The success of healthcare design and construction projects is greatly dependent on a strong focus on the patient experience combined with the application of technological solutions and strict control of budget and schedule. With 30-50% of the total cost of a hospital build project allocated to the procurement, installation and commissioning of medical equipment and associated technology, the involvement of strong clinical consultants, medical equipment planners and biomedical engineers is critical.

The role of Medical Equipment Planning on healthcare construction projects and in ongoing management of healthcare facilities will be explored in depth at the Transforming Medical Equipment Planning Conference at Hospital Build & Infrastructure Exhibition and Congress, held in Dubai on 4 June 2014. Here, planning professionals from AECOM, RTKL, and Attainia share their collective thoughts.

THE CRITICAL ROLE OF THE MEDICAL EQUIPMENT PLANNER
As we look to create projects that keep pace with rapid advances in technology while remaining within the constraints of budget and schedule, medical equipment planning should be seen as a core requirement, a ‘nerve centre’ of sorts, critical to the success of today’s and tomorrow’s healthcare facilities.

By: Jill Worley, Director of Product Marketing, Attainia, and Christine Chadwick, Global Strategy Officer & Managing Director, AECOM, Canada
Medical equipment planning is an ongoing and iterative task that evolves throughout the lifecycle of a project and beyond into ongoing operations. The best time to bring a medical equipment planner onto a project is at the inception stage. This way, functional programmes and business cases can accurately depict the current and future demographic and clinical needs with viable technology, equipment and costing options.

Medical equipment planners act as a single source of information between various disciplines and provide the latest information on the state of healthcare technologies to the stakeholders. They are responsible for the management and dissemination of the myriad details associated with a successful technology and equipment planning programme.

The impact of not incorporating dedicated healthcare technology planning early in the project process can be considerable. As design and construction progresses, the details provided by a healthcare technology planning team are invaluable. When no information exists around the project’s ‘what if’s’, there is an inherent, but unknown, additional capacity to the building that will account for significant additional cost. Change orders during design or construction are costly. The medical equipment planner helps to streamline decision-making, hit deadlines imposed by the design and construction teams and mitigate risks against change orders or cost overruns. The clinical consulting team members will also...
THE IMPORTANCE OF COLLABORATION AND EFFECTIVE DECISION SUPPORT

As healthcare technology and clinical IT systems become much more tightly integrated and the timescales and costs become much more compressed, the medical equipment planner must be aware of, and work with, the requirements of clinicians, operations and facility managers, construction and MEP contractors, procurement and finance staff, clinical IT and integration specialists, biomedical engineers as well as various acoustic, vibration, fire and safety experts.

Despite the improvement in equipment manufacturer websites, there continues to be a lack of practical information to support the clinical stakeholders in their equipment selection processes. As a result, clinical staff tend to either default to technologies they are already familiar with, or randomly browse the internet looking for viable options. Today’s healthcare technology planners require a wealth of information in order to keep up with new and innovative working practices in diagnostics, intervention and patient care. They must digest a tremendous number of diverse product technology assessments, be conversant in patient outcome studies, and develop total cost of ownership and return on investment calculations.

It is a delicate balance facilitating both clinical and non-clinical stakeholders through an equipment specification and selection process, while simultaneously managing installation requirements and delivery dates driven by a construction schedule that cannot be delayed. The impact on project costs and timescales of assumptions made by one stakeholder and conflicting decisions taken by another are significant and require a good deal of discussion and collaboration.

Traditionally, detailed lists and mountains of paper and electronic documents were drawn up and delivered to the various contractors and stakeholder groups working on a project. This required an army of resources to ensure that documents held by each party were up-to-date and aligned, and that the impact of any changes made or clarifications provided were correctly assessed and managed through the process. In order to ensure that everyone was working from the same information, large meetings had to be planned and facilitated, often requiring weeks of preparation and more delay in documenting and disseminating updates to plans and specifications. Every day of delay results in additional cost, loss of revenue for the owner of the facility and lack of provision of healthcare services for the local community.

Clearly, while performing such a critical role, there is a risk of the Medical Equipment Planner becoming a bottleneck. Project teams on the larger and more technologically advanced projects often include subject matter experts on virtual teams around the world. Although the advent of the internet, email and even shared databases (e.g. SharePoint) has opened up and enhanced communication between project stakeholders, healthcare technology planners are still striving to improve their ability to share a broad spectrum of information utilising real-time, on-demand tools.

TRANSPARENCY, STANDARDISATION AND STRATEGIC SOURCING

There was a time when strategic sourcing simply meant that the best price and delivery terms were negotiated. Today, strategic sourcing demands the best possible aggregation of planned purchases, maximum utilisation of available contracts, optimal negotiation of payment terms, and careful timing of delivery.

Historically, planning medical equipment within the silo of construction and facilities management limited strategic sourcing opportunities, resulting in higher costs for the equipment and potentially different equipment standards in each facility. Corporate healthcare facility management executives today strive to aggregate not only project equipment purchases, but also routine and replacement equipment.

Standardisation of equipment purchases also reduces clinical risk through more efficient training time and staff familiarity, lowers maintenance costs, creates fewer service contracts, results in smaller replacement parts inventories and increases equipment availability.

This level of transparency requires synchronisation of product selection, approval and procurement, across multiple projects as well as in conjunction with routine and replacement capital forecasting processes. This synchronisation is difficult for most organisations, regardless of size or infrastructure, as the processes are often disparate and/or decentralised.

Finding an efficient means of tracking, normalising and analysing this information extends beyond the typical spreadsheet or database.
WHAT DOES IT ALL MEAN?

The planning of medical and non-medical equipment requirements cannot be done effectively within organisational silos. People, processes and technology must be aligned to empower organisations to consolidate, collaborate, communicate, and contain costs for capital equipment.

By implementing common processes and data standards and leveraging business intelligence and analytics, equipment planners can work more efficiently, build consensus more quickly, distribute information and reports more readily, source equipment more strategically and, ultimately, reduce the cost of care.

CASE STUDY 1: AECOM CASE STUDY

King Khalid Medical City, Dammam, Saudi Arabia

Project team: King Khalid Medical City Project Management Office, AECOM, Vanir Construction Management

AECOM’s medical equipment planning service line, AEquip, was an important element of the integrated design team appointed by King Khalid Medical City (KKMC), illustrating the progressive use of clinical consultants and healthcare technology planners from the onset of a project to enhance design functionality.

Medical cities form the foundation of Saudi Arabia’s future national healthcare infrastructure and KKMC is envisioned to be the leading centre of excellence for tertiary referral healthcare in the Eastern Region, serving seven million with a focus on integrated treatment, research and education.

KKMC is the largest of the four medical cities being developed and the inevitable shifts in future healthcare provision requires its facilities to flex. Detailed technology planning was required to ensure the sustainability of the design will work with the changing technological and modalities that are inherent in healthcare.

The sheer size and complexity of the KKMC project led to what is believed to be one of the largest Building Information Modelling projects in history. The detailing of all medical equipment and technology within the model provided an excellent implementation and readiness for co-ordination of all disciplines during the design process and resulted in drawings that reduced opportunity for costly change orders during construction. The detailed database of equipment allowed the client to have real time access to all equipment information and manage change and risk to the equipment budget.

The KKMC project demonstrates the benefits of clinical consulting in shaping future-proofed healthcare facilities and delivering them on budget and on schedule. A model that will provide a wide range of significant benefits to many other healthcare providers in the Middle East and worldwide.

King Khalid Medical City/AECOM approach to medical equipment planning in Saudi Arabia

For projects like the 2013 Best Hospital Design (Future) Award winner, the King Khalid Medical City (KKMC) mega project in Dammam, the medical technology design took place early in the concept design phase with the assistance of the medical equipment planning team at AECOM, the project’s architect and engineering firm’s headquarters in Minneapolis, USA, during a week-long series of meeting sessions involving going over room-by-room selection of medical equipment and furnishings, guided by ten design principles to realise the project vision for a smart academic medical and research centre.

For this mega project, the selections made were then entered into the de facto standard for medical equipment and asset management system by Attainia, a cloud-based equipment planning and sourcing tool whereby all the planning data and equipment specifications were captured and are readily available for the strategic equipment sourcing and the project construction efforts. The Ministry of Health’s plans are to purchase the equipment over a number of ramp-up phases, as their way to avoid initial high costs, equipment obsolescence, while guarding future proofing of the facility. This early planning activity further facilitated the preparations for the facility construction by having detailed medical equipment list, and specifications.

Several special review sessions were carried out by the KKMC Project Management Office (PMO) later in the project involving the review of critically specialised areas, such as the medical imaging clinic spaces such as the large and technically complex seven MRI suits in order to ensure the efficient and culturally appropriate design are in place. The KKMC PMO as the owner, further requested and received independent reviews of the space MRI clinic space design from major equipment manufactures to ensure that this expensive space can accommodate any number and types of equipment, while safe guarding the culturally sensitive patient changing area design and the standardisation associated patient flow processes.

These planned steps demonstrated thought leadership from the owner’s side, the KKMC PMO, and have further contributed to the design excellence of the KKMC by for critical clinical areas →
and accelerated better equipment construction information for electro/mechanical, plumbing and other construction trades using the largest building information system and likely the largest mega project to extensively implement and use BIM in its complex design.

**CASE STUDY 2: RTKL’S APPROACH TO COLLABORATION IN SAUDI ARABIA**

For projects like King Faisal Specialist Hospital, Jeddah and the Ministry of Health’s King Abdullah Medical City, Makkah, RTKL International Ltd. and Care-RTKL teamed with Saudi Diyar Consultants, a leading multidisciplinary design firm with their head office in Jeddah, to provide careful and strategic architectural design and medical equipment decisions early in the design stages to support each client’s patient care model. Key decisions surrounding complex areas such as imaging, integrated surgical theatres and patient care helped develop an early roadmap for equipment standardisation and sourcing efforts.

In both projects, the development of medical equipment standards was addressed early in the design phases with input from each project’s clinical team rather than waiting to address standards later when construction commenced. This up-front planning significantly streamlined design decisions by the architects for critical areas and accelerated better equipment construction information for electro/mechanical, plumbing and other construction trades. For these projects, since all the planning data and equipment specifications were captured by Care-RTKL in Attainia, a cloud-based equipment planning and sourcing tool, the information was readily available to move forward for strategic sourcing and construction efforts.

**CASE STUDY 3: CARE-RTKL STANDARDISING EQUIPMENT…ACROSS CITIES**

Taking a closer look, Care-RTKL (a leading KSA-based medical equipment and technology planning firm) has applied these methodologies to several large-scale projects in the Middle East.

At the Kingdom of Saudi Arabia’s National Guard Health Affairs (NGHA) King Saud Bin Abdul Aziz University for Health Sciences (KSAU), one of the largest multi-city academic and research campus projects in the Middle East, medical equipment standardisation processes have been implemented in order to manage the enormous implementation effort. The challenge wasn’t easy.

With more than 30 combined academic, specialised hospitals and health sciences research buildings distributed across campus locations in Riyadh, Jeddah and Al Hasa, NGHA and Care-RTKL developed stringent medical equipment and technology standards and specifications across all clinical areas.

A key success factor in the process involved NGHA forming clinical technology review committees, whose responsibility was to review and approve all equipment and technology specifications. The committees were comprised of both clinical and operational leadership to ensure comprehensive inputs were considered from each stakeholder. Careful thought and coordination was required to ensure full compliance with the standards prior to commercial bidding by suppliers.

Standardisation of the equipment not only supported the unified academics and patient care practices at each campus, but it facilitated significant strategic sourcing and delivery efforts with suppliers and allowed for consistent clinical training across all the sites. From a biomedical engineering perspective, standardised equipment contributes towards better on-going equipment maintenance and specialised training, as well as future replacement or upgrading of the equipment. All were key elements for NGHA to manage the volume of equipment in operation for this size project.

With approved standardised equipment specifications in-hand, the process of commercially sourcing the equipment became the next focused effort. The extraordinary quantity of equipment being purchased required NGHA to aggregate equipment sourcing across not only one campus location comprised of multiple buildings, but across all three campus locations. NGHA could significantly leverage the best commercial offering and incorporate centralised contractual terms and conditions, warranties and training requirements. Whilst some of the large speciality hospital buildings were on longer construction timelines than less complicated clinical academic buildings, identical equipment specified within multiple buildings could be negotiated with the suppliers for staggered deliveries based on the construction completion schedules. Since equipment was standardised across the campuses, similar construction methodologies by each of the different site construction teams could also be coordinated.

**AUTHOR INFO**

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**Additional case study materials:**

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