

Out of the workshop 'on to the ward'

The electro-biomedical engineering (EBME) sector is tasked with moving away from focusing on 'maintenance' towards having a much greater contribution to delivering safe, productive and cost-effective care. The challenge ahead will be to ensure better procurement, improved utilisation of equipment and smarter use of technology to support new models of care. **LOUISE FRAMPTON** reports.

In 2014, a damning report warned that 'the low priority given to NHS engineers is leading to problems caused by faulty medical equipment, cancelled operations and poor value for money for taxpayers'. In the previous year, over 13,000 incidents were reported relating to faulty medical equipment, which led to over 300 deaths and around 5,000 serious injuries. This report, from the Institute of Mechanical Engineers, highlighted the crucial role of electro-biomedical engineering in delivering safe, quality care and was reinforced at this year's EBME Seminar – the message was clear: improving healthcare technology management saves lives and money.

High profile speakers and over 200 delegates gathered to discuss some of the key challenges (and opportunities) ahead, for electro-biomedical engineers, in the face of continued financial pressure in the NHS. Key issues raised included the fact that medical equipment remains under-utilised, technology continues to be poorly specified, user training remains inadequate, and planned maintenance and replacement strategies require significant improvement.

Faced with significant financial pressures, Trusts also need to be assured that they are gaining value for money from procurement decisions, while a lack of investment means that NHS technology is continuing to age. As the NHS is tasked with having to do 'more for less', the question arises: how could electro-biomedical engineers help their clinical colleagues continue to deliver high quality care for all?

'Out of the workshop on to the ward'

According to Professor Nick Bosanquet, Emeritus Professor of Health Policy at Imperial College London, this is an important period for electro-biomedical engineering; as the profession moves out of the 'workshop in the basement', to the ward space, the sector will provide an increasingly important contribution to the quality and productivity of patient care.

He highlighted the scale of challenges ahead for the NHS – pointing out that it is clear, from election promises, there will be no significant increase in funds for the NHS, in real terms, and the health service



will continue to experience financial pressures. He added that the NHS is entering a 'creative and important period of service redesign', in the wake of the *NHS Five year Forward View* – and the central challenge will be to increase productivity.

"It is about doing more work with the same resources," he commented. "The Nicholson challenge was about reducing cost and this has been achieved by freezing pay, reducing pricing on contracts, and freezing the total budget for pharmaceuticals, including using more generics. We are running out of these solutions, however. The next five years has got to be about empowering staff to deliver more high quality and appropriate services within very tough financial constraints."

This is where the EBME sector and technology could make a significance difference, according to Prof Bosanquet. He predicted that electro-biomedical engineers will have increasing input at the boardroom level as key players in the strategic challenges ahead.

Party leaders have pledged to increase the numbers of frontline staff, but they cannot do this overnight, as Prof Bosanquet pointed out. He added that such promises do not address the need for 'experienced staff'. In relation to healthcare teams, the task for electro-biomedical engineers will be to be to 'give more power to their caring ability' and raise their productivity.

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“The focus in the next five years will not just be on the performance of machines, but also on the interaction between the machines and the users. There needs to be a focus on how we use all of this equipment and to assess whether it is being used in a way that is most productive,” Prof Bosanquet continued.

He emphasised the importance of managing the many acquisition pathways – including, equipment acquired through ‘fundraising’ or ‘charitable donation’ as, all too often, there are no funds to maintain it or to train people to use it.

“There needs to be a more focused acquisition strategy. Above all, there needs to be a move towards a technology management model.”

He explained that this should include focused strategies for the procurement process; continuous training of staff/users; implementation of guidance; as well as maintenance. There will need to be more information on access and utilisation, as well as equipment costs, and electro-biomedical engineers will need to help hospitals achieve their targets in terms of increasing productivity.

It is no longer ‘just about maintenance’, he pointed out; EBME departments will have a key role in lowering costs and raising staff capability and competence.

In May 2007, the World Health Organization urged Member States to: “to formulate appropriate national strategies and plans for the establishment of systems for the assessment, planning, procurement and management of health technologies, in particular medical devices, in collaboration with personnel involved in health technology assessment and biomedical engineering.”²

One of the delegates reported that they had encountered resistance to standardisation of equipment from some clinical staff, during discussions over procurement, and some members of staff continue to want to exert control over purchasing of specific equipment, for which they have a preference.

Prof Bosanquet advised that it is important to help these individuals to consider, not just how the piece of equipment will function in their unit, but ‘how it will affect the general standard of care in the hospital in a wider context’.

Another delegate pointed out that simply focusing on the cost of procuring equipment was inadvisable as it does not consider factors such as whether the manufacturer will support the EBME and clinical staff with training, for example. He stressed that hospitals need to look at the ‘value’ of the product on an ongoing basis.

EBME Seminar chair, Dr John Sandham agreed that ‘value’ was concerned with much more than the cost



John Sandham

of the equipment. “It is not about equipment being ‘cheap’ but being procured ‘correctly,’” he asserted. “For example, if you can purchase equipment that connects the patient at home to the doctor, it may mean that you do not need the patient to come to the hospital or they may be able to return home sooner.

“As engineers, we need to move away from thinking about repairing, fixing and maintaining ‘boxes’, to thinking about ‘how we can use these boxes to improve the processes within the organisation’. How can we use technology for the benefit of patients and ensure we spend the money as wisely as we can? There are ways of using technology that can bring value.”

He added that research shows there is a lack of utilisation of equipment in the NHS: “Utilisation rates in India are around 80% while the figure for the NHS is around 45%. If the NHS could match this rate, we could reduce the need for equipment by 30%-35% which would be a considerable saving.”

Research also shows that the NHS assets are ageing and Dr Sandham asked the audience to raise their hands if they felt they had sufficient funds to keep the age of their asset as it is at present – the response clearly showed the pessimistic view shared across the 200 delegates.

“The answer to addressing the problem of ageing equipment is to improve utilisation and use technology differently, so we can spend more wisely,” Dr Sandham concluded.

Equipment replacement

Dr Scott Brown, capital investment manager, Royal Cornwall Hospitals NHS Trust, and managing director, Health Tech Solutions, commented that, in the past, there has been a lack of standardisation on equipment. Procurement planning has been inadequate and replacement strategies have typically been reactive – mainly focusing on replacing equipment when it is broken. Special funds, end of year



Nick Bosanquet

monies and panic buying have also presented challenges to ensuring effective procurement management.

In the future, the NHS must strive for more proactive replacement strategies, work towards implementing a rolling replacement programme for equipment, as well as ensure better value for money and capital planning, he asserted.

Drivers for change

Dr Brown provided an insight into equipment replacement processes and some drivers for change. In 2008, Lord Darzi’s strategic review, *High Quality Care For All*, highlighted the need to ensure that ‘clinically and cost effective innovation in medicines and medical technologies is adopted.’ The review identified a need to ‘strengthen the horizon scanning processes’ for innovations, as well as to ‘simplify the pathway’ by which new technologies pass from development into wider use.

Another important document was issued by the Medicines and Healthcare Products Regulatory Agency on *Managing Medical Devices* in 2015. This stated that healthcare organisations should set out a long-term approach and objectives for the management of their medical devices, including strategic replacement and procurement planning.

The ISO 55001:2014 standard also has relevance to EBME departments – setting out the requirements of an asset management system, with the aim of helping organisations to maximise the value from their assets.

Section 6.2.2: ‘Planning to achieve asset management objectives’ discusses ‘the processes and methods to be employed in managing assets over their life cycles’, as well as ‘actions to address risks and opportunities associated with managing assets’.

Other relevant documents include the Care Quality Commission’s Outcome 11 (Regulation 16) on the ‘*Safety, availability and suitability of equipment*’. Section ‘11a’

identifies the need for equipment to be 'properly maintained, tested, serviced and renewed under a recorded programme'.

As part of equipment replacement planning, it is important to validate the asset base and conduct a risk assessment – this is not just for patient safety but also to ensure serviceability, maintenance and reliability.

Device specifications need to be agreed with the involvement of key stakeholders and there needs to be a clinical evaluation. A rolling replacement report can then be developed and a long-term procurement plan implemented.

Dr Brown provided an insight into a case study that illustrated the process of equipment replacement planning (in this instance incubator resuscitators.) The process started with the device specification and horizon scanning, with involvement from clinical, technical (EBME) and procurement stakeholders.

'Essential' and 'desirable' factors for the clinical specification were subsequently outlined, as follows:

- Essential
- Easily manoeuvrable
- Variable height
- Integral heater
- Blended gases 2-100% O₂
- Manometer for peak and expiratory end pressures
- Variable pressure suction
- Storage for additional resus equipment

Desirable

- Integral oxygen saturation monitoring
- Weighing scales
- Audible alarm when cylinder depleted
- Suction apparatus that functions when gases not turned on

Clinical evaluation

Approval was then given for a two-week clinical evaluation, involving key stakeholders, including:

- Clinical staff
- Technical (EBME)
- Supplies (whole life cycle costs).

Specialist input was also sought from manual handling, infection prevention and control and a physicist.

The findings of the evaluation showed that the clinical stakeholders had a preference for 'equipment A' because it was easy to use, offered integral SpO₂ monitoring and, as it was used in other Trusts around the region, paediatric doctors in training would benefit.

The technical stakeholders had a preference for 'equipment B'. They identified issues with reliability and servicing costs, in the case of 'equipment A', and the gas mixer/blender was expensive in comparison with 'B'.

The financial stakeholders also

preferred 'equipment B' stating that the capital cost was much lower (i.e. capital charge and interest), the maintenance costs were lower and there was a significant difference in whole life cycle costs (around £12K excluding spare parts).

After discussion, a solution was found to the issue that had been raised that 'equipment B' did not have integral SpO₂ monitoring. A portable handheld SpO₂ monitor was specified and, even with the additional cost of the monitor, a saving of over £4k could be achieved on capital cost.

Risk assessment

A risk assessment was conducted for:

- Clinical/patient safety
- Service delivery
- Financial
- Reliability
- Maintainability

Replacement planning

A replacement planning report was then developed, along with a budget forecast for replacement on an annual basis.

- Ultimately, the benefits of this approach include:
- Long term planning with key stakeholder engagement (clinical, technical, procurement).
- Realisable savings in capital and revenue through optimisation of the asset base.
- Selecting the right equipment to meet clinical needs.
- Standardisation of equipment (maintenance, safety and training improvements).
- Facilitates longer term business planning (i.e. cost pressures).

The EBME Seminar offered further insights into technology innovations – from analysing vital signs and surgical diathermy, to X-ray equipment, surgical microscopy and real time ECG monitoring. An exhibition taking place alongside the educational programme also featured the latest solutions and technology advances to support the EBME sector. The EBME Seminar took place at the Double Tree Hilton, located at the Milton Keynes football stadium – home of the MK Dons. For further information visit: www.ebme.co.uk +

References

- 1 Dr Finlay, Biomedical engineering: advancing UK healthcare, Institution of Mechanical Engineers, July 2014, accessed at: http://www.imeche.org/news/institution/New_report_lack_of_NHS_engineers_is_putting_lives_at_risk
- 2 WHO resolution; WHA60.29; May 2007
- 3 Darzi, I(2008)



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