The Modern Operating Theatre in the Digital Era

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REIMAGINING hospital care, the conference 'The Operating Theatre in the Year 2030', held at the Global Innovation and New Technology (GIANT) Health Event 2025, showcased the evolving landscape of hospitals in the UK. During the session 'Operating Theatres in 2025', chaired by Rajesh Sivaprakasam, Lead for Robotic Renal Failure Surgery, Barts Health NHS Trust, London, UK, an expert panel reflected on how perioperative services have evolved, and what challenges remain. While technological advancement featured prominently, discussions repeatedly returned to human factors: communication, leadership, training, and cultural change. Collectively, the panel articulated a vision of operating theatres that are not merely technologically sophisticated, but safer, more inclusive, and better aligned with patient-centred care.

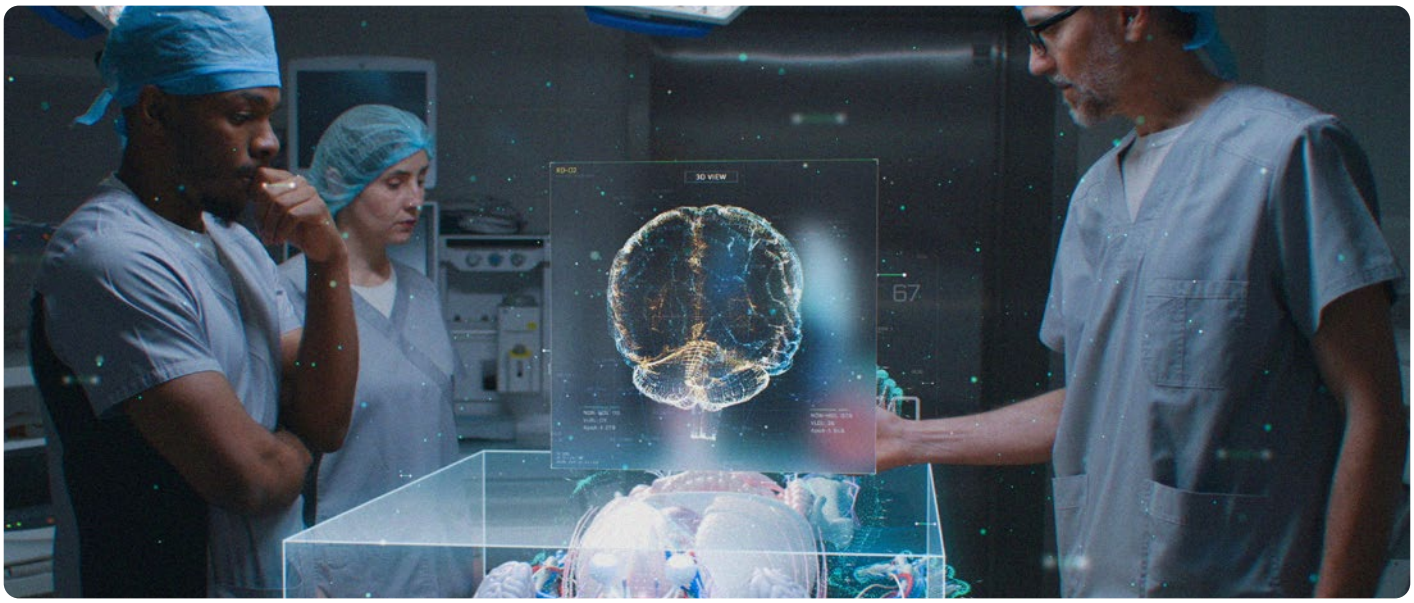
FROM SURGEON-CENTRIC TO SYSTEM-CENTRIC CARE

A key theme of the conference was the cultural transformation of the operating theatre in recent years. Stella Vig, Deputy National Medical Director for Secondary Care and Quality, NHS England, UK, described a decisive shift in the past 10 years, away from the historically hierarchical, surgeon-centric model, and towards multidisciplinary, inclusive leadership structures. This cultural evolution, she argued, has had tangible benefits for patient safety, situational awareness, and team performance. Vig argued that initially, the operating theatre was built around the surgeon, who was often male, but that culture has changed to be more inclusive, and this has positively impacted patient safety.

Luxmi Velauthar, Consultant in Obstetrics and Gynaecology, Barts Health NHS Trust, echoed this perspective from a women's health standpoint, noting that theatres are no longer designed solely around surgical efficiency but increasingly around multidisciplinary safety processes, including structured WHO checklists and team briefings. She described that as a junior doctor, the operating theatres were always very cold, even for a Caesarean section. Now, however, with a massive shift towards patient safety, everyone's input is taken into consideration, and patients are being discharged much quicker due to streamlined perioperative pathways.

A DIGITAL THEATRE

Annie Hunningher, Consultant Anaesthetist, Barts Health NHS Trust, described the operating theatre in 2025 as "a spaceship" with the fast pace at which healthcare technology is advancing. She highlighted the growing role of digital pre-operative planning, continuous physiological monitoring, and AI in enhancing patient safety. In particular, Hunningher highlighted how AI has transformed incident reporting. Rather than responding only to individual adverse events, AI-enabled thematic analysis enables organisations to understand system issues and address them at scale with tools such as digital checklists. Structured checklists used by



the multidisciplinary operating theatre team have been shown to maintain safety, as they enhance communication and situational awareness, and encourage mutual support and leadership. “These checklists help people come back together, stay on the page, and stay patient focused,” said Hunningher. The issue at the moment, however, is “checklist fatigue.” Therefore, she emphasised that finding a way to digitally enhance these checklists will be pivotal.

THE WORKFORCE CHALLENGE

From the perspective of a trainee surgeon, Raiyyan Aftab, President of the Association of Surgeons in Training, London, UK, outlined significant contemporary challenges in surgical education. He argued that, whilst some subspecialties have begun incorporating technology engagement into training assessments, digital literacy and surgical training remain heterogeneous on the whole. Aftab highlighted persistent barriers to accessing operating theatre exposure, increasing variability in the quality of training experiences, and diminishing availability of time and supervisory capacity, particularly from trained nursing staff, to support education in the theatre. He advocated for a fundamental culture shift in how training is viewed: training should not be perceived as secondary to service delivery, but as a component of the patient pathway.

In discussing the implementation of new technologies, Hunningher suggested that clinicians’ reluctance to engage with innovation may, in part, stem from a lack of meaningful performance data. She questioned how clinical teams can be expected to improve when they are unable to visualise performance, yet are simultaneously urged to increase productivity and throughput. This perspective reflects a broader structural issue: data visibility for frontline teams remains limited, and digital systems are often fragmented. Without access to interpretable, integrated performance data, teams are tasked with improving productivity and safety without a clear understanding of underlying system pressures or outcomes.

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WOMEN’S HEALTH

The integration of technological innovation in women’s health was identified as a particular area of both need and challenge. Velauthar highlighted how governance, litigation concerns, and complex regulatory frameworks have slowed technological adoption in obstetrics and gynaecology.

Although understandable, this caution risks widening digital inequities between specialties. She advocated for clearer innovation pathways, standardised governance checklists, and structured engagement processes that would allow digital innovators and clinical teams to collaborate safely and efficiently, particularly in areas involving both maternal and fetal risk.

WHAT TO EXPECT BY 2030

Looking ahead, Vig spotlighted three converging priorities shaping the future of the operating theatre: prevention, flow optimisation, and productivity. She argued that preventative health strategies, such as weight management and smoking cessation, may increasingly reduce surgical demand, whilst day-case surgery and community-based pathways will become the default for suitable patients. At the same time, she highlighted inefficiencies in theatre utilisation as a major unresolved challenge. High cancellation rates and underused theatre capacity represent both a patient safety issue and a financial liability. With constrained funding, future progress will depend on optimising patient selection, theatre scheduling, and perioperative flow to reduce "surgical regret" and improve outcomes.

Hunningher proposed a complementary framework for transformation: insight, involvement, and improvement. She observed that frontline teams often lack access to coherent data relating to operational efficiency, patient experience, reported incidents, and the interrelationships between these domains. This absence of actionable insight limits both engagement and the capacity for meaningful quality improvement. By contrast, providing teams with transparent, integrated data on efficiency, safety events, and patient experience would foster engagement, empower local quality improvement initiatives, and drive measurable improvement. Hunningher further argued that, although additional financial investment may be constrained, sustained returns could be achieved through cultural investment, including coaching, psychological safety, and leadership development.

Furthermore, the potential for AI to improve productivity and cost-effectiveness was widely acknowledged. Velauthar described how AI-supported consultation tools can double the number of patients that can be seen, but warned that poorly integrated digital systems can increase administrative burden and contribute to burnout. Burnout was a particular concern in women's health, where a predominantly female workforce faces compounded pressures from clinical demands and external caregiving responsibilities. Flexible digital clinics, remote working models, and integrated digital platforms were identified as potential mitigations.

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Finally, Aftab highlighted the role of machine learning in addressing systemic workforce mismatches. He advocated for fully digitised notes and AI discharge summaries to reduce administrative delays. Additionally, he proposed data-driven workforce planning models that align training numbers, theatre capacity, and population health needs, thereby addressing bottlenecks that currently impede both service delivery and career progression.

CONCLUSION

The GIANT Health 2025 panel highlighted the current landscape of the modern operating theatre: technologically advanced, safer for patients, and more inclusive, yet organisationally fragmented and under mounting workforce pressure. Looking ahead, emphasis was placed on the need to integrate data across systems, redesign training cultures, support workforce wellbeing, and embed prevention and productivity within patient-centred pathways.