INTRODUCTION
Mediclinic provides a wide range of hospital-related clinical services throughout its operating platforms. This includes outpatient consultation services and pre-hospital emergency services, hospital-based emergency centres, day-case surgery, acute care inpatient services, and highly specialised services. Support services include laboratory, radiology, and nuclear medicine.

Mediclinic strives to ensure that the clinical services provided throughout the organisation are efficient, effective, appropriate, evidence-based and in line with modern technological advances. This is a formidable task, and is approached by way of clinical governance, clinical information management and clinical services development. Clinical governance focuses on ensuring patient safety and quality improvement. Clinical information management enables clinical performance measurement and deals with systems that support the clinical care process at hospital level, including electronic patient records. Clinical services development deals with developing new coordinated care models, investigating new services lines and keeping abreast of technological developments.

During 2013 the platforms strengthened their clinical leadership and management structures, appointed dedicated patient safety officers, formulated new patient safety strategies, made significant progress in infection prevention and control, and focused on establishing a more integrated approach to patient care.

It is important to note that all indicators are reported per calendar year to ensure completeness and consistency, as a significant time lag needs to be provided for in the collection of clinical data.

MEDICLINIC SOUTHERN AFRICA
SPECTRUM OF SERVICES
Mediclinic Southern Africa offers acute care hospital services in 52 facilities and emergency services in 46 facilities throughout South Africa and Namibia, and acute rehabilitation services in one Pretoria facility. ER24 offers emergency transportation services from its 43 branches throughout South Africa.

The hospital services range from routine procedures and medical treatment plans provided in 15 smaller secondary care community hospitals to complex and technologically advanced treatment modalities provided in 34 larger tertiary care city hospitals, as well as highly specialised and transplant medicine provided in three quaternary care hospitals. The majority of cases are elective in nature, but a significant portion is unscheduled, emergency and trauma related. All admitting doctors are self-employed and practise independently. Radiology, laboratory and oncology services are also provided by independent practices.

The burden of disease of the Southern African population consists mainly of communicable (infectious) diseases, followed by chronic diseases and trauma. In the medical scheme population, as a subset of the general population, chronic diseases are more prominent, followed by communicable diseases and trauma. Figure 1 illustrates the contribution per clinical discipline in terms of number of patients admitted to Mediclinic Southern Africa’s hospitals in 2013. Internal medicine was the most prominent contributor (26%), followed by general surgery (17%), obstetrics and gynaecology (16%) and orthopaedic services (13%).
The chronic underlying medical conditions that might be present in a patient on admission to a hospital may have a significant impact on the level of care the patient receives and/or length of stay such a patient experiences during hospitalisation. The proportion of patients who were admitted to the group’s hospitals with chronic underlying medical conditions in 2013 was 30%, as was the case in 2012. Hypertension, obesity and diabetes mellitus were the most common underlying chronic conditions. Although obesity is not regarded as a chronic underlying medical condition unless it is quite severe it can impact significantly on morbidity while in hospital. In 2013 about 67% of adult patients admitted were overweight or obese.

The case mix index of Mediclinic Southern Africa for 2013 was 1.23 compared to 1.45 for Hirslanden and 1.00 for Mediclinic Middle East. The inpatient length of stay, measured in calendar days, for Mediclinic Southern Africa for 2013 was 3.75 compared to 4.88 days for Hirslanden and 2.76 for Mediclinic Middle East.

**CLINICAL GOVERNANCE**

As leadership is indispensable in the promotion of quality and safety of patient care, Mediclinic Southern Africa reorganised its medical departments at corporate office into one multi-disciplinary team led by the Chief Clinical Officer. This will strengthen clinical leadership and foster a multi-disciplinary clinical approach. In addition, a dedicated patient safety officer was appointed to drive a number of focused patient safety initiatives. At hospital level the multi-disciplinary clinical hospital committees that drive quality and safety and promote cooperation between doctors, nursing staff and management are being developed further.

Quality and safety of patient care are very reliant on a well-trained, skilled and experienced healthcare workforce. Mediclinic Southern Africa has refined its recruitment practices, credentialling of healthcare professionals, performance surveillance and continuous professional development to ensure a capable healthcare workforce. In addition, a specific project focusing on the development of a number of important aspects in nursing care has been embarked upon.

Mediclinic Southern Africa is actively involved in training. A variety of courses are presented and the company spends approximately 3.3% of payroll on training annually. This ranges from formal basic training in nursing to continuous professional development of healthcare professionals by providing various training courses, sponsoring international conference attendance and hosting training workshops.

Hospitals are high-risk environments in which complex treatment processes are executed using sophisticated equipment and techniques. Mediclinic Southern Africa makes use of the process of accreditation to ensure that international standards are adhered to in all aspects of hospital operations. The Council for Health Services Accreditation of Southern Africa, an organisation whose standards have been accredited by the International Society for Quality in Healthcare, has been accrediting Mediclinic Southern Africa’s hospitals since 1996. Currently 33 of the 36 participating Mediclinic Southern Africa facilities have received accreditation status.
PATIENT SAFETY AND CLINICAL RISK

The numerous treatment plans that are executed in each hospital every day consist of countless interdependent and interrelated clinical care processes that by their nature are error prone. Hospitals face many clinical risks, the most prominent of which are healthcare-associated infections (HAIs) and hospital adverse events. These and other clinical risks are managed through different control measures and continuous process re-engineering.

Healthcare-associated infections

HAIs have become a major international challenge because of a significant increase in antimicrobial resistance. Mediclinic Southern Africa maintains an effective infection prevention and control programme centred around a comprehensive electronic surveillance system that is based on the principles and definitions of the US Centres for Disease Control and Prevention. The services of independent microbiologists and infection prevention and control specialists are regularly utilised in order to ensure continuous improvements in the programme.

Southern Africa is facing significant challenges with the emergence of carbapenemase-producing enterobacteriaceae (CPE) and other multi-drug resistant organisms. It is also concerning that patients with multi-drug resistant organisms such as methicillin resistant *staphylococcus aureus* and extended spectrum beta lactamase are mostly already colonised on admission to healthcare facilities. Screening of high-risk patients for CPE was implemented in 2013. The screening recommendations are based on international guidelines from the US Centres for Disease Control and Prevention, the European Centre for Disease Prevention and Control as well as recommendations based on local surveillance data.

The added burden of communicable diseases such as pulmonary tuberculosis makes patients with resistant organisms very challenging to accommodate and manage in the hospital setting. These patients all need to be isolated with the necessary transmission-based precautions to prevent transmission to other patients. As a result of all these challenges, infection prevention and control is a key performance indicator and hospitals are strongly focused on this aspect of their operations.

**Figure 2** reflects the HAI rate per 1 000 patient days, in line with international reporting trends. The decrease in the HAI rate of 20.6% during the previous reporting period is very encouraging.

Mediclinic Southern Africa is focusing on three major initiatives to reduce HAIs. The first initiative is an active and ongoing participation in the national *Best Care ... Always!* campaign. The campaign focuses on the prevention of surgical site and three types of device-associated infections. Mediclinic Southern Africa is a founding member of this campaign and all 52 hospitals continue to be committed to this initiative. Hospitals are actively implementing evidence-based interventions shown to reduce these types of HAI. Mediclinic Southern Africa is striving to ensure that best practices are reliably implemented for all patients who are ventilated, have indwelling urine catheters or central line catheters, or who undergo surgery.
Figure 3 shows a significant reduction in device-associated infection rates in 2013 as compared to 2012.

The second initiative involves the promotion of the rational use of antimicrobials through a comprehensive antimicrobial stewardship programme. Currently 70% of Mediclinic Southern Africa hospitals have active antimicrobial stewardship teams. A uniquely developed methodology focuses on measuring and reporting antimicrobial utilisation at hospital level.

Figure 4 reflects the most prominent antimicrobial utilisation indicators.

There was a significant decrease in the usage of undesired drugs used for surgical prophylaxis from 13% in 2012 to 10% in 2013. This can be attributed to the availability of more specific national as well as internal surgical prophylaxis guidelines. The number of days on four or more simultaneous antimicrobials decreased from 3.2 per 1,000 patient days to 3.0 per 1,000 patient days. This measure includes anti-fungal drugs, but not anti-viral drugs. The number of patient exposures on longer than seven days of therapy stayed relatively static during this period.

The third initiative focuses on the improvement of hand hygiene in order to prevent the transmission of infections. Hand hygiene compliance is continuously monitored, and an annual hand hygiene compliance audit is conducted at all hospitals. All categories of healthcare workers are evaluated.

Figure 5 demonstrates the hand hygiene compliance per category of healthcare worker as well as the overall compliance in Mediclinic Southern Africa in 2012 and 2013. The overall compliance of 66% is comparable to results from other parts of the world. According to the Guidelines for Hand Hygiene in Healthcare published by the World Health Organisation in 2009, observational studies of hand hygiene compliance demonstrated rates between 5% and 89% with an overall average compliance of 38.7%. Improving hand hygiene compliance is a continuous long-term project and one of the key strategies is to ensure that alcohol hand rub is freely available and accessible at the point of care.

Adverse events
An adverse event is defined as any event which causes harm to a patient while in the care of the hospital. A near miss is any event which could have caused harm, damage or loss, but which was prevented from happening by design or good fortune. Mediclinic Southern Africa makes use of hospital event management systems in which all events are reported and analysed, and corrective action is taken to prevent recurrence.

The adverse events in Figure 6 are reported per 1,000 patient days to be in line with international reporting standards.

There were no significant changes in the incidence of medication errors, falls and pressure ulcers (all grades are included and reported on), but there was a reduction in the overall numbers of all other clinical adverse events.
Other clinical risks
Mediclinic Southern Africa uses a comprehensive standardised clinical risk register as a starting point in clinical governance. Innovative control measures are continuously being developed, implemented and improved.

Regular clinical audits form an important part of Mediclinic Southern Africa’s continuous quality improvement programme. These audits are performed by the regional clinical teams during regular visits to each hospital. The findings of these audits are used to formulate proactive responses to clinical system failures.

**CLINICAL PERFORMANCE MANAGEMENT**

Clinical indicators and outcome measures are the “vital signs” of clinical care and provide an idea of the performance and integrity of this very important core element of operating hospitals. Organisations can either develop these indicators and outcome measures internally, or participate in external initiatives. Mediclinic has been following both these approaches to measure clinical performance.

With internal developments it is usually the availability of accurate and reliable clinical information that dictates which indicators and outcome measures are selected. Internally developed indicators can usually not be compared with published benchmarks or figures from other organisations, because of differences in data structures, definitions and criteria, but are valuable for internal benchmarking and trend analyses. Examples include the mortality rates, re-admissions and adverse events indicators reported by all three operating platforms, and the extended stay indicator reported by Mediclinic Southern Africa.

When participating in external initiatives, organisations have to purposefully collect data according to strict, agreed-upon criteria. The data from the different organisations are then combined, external benchmarks calculated and comparisons made. Examples include the Vermont Oxford Network (VON) in neonatal critical care, of which hospitals of both Mediclinic Southern Africa and Mediclinic Middle East are members, and the IQIP indicators that all Hirslanden hospitals participate in.
Mortality

Mortality is one of the most important indicators for determining quality care. Mediclinic Southern Africa uses a statistical methodology to adjust hospital mortality rates for a number of risk factors (e.g. age, gender, comorbidities) in order to make justifiable comparisons between hospitals and reporting periods. The expected mortality is a statistical calculation that takes the above-mentioned patient risk factors into consideration. The mortality index is the actual mortality in relation to the calculated expected mortality. Figure 7 reflects the inpatient mortality rates.

Although the mortality index worsened slightly from 0.95 to 0.98, the actual mortality is still 2% better than expected. Hospitals are continuously focusing on their indices, supported by detailed monthly reports and audits.

Adult critical care mortality – APACHE® IV

Mediclinic has been using the Acute Physiology and Chronic Health Evaluation (APACHE®) physiological prediction model as a scoring system in adult critical care units (CCUs) to measure and manage clinical outcomes. Physiological prediction models like APACHE® deteriorate over time and need to be updated and the weighting adjusted in order to maintain accuracy. In keeping with this Mediclinic moved from APACHE® III-j to IV. APACHE® IV went live in May 2013 and 31,402 cases were scored in 70 units at 42 participating hospitals for the 2013 calendar year (refer to Table 1). The weightings allocated to the model inputs in APACHE® IV are more relevant to the disease profile of the Mediclinic Southern Africa patients than APACHE® III-j, and the results of the two systems are therefore not comparable.

One limitation of the current results is the under-reporting of chronic underlying conditions by hospitals, which has an impact on the predicted mortality by lowering the expected mortality rate and increasing the mortality index. A concerted effort is under way to improve this aspect of the reporting process.

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**Figure 7: Inpatient Mortality – Mediclinic Southern Africa (2011 – 2013)**

**Table 1: APACHE® IV Mortality Index – Mediclinic Southern Africa (2013)**

<table>
<thead>
<tr>
<th>2013</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>31,402</td>
</tr>
<tr>
<td>Average age of patients (years)</td>
<td>58.7</td>
</tr>
<tr>
<td>Number of mortality cases</td>
<td>2,344</td>
</tr>
<tr>
<td>Mortality rate (%)</td>
<td>7.5%</td>
</tr>
<tr>
<td>APACHE® IV expected mortalities (cases)</td>
<td>1,982</td>
</tr>
<tr>
<td>APACHE® IV expected mortality rate (%)</td>
<td>6.3%</td>
</tr>
<tr>
<td>APACHE® IV mortality index</td>
<td>1.18</td>
</tr>
<tr>
<td>Average CCU length of stay (days)</td>
<td>3.57</td>
</tr>
<tr>
<td>Average APACHE® IV expected CCU length of stay index</td>
<td>3.68</td>
</tr>
<tr>
<td>APACHE® IV CCU length of stay index</td>
<td>0.97</td>
</tr>
<tr>
<td>Average APACHE® IV score</td>
<td>36.5</td>
</tr>
<tr>
<td>Average Acute Physiology Score (APS)</td>
<td>26.7</td>
</tr>
<tr>
<td>Number of ventilated cases</td>
<td>1,944 (6.5%)</td>
</tr>
</tbody>
</table>

*APACHE® is a registered trademark of Cerner Corporation, Kansas City, Missouri, USA*
Figure 8 reports that 32.0% of patients were admitted to CCU for cardiovascular conditions, 17.0% for neurological conditions and 13.5% for musculoskeletal/skin conditions. The high percentage of musculoskeletal conditions was mostly due to surgical orthopaedic procedures, especially large joint replacements and spinal surgery.

The implementation of the APACHE® scoring system in all Mediclinic Southern Africa’s adult CCUs is an important step towards a more measurable approach to quality care in this complex setting.

Extended stay
The extended stay indicator measures the percentage of cases with hospital stays that exceeded a calculated extended stay point, and is regarded as a proxy measure for quality of care. The extended stay point was calculated as the 90th percentile of hospital stays for each admission type over the past three calendar years. As this calculation is performed on a three-year rolling period, the nominal figures may differ from reports of previous years. Note that the percentages provided are unadjusted, and may reflect patient demographics, comorbidity profiles and complications. This indicator was developed internally, and comparable external benchmarks are therefore not available.

Figure 9 reflects the overall extended stay rate for Mediclinic Southern Africa, which increased slightly in 2013.

Re-admission
The re-admission indicator calculation is based on the number of patients re-admitted to hospital within 30 days of discharge. This includes scheduled (planned) as well as unscheduled (unplanned) re-admissions, but it is the latter that are important as they represent late complications of initial admissions. Because of the nature of available Mediclinic Southern Africa information, it is impossible to distinguish accurately between planned and unplanned admissions. The methodology used in calculating this indicator does, however, exclude certain admission types with a high percentage of predictable planned re-admissions, for example, cataract surgery (one eye followed by the next), haematology, chemotherapy, ante-partum admissions and sleep studies. Although still an incomplete science, re-admission is generally accepted as one of the proxy measures for quality of care if used as a trend indicator.
Figure 10 reflects the 30-day re-admission rate for all hospital admissions. The overall re-admission rate increased during the period under review. The indicator was developed internally and comparable external benchmarks are not available.

**Figure 10: Re-admission rates – Mediclinic Southern Africa (2011 – 2013)**

<table>
<thead>
<tr>
<th>CALENDAR YEAR</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE-ADMISSION RATE (%)</td>
<td>7.0</td>
<td>7.0</td>
<td>7.3</td>
</tr>
</tbody>
</table>

Adult Cardio-thoracic surgery

The Adult Cardio-thoracic Database (ACTD) is modelled on the database of the Society of Thoracic Surgeons in the United States. The primary aim of this initiative is to measure and improve the clinical outcomes of cardio-thoracic surgery. It has been used in Mediclinic Southern Africa hospitals with cardio-thoracic units since 2005.

Table 2 reflects the ACTD clinical outcomes. Comparable international figures are not freely available, hence the year-on-year comparisons.

The mortality index (actual/expected) for 2013 has declined significantly, compared to the 2011 index. This is because the expected mortality rate for 2013 is marginally higher than the 2012 rate while the actual mortality rate for 2013 decreased slightly. The re-operation rate increased somewhat during 2013 because of a slight increase in re-operations for bleeding at one of the participating units, while the rate of infections for 2013 decreased compared to 2012. The decrease in the overall infection rate is due to improvement in the rate of one of the larger units. The database remains a very valuable tool in support of quality improvement.

**Table 2: General Indicators as Percentage of Cases – Mediclinic Southern Africa (2012 – 2013)**

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-operative outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infections</td>
<td>2.6%</td>
<td>2.7%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Re-operation</td>
<td>5.4%</td>
<td>3.1%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Mortality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected mortality (EuroSCORE)</td>
<td>7.7%</td>
<td>11.8%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Actual mortality</td>
<td>5.4%</td>
<td>4.4%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Mortality index</td>
<td>0.70</td>
<td>0.37</td>
<td>0.32</td>
</tr>
<tr>
<td>Re-admission (within 30 days)</td>
<td>11.6%</td>
<td>9.5%</td>
<td>9.5%</td>
</tr>
</tbody>
</table>

Neonatal critical care – Vermont Oxford Network

The Vermont Oxford Network (VON) is an international initiative aimed at improving the quality of care of newborn infants. The network was established in 1988 with more than 900 units participating around the world currently. Mediclinic Southern Africa has been participating in the initiative since 2001, with 21 units currently involved. Although all infants admitted to the neonatal CCUs are included in the programme, this report focuses on all infants eligible for the very low birth weight (VLBW) database (infants with birth weights between 401 and 1 500 grams or gestational ages between 22 weeks and 29 weeks). The performance measures that are reported on have been changed to bring the measures in line with the “Key Performance” measures reported on by VON. The conditions reported on in the “Key Performance” measures contribute to the long-term clinical outcomes of the infants and is used in the calculation of the “Mortality or Morbidity” measure.
Mediclinic Southern Africa treated 729 infants which qualified for the VLBW database with an average birth weight of 1 166 grams. At the time of this report a number of infants were still hospitalised.

**Figure 11** reflects the average birth weight, gestation age and number of admissions for VLBW infants.

The number of admissions for the VLBW infants assumes a normal distribution with a peak between 28 and 29 weeks. The statistics for 2012 and 2013 are compared with the official VON annual report figures for 2012. The VON annual reports are only available six months after the year end and the 2013 report was therefore not available to be included in this report.


<table>
<thead>
<tr>
<th></th>
<th>Mediclinic Southern Africa</th>
<th>VON 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average birth weight</td>
<td>1 166 grams</td>
<td>1 053 grams</td>
</tr>
<tr>
<td>Average discharge weight</td>
<td>2 340 grams</td>
<td>2 536 grams</td>
</tr>
</tbody>
</table>

**Figure 12** reflects the key performance measures over the past three calendar years for Mediclinic Southern Africa as a percentage of cases.

**CLINICAL INFORMATION MANAGEMENT**

Hospital clinical information systems (CIS) support the flow, storage and utilisation of clinical information by way of comprehensive electronic medical records providing a variety of functionalities like electronic scripting, clinical care pathways and decision support. A CIS enables secure sharing of information with healthcare practitioners, patients and healthcare funders and promote the integration of healthcare. Integration in healthcare plays a significant role in improving quality and safety of patient care, improves efficiencies, and optimises revenue.

Mediclinic Southern Africa maintains a number of stand-alone clinical datasets (APACHE® IV, VON, cardiac surgery, ICNet infection data, and hospital events), has digitised radiology in 25 hospitals, but does not have a comprehensive CIS at present.

Mediclinic Southern Africa has embarked on an E-health project. The aim of the project is partially to understand the current needs of the company with regard to a CIS as well as to optimise the integration and use of the current stand-alone clinical datasets, aligning this with the company goal of safe patient care. Mediclinic embraces the philosophy that patients are the custodians of their own healthcare information and that the E-health initiatives should be built around the needs of the patient.
Clinical coding is the translation of relevant clinical information into clinical codes. Clinical codes are elements of hierarchical coding systems that represent clinical information in organised and standardised formats. Accurate clinical coding is important for running CIS effectively, as well as managing reimbursement systems and analytics. Mediclinic also uses clinical codes to aggregate, analyse and interpret clinical activities in a meaningful way, and it forms the basis of most clinical performance indicators. Clinical coding should therefore always provide a true reflection of patients’ pathways through hospitals. Mediclinic Southern Africa uses the ICD 10 diagnosis and CPT 4 based Complete CPT® for South African procedure coding systems. Clinical coding is done at hospital level at Mediclinic Southern Africa, and there is a strong focus on training, internal audits, and coding support systems.

Another well-developed aspect of clinical information management at Mediclinic is the use of administrative data to measure clinical performance. Mediclinic Southern Africa has over many years refined its techniques in groupings, algorithms, data leveraging and analytics in a mature data warehouse environment. These capabilities are now being extended to Hirslanden and Mediclinic Middle East, and used to create an international data warehouse that combines all three operating platforms’ information to reflect the activities of the entire Group.

**COORDINATED CARE INITIATIVES**

Mediclinic promotes the development of coordinated care models to improve patient care. These models follow a multi-disciplinary approach to patient care, with the patient at the centre. It is based on integrated teamwork and requires a specific and unique organisational structure and set of processes in order to be effective. Several of these coordinated care centres are being developed, the most prominent of which are reported below.

**Wits Donald Gordon Medical Centre (WDGMC)**

The most prominent coordinated care centre within Mediclinic Southern Africa is located in the WDGMC. The WDGMC is a private academic hospital for the training of specialists and sub-specialists, and is a public private partnership between Wits University and Mediclinic Southern Africa. WDGMC operates South Africa’s largest solid organ transplant unit, established in 2004, and performs liver, kidney, simultaneous kidney-pancreas, and pancreas after kidney transplants. The unit performed a total of 103 transplants in 2013. All cases are peer reviewed pre- and post-operatively by the multi-disciplinary team. All morbidity and mortality outcomes are measured and benchmarked against international standards, to which they compare very favourably. The unit has recently recruited an internationally acclaimed expert in the field of paediatric liver transplantation to develop split liver and living donor paediatric liver transplantation at the centre, which is not currently available in South Africa. WDGMC is also academically known for its colorectal, hepatobiliary and multi-disciplinary CCUs, and its geriatric unit has a public private partnership with Helen Joseph Hospital. The WDGMC plans to further expand in the future to maximise the benefit of private sector funding and expertise for the benefit of patients in all sectors of the healthcare landscape.

**Figure 13** reflects the total number of kidney, liver and pancreas transplants performed in the unit in 2013.
Liver outcomes
The survival rate of paediatric patients after one year is 88%, while the adult survival rate is 92%. The combined paediatric and adult survival rate is 91%.

Figure 14 shows survival data from the start of the liver programme.

Constantiaberg haematology and bone marrow transplant unit
The Constantiaberg Haematology and Bone Marrow Transplant (BMT) Unit at Mediclinic Constantiaberg was established in March 1998 by Professor Peter Jacobs together with Dr Mike du Toit and Sr Lucille Wood, and is a registered member of the European BMT registry and the US-based national marrow donor programme.

The unit is a comprehensive haematology referral centre for the diagnosis and treatment of haematology disorders and malignancies such as leukaemia, lymphomas, multiple myeloma, aplastic anaemia and various other types of anaemias, and bone marrow disorders, offering state-of-the-art treatment based on international research protocols. This includes the opportunity to undergo bone marrow transplants, where indicated, as part of a comprehensive treatment programme.

Working together with the South African bone marrow registry the unit is able to offer both autografts and allografts (sibling donors and matched unrelated donors).

The unit offers a comprehensive multi-disciplinary team approach, consisting of specialist haematologists, experienced and very dedicated nursing staff, pharmacists, psychologists/play therapists, a psychiatrist, counsellor, physiotherapists, a dietician and input from the microbiology department, allowing patients the unique service of having treatment under one roof in one department. Daily ward rounds are complemented by a weekly haematology micro round when the microbiologist ensures appropriate use of antibiotics.

Figure 15 indicates the total number and type of transplants done.

It remains imperative that the unit measures itself to ensure safe practice and ongoing improvement within the department. This is achieved in various ways, namely:

- **Best Care ... Always!** campaign involvement, monitoring and displaying various infection and compliance rates;
- APACHE® IV system scoring of “high care” graded patients; and
- infection prevention and control coordinator collaboration to monitor and control infection rates.

The unit prides itself with being known nationally and internationally as “a centre of excellence” and “treatment centre of choice”, by delivering a high standard of care throughout the patient’s journey while they entrust themselves to the hands of the specialised team.

Muelmed Rehabilitation Centre
The Muelmed Rehabilitation Centre offers acute, functional rehabilitation for spinal cord and traumatic brain injuries, stroke, amputation patients as well as treatment for other disabling conditions on an inpatient and outpatient basis.
The centre follows a multi-disciplinary approach in providing comprehensive neurological and spinal rehabilitation using state-of-the-art facilities and highly trained staff. The team is led by an orthopaedic surgeon and consists of a neurologist, urologist, physician, plastic surgeon, two general practitioners as well as physiotherapists, occupational therapists, speech therapists, psychologists, sexologists, social workers, dietitian, orthotists and rehabilitation nurses.

The centre makes use of the South African Database for Functional Medicine to monitor progress and direct care. Regular daily scoring reflects the progression or regression of the functionality of each patient’s self-care abilities. Since the centre operates within Mediclinic Muelmed, an acute care hospital, it has easy access to various services and technology to respond to any complications. It also enables the multi-disciplinary team to start with functional rehabilitation as soon as possible after patients are admitted to hospital, even while they are still ventilated in the CCU.

Neonatal Critical Care – Mediclinic Panorama and Mediclinic Sandton

The Neonatal Critical Care units (NCCUs) at Mediclinic Panorama and Mediclinic Sandton were established in the 1980s and have since then delivered excellent care to neonates. The NCCUs have 22 beds and 41 beds respectively, and function as closely coordinated intensive care units run by teams of neonatologists. Both care teams embrace evidence-based medicine in non-invasive ventilation, human milk feeding, brain cooling and the use of antenatal steroid therapy. Both NCCUs have established paediatric surgical services and act as referral units for other NCCUs. Major abdominal surgery and surgery to correct persistent patent ductus arteriosus are often performed in the Mediclinic Panorama NCCU as these patients may be too unstable to be moved to theatre. An integrated developmental care programme is followed in keeping with both teams’ goal of ensuring not only the survival of the infant but also the best possible long-term clinical outcome. Mediclinic Panorama has participated in the VON Database since 2001 and its clinical outcomes compare favourably with the network.

Figure 16 reflects that the percentage of infants that died or suffered a serious complication compares favourably with the VON and the high quality of care delivered in both the units.

ER24

ER24 offers emergency transportation services at 43 branches throughout South Africa, most positioned at or in close proximity to a Mediclinic. ER24 has more than 135 emergency vehicles on duty each day, as well as two fixed-wing aircraft and four emergency helicopters. ER24’s Contact Centre forms an integral hub of our operational business. They dispatch emergency resources to over 13 000 incidents per month, and in excess of 8 000 patients are transported per month. The Helicopter Emergency Medical Service team flies in excess of 100 missions per month.

Excellence in clinical care is not negotiable. The clinical governance team is responsible for ensuring best clinical protocols and guidelines are followed. This team reviews any adverse events and clinical concerns, and assists with concurrent case management of high-risk cases.
HIRSLANDEN
SPECTRUM OF SERVICES
Hirslanden offers acute care hospital services in 14 facilities across 10 cantons. The hospital services range from routine procedures and medical treatment plans in seven smaller secondary care community hospitals to highly specialised, complex and technologically advanced treatment modalities in seven larger tertiary care city hospitals. The majority of cases are elective in nature, and services like advanced neonatal critical care and major trauma are provided by the cantonal and university teaching facilities. Most admitting doctors are self-employed, but doctors working in the fields of hospital-based specialties like anaesthetics and internal medicine are employed at certain hospitals. Radiology, laboratory, nuclear medicine and radiation oncology services are in most instances owned and operated by the hospitals themselves.

The burden of disease of the Swiss population consists mainly of chronic diseases commonly associated with lifestyle and old age. The burden of communicable (infectious) diseases and trauma is very small. The chronic underlying medical conditions that might be present in a patient on admission to a hospital may have a significant impact on the level of care the patient receives and/or length of stay such a patient experiences during hospitalisation. During 2013 the proportion of patients admitted to hospital with chronic underlying diseases was approximately 20%, and hypertension, diabetes mellitus and obesity were the most common diseases present.

Figure 17 illustrates the contribution per discipline in terms of the number of patients admitted to Hirslanden’s hospitals in 2013. Orthopaedics was the most prominent contributor (32%), followed by obstetrics and gynaecology (14%), cardiac and vascular (14%), general surgery (13%) and internal medicine (11%).

Hirslanden is the operating platform with the highest case mix index of 1.45 in 2013. This is mainly due to its high load of complex and technologically advanced cases in an older population. In keeping with a high case mix index its inpatient length of stay measured in calendar days for 2013 was also the highest in the Group at 4.88 days.

CLINICAL GOVERNANCE
Hirslanden has a well-developed organisational structure in clinical management. Every Hirslanden hospital has a quality manager, an infection control specialist, a critical incident manager as well as several sub-committees for quality, infection prevention and control and critical incident reporting. The Clinical Services department at the Hirslanden head office coordinates the activities of the sub-committees, and clinical key performance indicators monitor their activities. The affiliated doctors are integrated into this structure by established boards in several specialties.

There are strict entry criteria for doctors to become affiliated to Hirslanden hospitals. A comprehensive credentialling process, assisted by a clinical committee, is followed. The recruitment and credentialling of nursing staff is a rigorous process that includes a trial period of three months during which three formal assessments take place. Healthcare education is highly regulated in Switzerland, and Hirslanden participates by offering 599 healthcare apprenticeships and 89 positions for further training. The continuous training of
nurses is coordinated by training managers in every hospital, and resuscitation training takes place on an ongoing basis.

Hirslanden hospitals participate in ISO 9001:2008 certifications in cooperation with the Swiss Association for Quality and Management Systems. All 14 hospitals and the head office are currently certified. The initiative focuses on processes and is embraced by the objectives of the European Foundation for Quality Management (EFQM) initiative through which quality and safety in patient care are promoted. The EFQM Excellence Model is a non-prescriptive framework based on nine criteria. The five ‘Enabler’ criteria are concerned with what an organisation does and how it is done. The four ‘Results’ criteria measure organisational achievements. The main objective of this model is to add value to patients and other stakeholders of the business.

PATIENT SAFETY AND CLINICAL RISK
The numerous treatment plans that are executed in each hospital every day consist of countless interdependent and interrelated clinical care processes that by their nature are error prone. Hospitals face many clinical risks, the most prominent of which are healthcare-associated infections and hospital adverse events. These and other clinical risks are managed through different control measures and continuous process re-engineering.

Healthcare-associated infections
Hirslanden has been assisted in infection prevention and control by the Beratungszentrum für Hygiene (BZH) in Freiburg, Germany, since 1998. All Hirslanden hospitals use the standardised Hospital Infection Surveillance System of the BZH to record HAIs. This system is based on the criteria of the US Centers for Disease Control and Prevention. Each hospital has an infection control committee that oversees infection prevention and control. Hospitals are also represented on the group infection control committee, where hospital results and standardisation policies are discussed.

Methicillin-resistant Staphylococcus Aureus (MRSA) is a bacterium which is well known for developing resistance against multiple antimicrobials. Patients with impaired defence mechanisms against infections are particularly at risk. Patients who are hosts of this bacterium should therefore be isolated. Early detection and isolation of possible hosts by screening methods and consequent hand hygiene is important to prevent infection of other patients. All patients who are transferred from foreign countries, outside CCUs and nursing homes are thoroughly screened. In 2013 MRSA infections were detected in 127 cases.

Figure 18 shows the device-associated infection rates in Hirslanden CCUs. Hirslanden figures as well as the European benchmarks have been recalculated and will therefore differ from those reported in the previous report. Annual rates compare favourably with the European average. Infection prevention and control is a key performance indicator and hospitals are strongly focused on this aspect of their operations.

Figure 19 reflects the post-operative wound infection rates of selected procedures. Hirslanden hospitals compare very favourably with the European benchmarks.
Adverse events
An important aspect of improving the quality and safety of patient care is the prevention of adverse events which could cause harm to patients. However, the very low occurrence of some events prevents a systematic analysis of underlying factors. In this case the gathering of information on near misses is a very effective method to improve the processes of care. A total of 1,173 cases were reported in 2013.

Hirslanden also participates in the International Quality Indicator Project® (IQIP) for documented falls. Its weighted average figures are reflected in Figure 20. The figure shows that Hirslanden compares favourably with other participating European hospitals.

Another IQIP indicator that Hirslanden participates in is pressure ulcers in acute care. Its weighted average figures are reflected in Figure 21. This once again compares favourably with other participating European hospitals.

CLINICAL AUDITS
Clinical audits were done to verify the successful introduction of the safe surgery checklist concept, which was launched in 2010. All hospitals complied.

CLINICAL PERFORMANCE MANAGEMENT
Hirslanden has been participating in the IQIP since 2006. The initiative was developed over 16 years ago in the United States and currently more than 400 organisations in 18 countries participate in the initiative. The IQIP develops performance indicators that facilitate participants’ efforts to understand and improve performance. IQIP participants receive quarterly data reports, which allow for longitudinal trending and comparison with regional, national and international aggregate rates. Twelve Hirslanden hospitals have been participating in a set of five IQIP indicators as directed by the Hirslanden clinical governance committee since 2008, and Klinik Stephanshorn since 2010.
Mortality

**Figure 22** reflects the IQIP weighted average mortality rates for the last three calendar years. Hirslanden continues to experience a significantly lower mortality rate compared to other participating hospitals in Europe.

**Adult critical care mortality – Simplified Acute Physiology Score (SAPS) II**

SAPS II is a hospital mortality prediction methodology for patients in the adult critical care setting and is a useful tool in evaluating quality of care in this complex environment. Patients are evaluated and scored on a number of clinical parameters within the first 24 hours of admission to critical/coronary care. An expected mortality calculation is therefore based on the clinical condition of each patient.

The SAPS II scoring methodology is used in the CCUs of many Hirslanden hospitals.

**Table 4** reflects some important statistics, the most important being the mortality index, which is the relationship between the actual and predicted mortalities. The mortality index of 0.21 in 2013 implies that the overall mortality of the scored cases was 79% better than expected.

Re-admission

**Figure 23** reflects the new indicator introduced by Hirslanden in 2011, namely re-admissions within 15 days. The re-admission rate increased from 0.82% in 2012 to 1.07% in 2013. This increase is mostly due to a correction in the identification of cases eligible for counting as re-admissions. In the past these cases were collected manually at each hospital. The process is now supported by a data-driven analysis in the department of medical controlling, which helps the hospitals to identify the re-admissions more accurately. In spite of the increase in re-admission rate, Hirslanden still compares favourably with the IQIP European benchmark. The IQIP benchmark for 2012 was not released due to a decrease in participating hospitals for this indicator for that year.
 Unscheduled returns to the operating theatre

The IQIP weighted average rates for unscheduled returns to the operating theatre for the last three calendar years are reflected in Figure 24. Unscheduled returns to the operating theatre are not planned and are believed to be the result of early complications. Mainly due to an improved data collection process the Hirslanden return rate increased from 1.08% in 2012 to 1.3% in 2013, which is higher than the IQIP European benchmark. Other contributing factors for this increase are being investigated.

**CLINICAL INFORMATION MANAGEMENT**

Hirslanden successfully implemented a comprehensive CIS as a pilot project at Klinik Aarau three years ago. The system is fully integrated with the other administrative support systems and now covers the full functionality of a typical hospital information system. It provides a digital archive of patient records (including radiology images and laboratory results), computerised orders of radiological and laboratory tests, electronic charting and an electronic medication process. Its electronic patient record supports the full nursing and clinical processes, and information about previous inpatient stays is provided immediately. All known allergies, previous medications, information about chronic underlying conditions and other factors which might compromise the hospital stay are available. The medication process is supported by definite identification of the administered drugs, clinical decision support (overdosing, interaction, and age and weight adjustment) and traceability. Prescriptions are more legible and are being processed faster and more accurately. Duplication of laboratory tests is being reduced, the quality of documentation is much better, and ultimately the system will improve reimbursement. Planning is under way to roll the system out to all Hirslanden hospitals within the next couple of years.

All basic insured cases are being reimbursed by way of the Swiss-DRG system, and because DRGs are highly dependent on accurate clinical coding there is a strong focus on the coding process at Hirslanden. Clinical coding is done centrally at Hirslanden, and there is a strong emphasis on training, regular audits, and the implementation of coding support systems.

**COORDINATED CARE INITIATIVES**

The concept of coordinated care (competence) centres is an important part of Hirslanden’s strategy, and more than 100 centres have been established over time. An evaluation model, based on the criteria of different sources such as EFQM, JCI and ISO 9001, has been developed to grade and refine the functions of these centres. The model will be adapted for use throughout the Mediclinic Group.

Swiss Tumour Institute

One of the most well-known coordinated care initiatives at Hirslanden is the Swiss Tumour Institute. The Institute was established in 2005 and relaunched in August 2013, and involves several hospitals within the group. The objective of the Institute is to combine the competencies of different specialties working on the diagnosis and treatment of tumours and cancer. The concept of specialised oncology centres was started at the two hospitals in Zurich and will be spread to every other hospital of the group. As a first step, organ-centred tumour boards were set up. Examples of
The boards are the gastrointestinal, neurological, haematological, breast cancer and thoracic tumour boards. A typical board consists of interdisciplinary teams focusing on a subgroup of cancer diseases, and includes oncologists, specialised internists (e.g. gastroenterologist), surgeons, radio-oncologists, pathologists and radiologists. The physicians participate in the discussion of cases in person or by video conference. Each case discussion is documented electronically and includes a therapeutic plan for the patient which has to be followed.

The processes and guiding principles of the Swiss Tumour Institute are documented and have to be adhered to by every member of the Institute. This will form the basis for future certification by the German Cancer Society and the Society of Haematologists and Oncologists. The benefit for the patient is the availability of a full range of specialties and expertise in the treatment of his or her disease. The centre in Zurich consolidates the competencies of ten oncologists from both hospitals. They treated 5,065 outpatients and 2,953 inpatients in 2013.

The Swiss Tumour Institute functions in close cooperation with the Hirslanden Institute for Radio-oncology, which consists of four radio-oncology units in Aarau, Lausanne and Zurich. The second unit in Zurich was recently opened and is one of the first public private partnerships in oncology in Switzerland. The philosophy of radiation therapy in the Institute is fast access to treatment (within five days), minimal damage of healthy tissue and maximum precision. The most modern equipment and skilled staff guarantee these aspects for the patient. The institute treated 1,700 patients in 2013 with 29,000 sessions at three sites.

**MEDICLINIC MIDDLE EAST**

**SPECTRUM OF SERVICES**

Mediclinic Middle East offers acute care hospital services in two hospitals and primary care in eight clinics in Dubai. The relationship between the hospitals and clinics is that of a hub-and-spoke model. The clinics deliver specialist-orientated consultations and follow-up services, and refer to the hospitals. The hospital services range from providing secondary care procedures and medical treatment plans to tertiary care technologically advanced treatment modalities. The majority of cases are elective in nature, but a significant portion is unscheduled and emergency related, but major trauma services are provided by the state facilities. The majority of admitting doctors are employed by Mediclinic Middle East but there is also a significant complement of community-based specialists who admit and treat patients in the hospitals. The radiology, laboratory and nuclear medicine services are owned and operated by Mediclinic Middle East.

The burden of disease of the UAE population consists mainly of chronic diseases of lifestyle and communicable diseases. The chronic underlying medical conditions that might be present in a patient on admission to a hospital may have a significant impact on the level of care the patient receives and/or length of stay such a patient experiences during hospitalisation.
Figure 25 illustrates the contribution per discipline in terms of the number of patients admitted to Mediclinic Middle East’s hospitals in 2013. Internal medicine (34%), obstetrics and gynaecology (30%) and general surgery (10%) were the most prominent contributors in 2013 followed by cardiac and vascular surgery and ENT and ophthalmological surgery (7%).

The 2013 case mix index of Mediclinic Middle East was the lowest of the three platforms at 1.00 due to its young patient population. Inpatient length of stay measured in calendar days was a relatively short 2.76 days, which is in keeping with its low case mix.

CLINICAL GOVERNANCE

Clinical services at Mediclinic Middle East are coordinated by the central Clinical Forum, a multi-disciplinary committee comprised of the senior clinical leaders (medical, nursing, pharmacy, hospital and clinical directors), which meets monthly. Both hospitals have a full-time medical director coordinating the activities of all the doctors in the facility, and each has an active and functioning clinical hospital committee. These committees are multi-disciplinary, with excellent cooperation between doctors, nurses and management. A full-time medical director has been appointed to oversee clinical governance at the eight clinics, and a dedicated patient safety officer has been appointed to drive patient safety activities.

Mediclinic Middle East has to follow a thorough credentialling process when recruiting new doctors and nursing staff. The Dubai Health Authority (DHA) and the Centre for Planning and Quality in Dubai Healthcare City do primary source verification to validate the qualifications of all doctors and nurses applying for a licence to practise. Once a licence has been approved by the relevant regulating body, Mediclinic Middle East continues with the rest of the recruitment and credentialling process. Successful candidates receive specific clinical privileges based on qualifications and experience, which are reviewed biannually by hospital clinical sub-committees.

Doctors are regularly assessed by way of a clinical performance management system in which different competencies are assessed and graded. Nursing staff is evaluated twice a year and succession planning for key nursing staff is performed on an ongoing basis. Both hospitals conduct in-house continued medical education for their doctors and have a dedicated budget to support external training for doctors. Mediclinic City Hospital has been approved by Dubai Healthcare City Authority (DHCA) for physiotherapists from Gulf Medical University to complete an 18-week rotation through the core disciplines (orthopaedics, respiratory and neurosciences) as part of their internship programme. The training department conducts various mandatory courses internally as well as for several other institutions outside the Mediclinic Middle East group. These courses include training in life support.

Hospital accreditation is a mandatory requirement of the DHCA and the DHA. The DHCA appointed the Joint Commission International (JCI) as the sole accreditation body for the first re-accreditation cycle in 2013. Subsequently both hospitals successfully underwent re-accreditation and all eight clinics were successfully accredited by JCI for the first time in 2013. In addition to the JCI accreditation, the laboratory of Mediclinic City Hospital also achieved the very prestigious College of American Pathologists accreditation in 2009, 2011 and in 2013. Mediclinic City Hospital laboratory also obtained ISO 15189:2009 certification in 2010 and in 2013.
PATIENT SAFETY AND CLINICAL RISK

Healthcare-associated infections
The Mediclinic Middle East infection prevention and control programme is comprehensive and consists of hospital-based infection control specialists, multi-disciplinary infection control committees and a detailed reporting system. Apart from monitoring general infection rates, the hospitals rigorously track surgical site infections, ventilator-associated pneumonia, catheter-associated urinary tract infections, MRSA and other resistant organisms. Nursing staff plays a key role in this regard to ensure compliance with international standards.

Figure 26 reflects the overall HAI rate for Mediclinic Middle East. The HAI rate is very low, but with a slight increase from 1.5 to 1.7 per 1,000 patient days.

Figure 27 shows a continued decrease in device-associated infection rates in 2013 when compared to 2012. This was mainly due to the implementation of reliable evidence-based practices such as strict antimicrobial guidelines and the implementation of central line bundles in the CCU.

The rate of surgical site infections increased in Mediclinic City Hospital. This is mainly as a result of increased acuity levels of high-risk patients referred and transferred from other facilities in the Middle East. There is also an improvement in the reporting processes due to increased awareness, training and surveillance.

Adverse events
Figure 28 reflects the most pertinent adverse events. The medication errors decreased, whereas skin-related rates increased slightly.

CLINICAL AUDITS
Mediclinic Middle East makes extensive use of audits to promote patients’ safety and quality of care. Medical record, anaesthetic, epidural, prescription and surgical audits continue to be performed regularly.

CHECKLISTS
Surgical safety checklists were implemented in 2009 at both hospitals, with excellent compliance. This initiative, which contributes significantly to patient safety, is also aligned with one of the six patient safety goals of the JCI.
CLINICAL PERFORMANCE MANAGEMENT

Mortality

Figure 29 reflects the actual combined mortality rates for both Mediclinic Middle East hospitals. It is important to note that these figures are not yet adjusted for severity of disease, types of surgery or other patient factors. For the same reasons expected mortality figures cannot be calculated.

Actual mortality decreased from 0.23% to 0.19% in 2013, and remained significantly lower than the actual mortality for both Mediclinic Southern Africa and Hirslanden. This is due to the fact that Dubai has a very young population (average age of 32 years), and the types of surgery performed are in general not as invasive and complex as in the other two operating platforms.

Adult critical care mortality – APACHE® IV

Mediclinic Middle East moved from the APACHE® III-j physiological prediction model to APACHE® IV at both its hospitals during 2013. A total of 1391 cases were scored in the CCUs of the two hospitals in 2013. Table 5 reflects a summary of the important statistics, which cannot be compared to that of APACHE® III-j.

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**TABLE 5: APACHE® IV MORTALITY INDEX – MEDICLINIC MIDDLE EAST (2013)**

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>1236</td>
</tr>
<tr>
<td>Average age of patients (years)</td>
<td>53.3</td>
</tr>
<tr>
<td>Number of mortality cases</td>
<td>32</td>
</tr>
<tr>
<td>Mortality rate (%)</td>
<td>2.6%</td>
</tr>
<tr>
<td>APACHE® IV expected mortalities (cases)</td>
<td>50</td>
</tr>
<tr>
<td>APACHE® IV expected mortality rate (%)</td>
<td>4.0%</td>
</tr>
<tr>
<td>APACHE® IV mortality index</td>
<td>0.64</td>
</tr>
<tr>
<td>Average CCU length of stay (days)</td>
<td>2.84</td>
</tr>
<tr>
<td>Average APACHE® IV expected CCU length of stay (days)</td>
<td>3.33</td>
</tr>
<tr>
<td>APACHE® IV CCU length of stay index</td>
<td>0.85</td>
</tr>
<tr>
<td>Average APACHE® IV score</td>
<td>25.6</td>
</tr>
<tr>
<td>Average APS score</td>
<td>18.4</td>
</tr>
<tr>
<td>Number of ventilated cases</td>
<td>76 (6.1%)</td>
</tr>
</tbody>
</table>
Figure 30 reports that 59.9% of patients were admitted to CCU for cardiovascular conditions, 13.7% for respiratory conditions and 7% for neurological conditions.

Re-admission
Figure 31 reflects the 30-day re-admission rate for both hospitals. All admission types, except oncology, are included in the calculation. Comparable external benchmarks are unfortunately not available and an internal benchmark is used to compare this indicator. The re-admission rate has decreased significantly since 2012.

Adult cardio-thoracic surgery
Although the cardio-thoracic surgery team has been collecting clinical outcomes data as part of their own initiative since 2002 they have implemented the ACTD at the Mediclinic City Hospital in 2009. Although the primary aim of the ACTD initiative is to measure and improve the clinical outcomes of cardio-thoracic surgery, it also enables the comparison of results between the Group’s operating platforms.

Table 6 reflects general indicators and clinical outcomes. Comparable international benchmarks are not freely available, hence the year-on-year comparisons.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-operative outcomes</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>Infections</td>
<td>0.0%</td>
<td>1.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Re-operation</td>
<td>1.4%</td>
<td>12.7%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Mortality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected mortality (EuroSCORE)</td>
<td>5.7%</td>
<td>3.5%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Actual mortality</td>
<td>2.7%</td>
<td>1.8%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Mortality index</td>
<td>0.48</td>
<td>0.52</td>
<td>0.56</td>
</tr>
<tr>
<td>Re-admission (within 30 days)</td>
<td>4.1%</td>
<td>0.0%</td>
<td>4.6%</td>
</tr>
</tbody>
</table>

The mortality index and re-admission rates increased slightly, whereas the number of re-operations decreased significantly, and with no infections in 2013.

Neonatal critical care – Vermont Oxford Network
Both Mediclinic Middle East hospitals have been participating in the initiative for some time, with very good results. Although all infants admitted to the neonatal CCUs are included in the programme, this report focuses on all infants eligible for the VLBW database (infants with birth weights between 401 and 1 500 grams or gestational ages between 22 weeks and 29 weeks). The performance measures that are reported on have been changed to bring the measures in line with the “Key Performance” measures reported on by VON. The conditions reported on in the “Key Performance” measures contribute to the long-term clinical outcomes of the infants and is used in the calculation of the “Mortality or Morbidity” measure.
Mediclinic Middle East treated an overall total of 261 infants in the birth year 2013, of which 69 qualified for the VLBW database with an average birth weight of 1 149 grams (see Table 7). At the time of this report a total of 11 infants were still hospitalised.

**TABLE 7: AVERAGE BIRTH AND DISCHARGE WEIGHT OF QUALIFYING VLBW INFANTS**

<table>
<thead>
<tr>
<th></th>
<th>Mediclinic Middle East</th>
<th>VON 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average birth weight</td>
<td>1 149 grams</td>
<td>1 053 grams</td>
</tr>
<tr>
<td>Average discharge weight</td>
<td>2 145 grams</td>
<td>2 536 grams</td>
</tr>
</tbody>
</table>

*Figure 32* reflects the average birth weight, gestation age and number of admissions for VLBW infants.

*Figure 33* reflects the key performance indicators over the past three calendar years for Mediclinic Middle East as a percentage of cases. The two hospitals performed better than the VON control group in all indicators.

**CLINICAL INFORMATION MANAGEMENT**

Mediclinic Middle East standardised its CIS, a component of the Hospital Information System (HIS), across all its hospitals and multi-disciplinary outpatient clinics. The HIS is now fully implemented in Dubai and has a unified medical record number that allows doctors to access patient records from any one of the units. The system is also fully integrated with the Laboratory Information System and the Radiology Information System, allowing doctors to view results and images as part of the patient’s electronic medical record. The HIS also has a Computerised Physician Order Entry system that allows prescriptions to be ordered electronically and sent to the pharmacy from where medication will be issued. The full functionality of the HIS is currently mainly used in outpatient facilities. The relevant written documents (doctor’s notes, prescriptions, progress notes, etc.) are all scanned into the patients’ electronic medical records and are available in electronic format for inpatients.

The system enhances patient safety in a number of ways. The full medical record of the patient is available in the system and can be viewed from any location in the group. Doctors have full access to the most recent patient medical records at all times. The system has an allergy recording mechanism whereby the doctor will be alerted with each consultation to any previous or existing allergies (medication, food, etc.) that have been recorded in the electronic medical record. There is an alert system built into the HIS for certain infective diseases (HIV, MRSA, etc.) to inform the doctor and the infection control department. A list of high-alert medications has been built into the HIS to warn the doctors when the patients are on these particular drugs. Abnormal laboratory results will trigger an automatic e-mail to the treating doctor to inform him of the abnormal results.

As in the other platforms clinical coding is very important to a functioning CIS and in an environment where tariffs are based more on clinical activity. Clinical coding is done at hospital level at Mediclinic Middle East, and a strong focus on training, internal audits, and coding support systems ensures that the quality of coding is continuously enhanced.
The Mediclinic City Hospital Breast Centre was established to offer patients an internationally recognised multi-disciplinary approach to breast disease management. This includes quick access to preliminary consultations, rapid diagnoses and effective treatment using the latest technology and evidence-based medicine. It is a consultant-led service comprising radiology, surgery, pathology and oncology. The team offers a range of integrated breast care services for both benign and malignant diseases, including “Well Woman” reviews, surgery, radiotherapy (available on site from mid-2015), reconstruction and after care. After care includes the services of breast nurses and patient care coordinators, a lactation service offered to expectant and delivered mothers and lymphatic drainage procedures for post-operative patients. The programmes applied are individually tailored to each patient’s needs, and team members work closely together to ensure the best treatment for the patient concerned.

Mediclinic City Hospital has been a regional pioneer in the field of breast imaging, with full-field digital mammography and breast MRI. It remains the only unit in Dubai to offer a full range of interventional breast radiology services, specifically stereotactic vacuum assisted biopsy, for which its services are sought from across the UAE and beyond.

THE WAY FORWARD

Available information indicates that the clinical performance of the Group was satisfactory, and patients admitted to Mediclinic hospitals can have peace of mind regarding their expected clinical outcomes. This discipline, however, requires continued focus and relentless attention to detail.

Platforms are focusing their patient safety strategies on specific areas in need of improvement, coordinated by dedicated patient safety officers. These strategies are comprehensive in scope, and some innovative initiatives are under way. The development of more coordinated and integrated care processes and structures is another area of focus in order to improve quality and efficiency. In addition, more work is being done on developing clinical measures and indicators.

Clinical services that provide efficient, effective and safe patient care of the highest standard are what Mediclinic is all about. With effective clinical leadership structures, a strong focus on patient safety and an integrated approach to delivering care, Mediclinic is well positioned to provide excellent value to its patients well into the future.