
Furosemide (2)	Set Admin Solution 60 drop (2)
Calcium Gluconate (2)	Catheter Foley Latex 14g (2)
Magnesium Sulphate (2)	Catheter Foley Latex 16g (1)
Metoclopramide (2)	Catheter Suction Size 10
Hydrocortisone (2)	Bag Urine (1)
Naloxone 0,4 (2)	Cannula IV 18g (2)
Dopamine (2)	Cannula IV 20g (2)
Dobutamine (2)	Cannula IV 22g (2)
Heparin 5000 1ml (2)	Electrodes ECG lead (10)
Phenytoin (4)	Sodium Chloride 200ml (10)
Dextrose 50% 50 ml (2)	Sodium Chloride 1000ml (2)
Sodium bicarbonate 8.5% 50 ml (2)	Ringers Lactate 1000ml (2)

ANNEX E

DETAILED STAFFING AT QMMH

Staff by Category (December 2012)		Number of Local Female	Number of Local Male	Number of Non Local Female	Number of Non-Local Male
Administrative total	**12**	**6**	**1**	**2**	**3**
Operations Director	1	0	0	1	0
Catering Manager	1	1	0	0	0
Clinical Director	1	0	0	0	1
Financial Manager	1	0	0	0	1
Human Resources Manager	1	1	0	0	0
Nursing Services Manager	1	1	0	0	0
Manager: Stakeholders Relations Primary Health Care	1	0	1	0	0
Pharmacy Manager	1	0	0	1	0
Public Relations Officer	1	1	0	0	0
Reception Manager	1	1	0	0	0
Support Services Manager	1	1	0	0	0
Technical Services Manager	0	0	0	0	0
Clinical Equipment Manager	1	0	0	0	1
Physicians (excluding physicians in training) total[59]	**70**	**6**	**8**	**13**	**43**
General Practitioner	12	1	2	1	8
Medical Officer	27	2	3	5	17
Principal Specialist	4	0	1	1	2
Senior Medical Officer	8	0	1	1	6
Senior Specialist	1	0	0	1	0
Specialist	16	2	1	4	9
Junior Medical Officer	2	1	0	0	1
Dentists total	**5**	**1**	**0**	**1**	**3**
Chief Dentist	1	1	0	0	0
Principal Dentist	1	0	0	1	0
Senior Dentist	2	0	0	0	2
Dentist	1	0	0	0	1
Nurses (RN and above) total	**284**	**258**	**26**	**0**	**0**
Unit Manager	14	14	0	0	0
Night Super	2	2	0	0	0

[59] Physicians in training are medical interns in their final years of study. They come from various Universities including Russia, Malawi, Zimbabwe. QMMH has +/- 10 each year. They are evaluated after 18 months. These rotations are part of their medical training. They are the equivalent to being interns.

Staff by Category (December 2012)		Number of Local Female	Number of Local Male	Number of Non Local Female	Number of Non-Local Male
Nurse Clinician	6	5	1	0	0
Registered Nurse	238	213	25	0	0
Registered Midwife	21	21	0	0	0
Occupational Health Nurse	1	1	0	0	0
Infection Control and Prevention Nurse	1	1	0	0	0
2nd In charge Sister	1	1	0	0	0
Nursing assistants (total)	98	90	8	0	0
Other professionals total	**99**				
Allied Health Professionals	**29**	**17**	**6**	**3**	**3**
Auxiliary Dental Assistant	3	3	0	0	0
Clinical Audiologist	1	1	0	0	0
Dental Assistant	5	4	1	0	0
Dental Laboratory Technician	1	0	1	0	0
Dental Therapist	5	0	0	3	2
Dietician	1	1	0	0	0
Laboratory Technician	4	4	0	0	0
Ophthalmic Technician	1	1	0	0	0
Orthopaedic Technician	1	0	1	0	0
Plaster Room Technician	1	0	1	0	0
Principal Occupational Therapist	1	0	1	0	0
Principal Physiotherapist	1	1	0	0	0
Physiotherapist	1	1	0	0	0
Senior Occupational Therapist	1	0	1	0	0
Senior Physiotherapist	2	1	0	0	1
Clinical Support Services	**21**	**13**	**8**	**0**	**0**
Basic Counselors	5	3	2	0	0
Clinical Psychologist	1	1	0	0	0
Mortuary Officer	1	0	1	0	0
Lay Counselors	7	5	2	0	0
Physiotherapy Assistant	1	1	0	0	0
Professional Counselor	3	2	1	0	0
Radiology Assistant	1	0	1	0	0
Social Worker	1	1	0	0	0
Trainee Mortuary Assistant	1	0	1	0	0
Radiology	**12**	**1**	**2**	**1**	**8**
Chief Radiographer	1	0	0	0	1
Principal Radiographer	1	0	0	0	1
Radiographer	7	1	2	1	3

Staff by Category (December 2012)		Number of Local Female	Number of Local Male	Number of Non Local Female	Number of Non-Local Male
Senior Radiographer	3	0	0	0	3
Pharmacy	**37**	**25**	**12**	**0**	**0**
Senior Pharmacist	2	1	1	0	0
Pharmacist	9	7	2	0	0
Pharmacy Technician	26	17	9	0	0
Medical Intern	7	0	0	2	5
Support staff (ward clerks..)	**121**	**82**	**39**	**0**	**0**
Accounts Clerk	3	2	1	0	0
Admin Clerk	4	4	0	0	0
Basic Ambulance Assistant	4	1	3	0	0
Buyer	1	0	1	0	0
Cashier	4	4	0	0	0
Computer Liaison Officer	1	0	1	0	0
Creditors Clerk	1	0	1	0	0
Data Typist	1	1	0	0	0
Driver	4	0	4	0	0
Hands-On-Liaison Officer	1	0	1	0	0
Help Desk Officer	1	1	0	0	0
Human Resources Assistant	2	2	0	0	0
Human Resources Officer	2	2	0	0	0
Information and Compliance Clerk	2	0	2	0	0
Medical Records Clerk	2	1	1	0	0
PA To Operations Director	1	1	0	0	0
Pharmacy Cashier	2	2	0	0	0
Pharmacy Clerk	1	1	0	0	0
Pharmacy GRV Clerk	1	1	0	0	0
Porter	7	2	5	0	0
Reception Supervisor	1	1	0	0	0
Receptionist	32	25	7	0	0
Senior Debtors Clerk	1	0	1	0	0
Senior Creditors Clerk	1	0	1	0	0
Stock Controller Pharmacy	2	1	1	0	0
Storeman Pharmacy	3	2	1	0	0
Switchboard Operator	5	5	0	0	0
Tablet Packer	1	1	0	0	0
Technical Clerk	1	1	0	0	0
Ward Clerk	28	21	7	0	0
Gardening Technician	1	0	1	0	0
Catering	**37**	**31**	**6**	**0**	**0**

Staff by Category (December 2012)		**Number of Local Female**	**Number of Local Male**	**Number of Non Local Female**	**Number of Non-Local Male**
Catering Supervisor	3	2	1	0	0
Chef	6	5	1	0	0
Food Services Assistant	10	9	1	0	0
Function Coordinator	1	0	1	0	0
Menu Coordinator	2	2	0	0	0
Nutritionist	1	1	0	0	0
Stores Assistant	2	0	2	0	0
Ward Hostess	12	12	0	0	0
All other (specify) total	**149**	**122**	**26**	**0**	**1**
Clinical Facilitator	3	3	0	0	0
CSSD Supervisor	1	1	0	0	0
Billings Manager	1	1	0	0	0
Case Manager	1	1	0	0	0
Medical Technologist	1	0	0	0	1
Ward Attendant	142	116	26	0	0
Total	**882**	**652**	**142**	**22**	**66**