

The Role of Medical Technology in Value-Based Healthcare in MEA

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White Paper by



1. INTRODUCTION

1.1 Health and Economy are Synergistic

Population health and well-funded resilient healthcare systems are indispensable for economic prosperity. The unprecedented global public health crisis in 2020 served as a strong reminder of the health-impact on economies. Now more than ever, healthcare systems are under tremendous pressure to accommodate growing numbers of patients and achieve better outcomes under strict budget constraints. Healthcare systems in the Middle East and Africa region are no exception.

1.2 External Shock/ Public Emergency

In cases of public emergencies or pandemics, disruptions in both supply and demand for healthcare are foreseeable. Across virtually every healthcare system, the COVID-19 pandemic has upended hospital activities as procedures were postponed or cancelled, and resources were redirected to treat COVID-19 cases. New routines for infection control, static number of ORs, diminishing staff and continually changing guidelines exacerbated the problem and added to the complexity of allocating healthcare budgets. While the total economic impact of deferring the elective surgeries during the pandemic is yet to be estimated, a spillover effect on non-COVID patients' morbidity and mortality is inevitable.

As hospitals gradually return to normal operations and restart surgery lists, medical technology companies have a big role to play to help them face the backlog of patients and alleviate the capacity gap. Among the interventions considered are shifting procedures to an outpatient setting, digitalization and implementing better pathways to shorten hospital length of stays.

1.3 Transition towards value-based healthcare

Innovative technologies and solutions can deliver efficiencies for health systems and improved outcomes for patients. However, outdated models of financing and procurement – originally designed for buying low-cost goods at high volumes, or fee-for-service/product– are

ill-suited to purchasing innovative solutions that fundamentally alter patient pathways and the economy. A better approach are value-based healthcare models that consider care to be a long-term priority commencing at early diagnosis to months and often years after treatment.

In contemporary economic terms, value aims to maximize patient outcomes through strategic investments in healthcare by spending wisely on interventions with measurable economic benefits for patients and society. New ways of thinking about financing and investment models are therefore essential to achieve value and protecting sustainable universal health coverage. Rather than a narrow focus on volume and price, financing and procurement decisions should place value and innovation at their core. This encourages providers, funders, and patients to consider true cost, which embraces the long-term outcomes, economic cost and benefits of a treatment.

1.4 Role of Medical Technologies to accelerate the shift towards VBHC & create shared value

Mounting challenges facing health systems such as escalating costs, low-value care, disparities in patient outcomes and inefficiency in healthcare delivery are being addressed by the MedTech industry. In particular, medical device manufacturers are accelerating the shift to value-based high-quality healthcare as a tool to unlock value in healthcare, thereby placing improved patient outcomes, reduced total cost of care, and benefits for stakeholders at the heart of the definition of value¹. Medical device manufacturers continue to lead the transition towards value-based healthcare. They are working with providers to control costs and optimize pathways, proactively engage healthcare stakeholders including clinicians, administrators, policymakers, clinical societies, regulators, and governments to create alignment on different dimensions of value: clinical and non-clinical patient impact, cost and population impact, particularly for those diseases that carry a significant economic burden in the MEA region, as illustrated in the following case studies.

2. CASE STUDIES

2.1 Diabetes Type -1 Integrated Practice Unit (IPU), Saudi Arabia

Diabetes Type 1 IPU is a certified center dedicated to providing comprehensive and individualized care for children and young adults living with type 1 diabetes. Originally based in The Netherlands and now with presence in Saudi Arabia, it is one of the largest diabetes specialist centers in Europe, currently managing thousands of patients.

The clinics aim to decrease the burden of type 1 diabetes for patients and their families. It delivers individualized and comprehensive care, helping patients to achieve superior outcomes and lead a better life with fewer complications. This is achieved by empowering patients through self-care, offering a warm, motivating non-clinical experience with 7/24 expert support while also ensuring consistent tracking and analysis of outcomes for every patient.



Clinical Impact	Non-Clinical Impact	Care Delivery Revenue & Cost Impact	Public/Population Impact
<ul style="list-style-type: none"> • Minimum 5-year average delay in complications onset • > 50% of patients with blood glucose under control • Hospitalization rate lower than 1% versus a national average of 9% in Netherlands, and Saudi Arabia • More than 2.2 years increase in life expectancy in Europe • Significant reduction in Hypoglycemic events (Dropped in the Saudi clinic from 130% to 12%) 	<ul style="list-style-type: none"> • Increased productivity in the Diabetic population and their immediate care providers (less days off due to hospitalization, medical events, etc.) • Patient-friendly environment 	<ul style="list-style-type: none"> • Reduction in short term and long-term complications translates into significant savings for the payers • Outcome based payment scheme • The reduction in complications and the better outcome therefore secure lower burden of the disease on public and private payers 	<ul style="list-style-type: none"> • More children patients in range, dramatic reduction in long term vascular complications • Improved QoL for patient families

2.2 Diabetes Mellitus Type 2 (T2DM)

Over the past three decades, social and economic changes caused a dramatic rise in the incidence of T2DM in the Middle East, which now ranks second worldwide in prevalence and attributable deaths due to diabetes.

Patients prescribed multiple dose injection insulin therapy have a greater disease burden, experience greater medical costs and healthcare resource utilization, and exhibit poorer glycemic control than those treated with oral medications or basal insulin therapy. Insulin injection technique education and use of appropriate pen needles (length, geometry) can improve clinical and health economic outcomes, where such simple interventions can reduce lipohypertrophy and intramuscular injections¹, and in turn reduce glycosylated hemoglobin (HbA1c) by almost 4mmol/mol, unexpected hypoglycemia and glycemic variability¹, and the pain of injection, thereby improve patient comfort².

Healthcare institutions can realize direct cost savings with reduced insulin consumption and indirect cost savings by better glycemic control⁶.



Clinical Impact	Non-Clinical Impact	Care Delivery Revenue & Cost Impact	Public/Population Impact
<ul style="list-style-type: none"> Proper insulin injection techniques and the use of 5-bevel pen needle for insulin injection can result in clinically significant improvements for patients such as¹: Reduction in HbA1c by almost 4mmol/mol Total daily dose reduction by 5.6 units Patients with unexpected hypoglycemia falling by 40% Patients with glycemic variability falling by 41% 	<ul style="list-style-type: none"> The 5-bevel pen needle tip is clinically demonstrated to reduce the pain of injection and has greater patient preference compared with other needles² thereby increasing patient comfort 	<ul style="list-style-type: none"> A UK study estimated a potential of over £42 million in savings by adopting the interventions to reduce lipohypertrophy¹ 	<ul style="list-style-type: none"> A blended intervention insulin injection technique education, lipohypertrophy education, avoid reuse and changing the pen needle to a 5-bevel tip pen needle could lead to reduced health care costs by³. Reducing in the consumption/cost of insulin in the short term^{4,5} Reducing HbA1c being the single biggest factor in improving the cost of complications in diabetes patients⁶

2.3 Obesity: Bariatric/ Metabolic Surgeries

Obesity is a major public health concern across the world and specifically in the Middle East where the prevalence is one of the highest worldwide¹. It contributes to annual increase in healthcare costs and resources utilization. Most of the costs result from treatment of preventable chronic conditions including diabetes, arthritis, hypertension, stroke and other cardiovascular diseases.

Weight loss in individuals affected by obesity is achieved with medications, lifestyle interventions, and bariatric surgeries. Studies have shown that bariatric surgery is an effective treatment for morbidly obese patients and is a sound use of the healthcare resources as it enables sustainable weight loss as well as improving or resolving obesity related comorbidities like diabetes².



Clinical Impact	Non-Clinical Impact	Care Delivery Revenue & Cost Impact	Public/Population Impact
<ul style="list-style-type: none"> Bariatric surgery provides sustained weight reduction for long terms (up to 20 years follow up)³ Loss of excess body weight at year 1 was 67.3% post gastric bypass & 71.2% post sleeve gastrectomy⁴ 75-95% of obese patients with T2DM achieved diabetes remission within 2 years post-surgery^{5,6,7} 	<ul style="list-style-type: none"> At 12 months, patients who underwent bariatric surgery saw a 74% decrease in diabetes medicine usage⁸ Within 3 months after surgery, patients' prescriptions for hypertension & cholesterol drugs decreased by 34% & 55% consecutively⁸ Fewer hospital admissions, ER & outpatient hospital visits related to obesity comorbidities which reduces the burden on healthcare systems Morbid obesity may reduce life expectancy by 9 years for females and 12 years for males^{9,10} 	<ul style="list-style-type: none"> Economic burden of obesity is huge & it nearly doubles when associated with T2DM versus obesity alone³ In US setting, studies have shown that bariatric surgery will pay for itself by decreasing obesity related conditions within 2-4 years^{11,12} 	<ul style="list-style-type: none"> Obesity imposes a considerable financial burden on the workplace accounting for 6.5% to 12.6% of total absenteeism costs in the United States¹³ Bariatric surgery improves productivity and overall quality of life of morbid obese patients¹⁴ Patients who lost weight post op have reported improvement in self-esteem and were able to overcome the psychological issues that were intertwined with obesity¹⁵

2.4 Infection Control: The role of Triclosan coated sutures in reducing incidence of Surgical site infections

Surgical site infections (SSI) are serious complications related to surgical procedures which impacts the patient’s wellbeing as well as healthcare expenditure related to readmissions and reinterventions.

Suture materials used for wound closure can act as a medium for bacterial growth potentially leading to SSI. Triclosan coated sutures (TCS) are antimicrobial coated sutures that avoids the bacterial colonization in its surface hence reducing the risk of developing SSI¹⁻³.

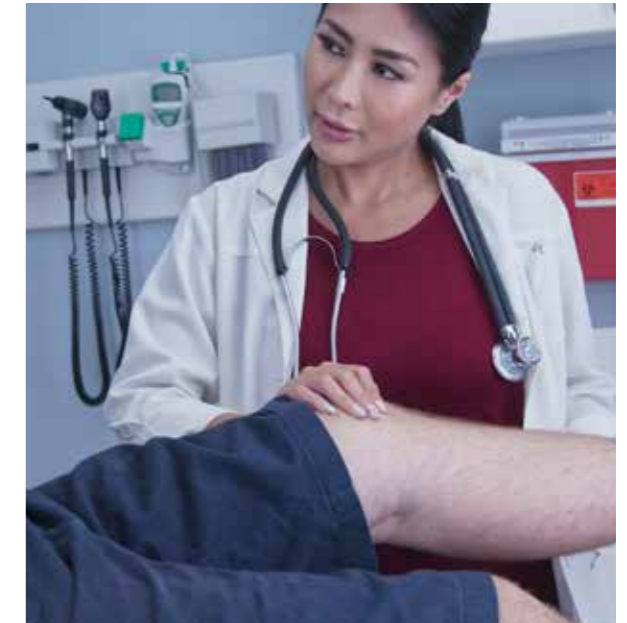
Even if the implementation of TCS into clinical practice comes at higher costs for adoption by hospitals, such increase is fully recovered by the prevented direct costs of wound infection and might even lead to annual net savings⁴.



Clinical Impact	Non-Clinical Impact	Care Delivery Revenue & Cost Impact	Public/Population Impact
<ul style="list-style-type: none"> • 32% of hospital acquired infections are SSI⁸ • Patients with SSI are 2X more likely to spend time in ICU^{5,6} • Patients with SSI are 2X more likely to die^{5,6} • TCS reduces the incidence of SSI by up to 39%⁷ 	<ul style="list-style-type: none"> • Patients with SSI are 5X more likely to be readmitted after discharge^{5,6} • SSI can increase LOS between 3–24 days depending on the type of surgery • TCS can help Free up hospital bed space due to reduction in SSI related readmissions & LOS¹¹ 	<ul style="list-style-type: none"> • TCS helps decrease overall hospital costs through: <ul style="list-style-type: none"> -reducing costs of readmission and extended LOS related to SSI -reducing costs related to reoperation due to SSI • In the UK setting, cost of treating SSI was approximately £3,500 and could vary depending on the nature of surgery⁹ 	<ul style="list-style-type: none"> • SSI has a negative impact on patients’ overall experience & satisfactions¹⁰

2.5 Osteoarthritis

The MEA region has the most youthful population in the world but also has an upward trajectory in life expectancy and an increase in the population aged 65+¹. OA is a common disease associated with aging that impacts patients’ quality of life². Total joint arthroplasty is considered as an effective treatment option for patients experiencing constant joint pain and stiffness which are not improving on medications or other non-surgical interventions³. For these patients, the cost effectiveness of a timely joint replacement intervention was proven when compared to non-surgical options or delayed surgery- which imposes a loss in quality of life².



Clinical Impact	Non-Clinical Impact	Care Delivery Revenue & Cost Impact	Public/Population Impact
<ul style="list-style-type: none"> • Approximately 85% of individuals over the age of 75 experience symptoms of hip and knee osteoarthritis • If no proper management is taking place, it can lead to fracture and reduced mobility • One of the common treatment options is to have a total/partial joint replacement surgery 	<ul style="list-style-type: none"> • Post- surgery, patients will be less dependent on NSAIDs and pain killers • Decreased frequency of outpatient hospital visits and frequent physiotherapies 	<ul style="list-style-type: none"> • In the US, the total direct annual cost of patients with OA were estimated to be 2X that of similar patients with no OA⁴ • The additional insurer cost to treat female patients with OA was estimated to be \$4,833⁴ • Timely total hip and total knee arthroplasty are considered cost effective interventions when compared to delayed surgery or when compared to non-operative strategies⁴ • The money saved from delaying joints replacement surgeries were forgone by the loss in patient’s quality of life during the delay period 	<ul style="list-style-type: none"> • Improved patients’ quality of life: less pain and improved • Less work absenteeism and improved productivity • Less dependency on care-givers post-surgery due to improved patients’ mobility

2.6 Medication Safety: Financial Impact of Error Prevention

15% of hospital expenditure treats safety failures¹ and medication error is responsible for 50% of this lost revenue across the care spectrum.² Investment in integrated smart pumps can protect organizations against extra direct costs and unnecessary additional Length of Stay (LOS). Serious medication errors are 2% of all IV medication errors.³



IV Medication Management	Clinical Impact	Non-Clinical Impact	Care Delivery Revenue & Cost Impact	Public/Population Impact
Smart Pumps	28% Reduction in dose/rate errors ⁴	Clinical staff involved in medication errors report feelings of 'worthlessness' ⁵	750,000 infusions PA for average 1,000 bed facility. 30% error rate. ⁶⁻⁸ 28% prevented by smart pumps of which 2% are 'serious' = 1,260 Serious Errors. \$7,300 per serious medication error ⁹	\$9,198,000 per 1,000 bed facility available for re-deployment
Networked Smart Pumps	Central infusion monitoring reduced infusion alarms by 56.25% and reaction time to critical short half-life infusions (CSHLI) alarms by 31% ¹⁰	Filtering alarms for 'immediate' and 'non-immediate' response is vital in high-pressure healthcare ¹¹	0.04% of CSHLI alarms are not responded to (Severe medication error). CSHLI are 11.9% of all infusions. ¹² = 36 severe medication errors	\$262,000 per 1,000 bed facility available for re-deployment
EMR-Interoperable Pump	Interoperability auto-populates dose, medication and patient details- cross checks order against prescription. Administration is auto-documented in the EMR	Reduction in programming keypresses by as much as 86%	EMR-Interoperable Pumps protect against 'wrong-patient wrong medication error' and 'omission' prevention. Error capture rate jumps from 28% to 75% ⁴	With interoperability the savings related to medication safety per 1,000 bed facility could be vast

The above investment could achieve an OECD Cost-Effective Incremental Factor of 3:1*

Intravenous medication safety technologies bring extensive cost-benefits, and there are, of course, also compelling duty of care reasons for embracing it.

3. Conclusions and Recommendations for various stakeholder groups

Value Based Healthcare is all about improving patient outcomes while reducing inefficiencies in the system. This is achieved by developing new healthcare models that put the patient at the center and enable an efficient allocation of scarce resources.

How can each stakeholder contribute to making Value Based Healthcare a reality?

Patients- ACTIVELY PARTICIPATING IN THE PROCESS

- Measurable improvement in overall health (i.e. measurable outcomes, less hospitalization)
- Better patient experience and improved patient satisfaction
- Patient's perspective strongly matters (i.e. patient-reported outcomes, patient experience surveys, more informed patients, more accountable care provision)

Policy makers- ENABLING VBHC

- Define and shape the future of healthcare delivery and how it functions in tomorrow's society.
- Breaking down barriers between purchasing departments and processes that work beyond simple order fulfillment and take providers' future planning interest into consideration.
- Fostering of data sharing to create regional value-based healthcare models.
- Value-Based Procurement that include the full investment lifecycle of products and services.
- Ensuring that any investment in healthcare technology is futureproofed.
- Seek out evidence for value-based healthcare decisions.

Providers- EXECUTING POLICY

- Partnerships with different stakeholders to better serve patient needs.
- Creating innovative Win-Win Value-Based agreements with the MedTech Industry.
- Measuring/ benchmarking/ communicating and optimizing outcomes to benefit, educate and better inform other relevant stakeholders.
- Removing barriers to change within organizations through education and dissemination of value-based presentations and proposals based on referenced evidence.

Payers and procurers- REWARDING VALUE

- Engaging with value-based models and reviewing current approaches to favour longer-term investment cycles and true societal value.
- Paying for performance as opposed to paying for services.
- Rewarding providers, who actively engage by measuring and communicating clinical outcome KPIs.
- Viewing DRGs, where applicable, not as "simple cases" but as an opening to deliver the most cost-effective solutions.

MedTech Industry- INNOVATION AND PERFORMANCE- DRIVEN/ RISK SHARING

- Providing value-based innovative solutions rather than “selling products”.
- Engaging in innovative partnerships with providers to bring valuable products to the market quicker, and to share change-risk.
- Sharing expertise and knowledge on value-based healthcare models in other regions and their relevance for MEA.
- Actively supporting education of all stakeholder groups on Value-Based Healthcare.
- Participating in the evaluation of outcome measurement via clinical trials and localized real-world evidence to create cost-benefit analyses relevant to specific markets.
- Partnering with providers to offer solutions that complement the organization’s operations and culture.

Mecomed and its members actively support progressive health systems that seek to set models and standards for patient outcomes measurement and establish partnerships in value-based healthcare programs. Mecomed commits to continue being a supportive and valued partner in implementing value-based healthcare to enable stakeholders and healthcare providers in building strong foundation for sustainable, innovative and cost-effective care to patients in the Middle East and Africa region.

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Case studies

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