



ROYAL COLLEGE OF PHYSICIANS LONDON | 10-12 JUNE 2024

# EUROPEAN HEALTHCARE DESIGN

RESEARCH • POLICY • PRACTICE

## FINAL PROGRAMME

### NATURAL INTELLIGENCE

### CREATING SELF-LEARNING HEALTH SYSTEMS

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Organised by:

**SALUS**  
GLOBAL KNOWLEDGE EXCHANGE



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Gold Design Leaders



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# LLEWELYN DAVIES

With over 60 years of experience in hospital design, Llewelyn Davies continues to expand its healthcare portfolio, most notably with its work in Jersey over the last 4 years. The firm is the lead architect for a new acute hospital in St Helier, of circa 45,500 sqm, scheduled to be submitted for planning in the summer of this year and with a scheduled construction completion date of 2028. This project extends a relationship with the Government of Jersey in supporting its National Healthcare Facilities Programme (NHFP), vital to support the future wellbeing of the Island.

With over 250 hospitals now completed, Llewelyn Davies demonstrates a distinguished history in both healthcare and master planning, extending over 6 decades in more than 75 countries, and encompassing a spectrum of innovation. The fundamental design principles of the modern hospital were essentially invented and shaped by the founding partners, John Weeks and Lord Richard Llewelyn-Davies. Their pioneering work, notably in understanding the need for continuous flexibility, was extraordinary and remains as relevant to hospital design today and the future as ever before.

## **Llewelyn Davies will be represented at the following sessions:**

### **Session 17**

The SNF Global Health Initiative  
The role of the SNF hospitals in Greece's  
healthcare sector

### **Dorchester Library Poster Gallery**

Enhancing CCU healing at St Thomas' Hospital

Robert Etchell (Director)  
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Founding Partner



Illustrative masterplan, Jersey



Concept image, Jersey

**Dear colleagues,**

Faced with the challenges of implementing climate-smart healthcare systems, delivering new service and asset models that strengthen resilience, and creating humanistic environments that promote wellbeing, how do we create self-learning health systems?

The most successful organisations also tend to be the best at learning. They are able to build collective intelligence, continuously refresh it, and make it readily accessible. Ideally, learning becomes embedded in ways of thinking and doing. Conversely, we know that institutional amnesia is wasteful and costly, leading to unnecessary re-invention and repetition of past mistakes.

Celebrating a decade at the vanguard of professional development and bridging the gap between research, policy and practice, the 10th European Healthcare Design Congress will once again welcome the healthcare design community to gather, share insights, and learn from one another: learning from practice, from history, from experiments, from accidents, from success, and from failure. At a time when everyone is talking about the need for system change, but few are able to articulate the path to realising it, our proposition is that when real learning is embedded, systems naturally change for the better.

As we approach the start of this century's second quarter, two factors compel an increased focus on learning. Firstly, we're now acutely aware of the interconnectedness of things. We now think of human beings as composed of billions of organisms, the health of which, or sometimes the lingering presence of which, is critical to general health. Intelligence, learning and communication are at the heart of understanding this interconnectedness. The second factor is the rapidly evolving story of artificial intelligence. AI has been on the edge of debate in healthcare design for many years: for example, through its connection with enabling personalised medicine. Now, AI has embedded itself into our collective consciousness in a new way, with greater focus on both the risks and opportunities it presents for improving health outcomes.

One thing is certain – AI will not succumb to amnesia. But in healthcare, as well as more widely, can we deploy natural intelligence to be as good at learning and remembering? Do we need to rapidly develop better natural intelligence to deal with AI? Not to mention other areas in which learning is urgently needed to address colossal challenges – from delivering climate-smart healthcare systems and net-zero carbon strategies, to delivering new service models that promote quality improvement and strengthen health system resilience, to creating humanistic environments that promote wellbeing and accelerate recovery while supporting patient identity and dignity.

EHD2024 features two days of insightful, provocative and entertaining talks, workshops and panel discussions. Days one and two will open with keynote plenary sessions, before splitting into four streams. Day one will close with an expert panel debate on AI in healthcare, while the final session of day two will be devoted to the EHD2024 Awards ceremony, supported by lead sponsor IHP. All sessions will be streamed virtually for delegates unable to attend in person.

The Congress will also host breakfast/lunchtime workshops, including an interactive art room (pp139-145); a Video+Poster Gallery of innovative research and design projects (pp29-34); an exhibition of design and technology solutions (pp156-170); a Welcome Reception (p39); a Garden Party (p39); and study tours to landmark UK healthcare facilities on 12 June (pp41-43).

Welcome once again to the Royal College of Physicians, London – we hope you enjoy a fantastic Congress.

**SUNAND PRASAD OBE**

EHD Programme Director,  
Architects for Health

**MARC SANSOM MBA**

Director,  
SALUS Global Knowledge Exchange





Thoughtful design  
to improve wellness



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# THE ROYAL COLLEGE OF PHYSICIANS

The 10th European Healthcare Design Congress & Exhibition, 10–12 June 2024, will, once again, be held at the prestigious headquarters of the Royal College of Physicians (RCP) in London.

Since its foundation in 1518, the RCP has had five headquarters in London. The current Grade 1 listed building in Regent's Park was designed by architect Sir Denys Lasdun and opened in 1964. Considered a modernist masterpiece, it's one of London's most important post-war buildings.

In 1992, Sir Lasdun was awarded the Royal Institute of British Architects' Trustee Medal in recognition of his work at the RCP, considered to be "the best architecture of its time anywhere in the world".

Sir Lasdun won the competition to design the new headquarters in 1959. He was surprised at being asked to design for such a traditional body, given his modernist philosophy, and he made it clear that he would not create a classical-style building. Ultimately, he responded to the challenge with a skilful integration of centuries-old traditions and his own vision.

As an award-winning and highly versatile venue for conferences, meetings, banquets, training and outdoor events, the building has an atmosphere of space and light, with stylish, modern architecture and a selection of both old and new styles to suit all tastes.

## The venue offers:

- **A central London location** – overlooking Regent's Park, with good access to road, rail and tube.
- **Magnificent conference and banqueting facilities** – tiered auditoriums, exhibition space, event and dining facilities, including the stunning Council Chamber and the 'jewel in the crown', the Dorchester Library.
- **An award-winning Grade 1 listed modern building** – an atmosphere of space and light with a contrasting mix of old and new facilities.
- **A rare heritage collection** – with 500+ years of history and more than 50,000 antiquarian books.

- **High-quality food and service** – eclectic cuisine, bespoke menus and first-class service.
- **A professional venue for international conferences** – a member of Unique Venues of London, International Association of Conference Centres, and London and Partners, to name a few.
- **A private 'Physic Garden' for events** – filled with rare plants and flowers from all over the world, suitable for barbecues, receptions and al fresco dining.
- **A professional and friendly events team** – dedicated event managers, catering experts and technicians. Full support is provided before, during and following events.





## GROUND FLOOR

### Wolfson Theatre

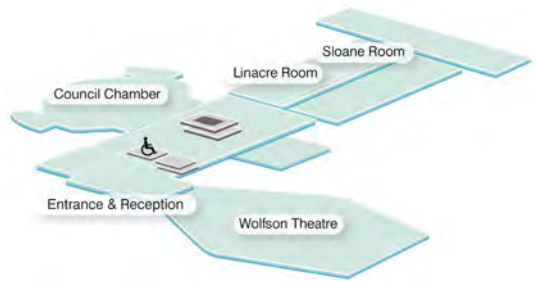
- Main conference plenary sessions, Streams 1 and 5 and the EHD2024 Awards ceremony

### Council Chamber

- Streams 3 and 7 and breakfast and lunchtime workshops

### Linacre and Sloane Room

- Streams 4 and 8



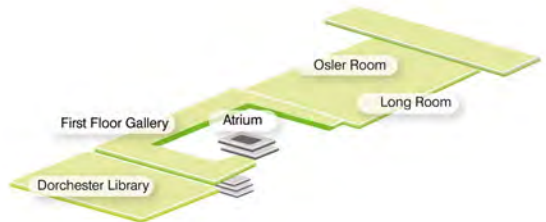
## FIRST FLOOR

### Dorchester Library

- Video+Poster Gallery

### Long Room and Osler Room

- Lunch, exhibition and the Welcome Drinks Reception



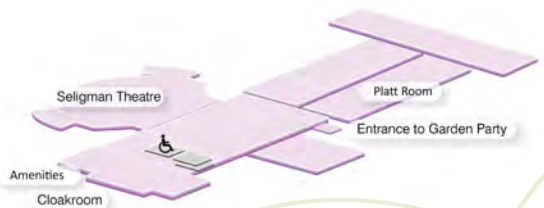
## LOWER GROUND FLOOR

### Seligman Theatre

- Streams 2 and 6 and the EHD2024 Awards Shortlist Gallery

### Platt Room and Garden

- The Art Room and Garden Party



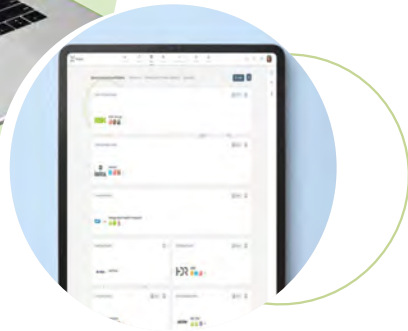


# EHD LIVE ON

Use the EHD2024 app to enhance your event experience: prepare your agenda; connect with colleagues and friends – old and new; explore the exhibition and Video+Poster Gallery; and catch up on recorded talks and sessions. The app will help you discover, connect and engage with attendees at the Congress.

## DOWNLOAD THE APP

The event mobile application is available on both the Google and Apple App Stores. To download it, search for **European Healthcare Design '24** or scan the QR code below. Once downloaded, you'll need to sign into the app using the email address you used when registering for the Congress.

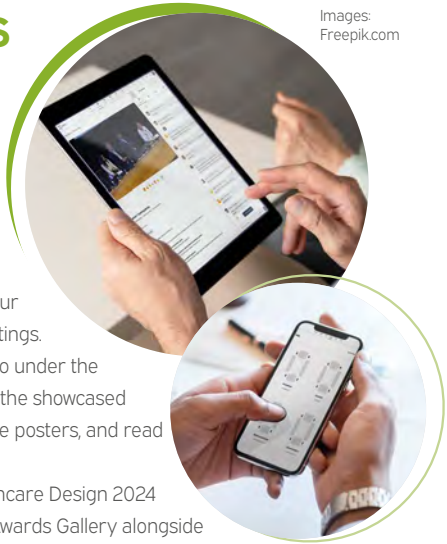




## FUNCTIONS AND FEATURES

Images:  
Freepik.com

- **Watch LIVE sessions** – Through the app, you will be able to watch LIVE sessions and catch up with talks and sessions you may have missed under the 'Agenda' tab.
- **Sponsors, exhibitors and partners** – Under the 'Expo' tab, you can visit sponsors', exhibitors' and event partners' stands to learn more about their latest design innovations, view their videos, download brochures and, if you're interested, share your contact details, or set up in-person and virtual chats and meetings.
- **Video+Poster Gallery** – Explore the Video+Poster Gallery also under the 'Expo' tab. Visit the Video+Poster Gallery to learn more about the showcased design projects, watch short video presentations, download the posters, and read the abstracts.
- **Awards Gallery** – Shortlisted projects for the European Healthcare Design 2024 Awards feature their own poster, which can be viewed in the Awards Gallery alongside recordings of the live judging webinars.
- **People** – Engage with other attendees under the 'People' tab. Filter attendees by specific job roles, sectors, interests and more. From here, you can set up a meeting with other delegates – click on their profile, choose a date and time, and add a personalised message. You can also chat with other attendees by clicking 'CHAT' on their profile.
- **Lounge** – If you're joining the Congress virtually, you still have the chance to connect and network with other delegates in the 'Lounge'. Here, you can pull up a chair at a table to join a video call with other delegates.
- **Schedule** – Create your own personalised schedule based on your interests and meetings and view this in your own personalised agenda at the top of the app.
- **Discussion** – Join in with fellow attendees in a discussion forum and share your thoughts on the Congress streams and topics beyond the Congress.
- Share your involvement with the Congress on social media by using the hashtag #EHD2024 and tagging us on Twitter with the handle @EHDCongress.



The European Healthcare Design 2024 Congress is delivered by SALUS Global Knowledge Exchange in collaboration with Architects for Health and our esteemed international programme committee, the members of which are outlined below. From shaping the Congress themes, to evaluating submission abstracts, to chairing sessions, their knowledge, time and effort are a huge part of the success of the Congress, and we thank them for their contributions.



**Sunand Prasad OBE, PPRIBA**

EHD2024 programme director; AfH;  
Chair, UK Green Building Council; Principal, Perkins&Will, UK



**Tom Best MBE, MD**

Clinical director / intensivist,  
King's College Hospital, UK



**Prof Noemi Bitterman PhD**

Academic director, Masters of Industrial Design (MID),  
Technion, Israel



**Tina Nolan BArch, MBA**

Managing director, director of healthcare strategy + planning, Lexica;  
Health Planning Academy, UK



**John Cole CBE**

Honorary professor,  
Queen's University Belfast, UK



**Göran Lindahl PhD**

Professor, Chalmers University of Technology;  
Director, Center of Healthcare Architecture, Sweden



**Christine Chadwick**

Managing director,  
Archus, Canada



**Sasha Karakusevic BDS, MBA**

Project director, NHS Horizons;  
Senior fellow, Nuffield Trust, UK



**Ganesh Suntharalingam OBE**

Intensivist,  
London North West University Healthcare NHS Trust, UK

**Nirit Pilosof PhD**

Head of research in innovation and transformation,  
Sheba Medical Center; Faculty member, Tel Aviv University, Israel

**David Allison FAIA, FACHA**

Alumni distinguished professor; Director of architecture + health,  
Clemson University, USA

**Harry van Goor MD, PhD**

Professor of surgical education,  
Radboudumc, Netherlands

**Marte Lauvsnes**

Manager, advisory and planning department,  
Sykehusbygg, Norway

**Cemal Sozener MD, EDAC**

Associate professor,  
University of Michigan Medical Center, USA

**Duane Passman**

Director,  
Percipio Consulting, UK

**Davide Ruzzon**

Director of TUNED,  
Lombardini22, Italy

**Karin Imoberdorf Dipl Arch, MPH**

Architect,  
LEAD Consultants, Switzerland

**Rhonda Kerr PhD**

Director, Guidelines and Economists  
Network International, Australia

**Cristiana Caira MArch**

Partner and board director,  
White Arkitekter, Sweden

08.00 REGISTRATION OPENS



**Session 1**

Opening plenary

Chair: **Sunand Prasad**, EHD programme director, Architects for Health, UK

08.45 **Welcome and introduction**

09.00 **Keynote: Innovation in the future hospital**

**Professor Shafi Ahmed**, Surgeon and chief executive officer, Medical Realities, UK

09.30 **Keynote: UNBROKEN: Designing for physical, psychological, and psychosocial rehabilitation in a European war zone**

**Mariana Svirchuk**, Chief executive director, First Medical Union of Lviv; head of project management, UNBROKEN, Ukraine

10.00 **Panel discussion**

10.15 **COFFEE, EXHIBITION AND VIDEO+POSTER GALLERY**



**Session 2**

Transforming health systems and infrastructure:  
Exploring global, community and human perspectives

Chairs: **Sunand Prasad**, EHD programme director, UK; **Sasha Karakusevic**, NHS Horizons, UK

10.45 **Transforming health systems and infrastructure**

**Brian Kowalchuk**, Global design director, HDR, USA

**Brian Niven**, Technical principal, global health, Mott MacDonald, UK

11.00 **Panel 1: Global perspectives panel**

**Panel:** **Prof David Allison**, Director of architecture and health, Clemson University, USA

**Prof Harry Van Goor**, Professor of surgical education, Radboud University Medical Center, Netherlands

**Tania Wee**, Executive director, National University Health System, Singapore

**Kate Copeland**, Chair, Australian Health Design Council, Australia

11.40 **Panel 2: Community and human perspectives**

**Hank Adams**, Global director of health, HDR, USA

**Clare Wildfire**, Global cities lead, Mott MacDonald, UK

**Robby Chibawe**, Chief executive officer, Puntukurnu Aboriginal Medical Service, Australia

**Nicola Bertrand**, Head of architecture and construction, Asklepios Kliniken, Germany

12.20 **Closing remarks**

12.30–  
14.00 **LUNCH, EXHIBITION AND VIDEO+POSTER GALLERY**





**Session 3**

**Next-generation hospitals: Building on what we have learnt**

Chair: **Jim Chapman**, Emeritus professor, Manchester School of Architecture, UK

**14.00 How can we expedite the capital business case development cycle and approvals process?**

**Dr Antonio Weiss**, The PSC, UK

**14.20 The future district general hospital: Harnessing the power of data science for resilient clinical service and space design at the new Leighton Hospital Campus**

**Alison Sanders, Nicola Clemo**, Archus, UK

**Clare Hammell**, Mid Cheshire Hospitals NHS Foundation Trust, UK

**14.40 Smart, safe and efficient use of clinical technology in hospital design**

**Ruth Strickland, Maria Chiekhwafa**, MTS Health, UK

**15.00 Panel discussion**

**15.30 COFFEE, EXHIBITION AND VIDEO+POSTER GALLERY**



**Session 4**

**Evaluating impact and value**

Chair: **Danny Gibson**, MJ Medical, UK

**16.00 Social value in healthcare planning and design**

**Alessandra Leach, Regina Kennedy, Lucy Symons-Jones**, Lexica, UK

**16.15 Post-occupancy evaluation of hospitals in Norway**

**Unni Dahl, Lilian Leistad**, Sykehusbygg HF, Norway

**16.30 Post-occupancy evaluations in practice**

**Gemma Ham, Kate Bradley**, MJ Medical, UK

**16.45 Panel discussion**



**Session 5**

**Closing plenary: The big debate**

Chair: **Sunand Prasad**, EHD programme director, Architects for Health, UK

**17.00– AI in healthcare – Utopia or Dystopia?**

**17.45**

**Indy Joha**, Co-founder, Dark Matter Labs, UK

**Dr Charlotte Refsum**, Director – health policy, Tony Blair Institute, UK

**Dr Nirit Pilosof**, Head of research in innovation and transformation, Sheba Medical Center; Faculty member, Tel Aviv University, Israel

**Dr Paul Barach**, Thomas Jefferson University; University of Birmingham School of Medicine; Imperial College School of Medicine, USA/UK

**18.00– WELCOME DRINKS RECEPTION (Exhibition, Video+Poster Gallery)**

**20.30**

*Osler and Long Room*

Hosted by: Supported by:



Stream 2 begins at 10.45 in the Seligman Theatre, after the day's opening plenary session (08.45-10.15).



## Session 6

**Zero-carbon and regenerative design**  
Chair: Warren Percival, RSK Group, UK

- 10.45 The future of healthcare design will be regenerative**  
Porus Antia, Vanessa Nelson, Dave Cubberly, Stantec, USA
- 
- 11.05 A hospital in a health-food-park – RZ Tienen (Belgium)**  
Tom Debacker, Stephane Vermeulen, VK Architects + Engineers | part of SWECO, Belgium
- 
- 11.25 Sustainable hospitals of the future**  
Jonathan Sylvester, Laura Harrop, Leeds Teaching Hospitals NHS Trust, UK  
Asif Din, Perkins&Will, UK
- 
- 11.45 Designing the US' first all-electric hospital: Key considerations and benefits**  
April Woods, WSP, USA
- 
- 12.05 Panel discussion**
- 
- 12.30–14.00 LUNCH, EXHIBITION AND VIDEO+POSTER GALLERY**

**The Art Room**  
Platt Room and Garden

Organised by:

**Art in Site**

- 14.00–15.30 Improving healthcare environments through person-centred design**  
See page 139 for the full abstract and details on this interactive session.  
**Panel:** Victoria Bates, University of Bristol, UK  
Laura Waters, University Hospitals of Derby and Burton NHS Foundation Trust, UK



**Session 7**  
**Embracing nature, balancing carbon**  
 Chair: Richard Mann, AECOM, UK

**14.00 CIO – nature at the heart of the hospital**

**Erik Cooremans**, archipelago architects, Belgium

**14.20 The first all-mass timber hospital in North America – The Prince Edward County Memorial Hospital**

**Jason-Emery Groen, Jeff Mosher**, HDR Architecture Associates, Canada  
**James Hildebrand**, Quinte Health, Canada

**14.40 Design through life: Humanistic environments for better health and wellbeing**

**Andrew Tempany**, Stephenson Halliday, RSK Group, UK  
**Lynne Houlbrooke**, Stephenson Halliday, RSK Group, Switzerland

**15.00 Panel discussion**

**15.30 COFFEE, EXHIBITION AND VIDEO+POSTER GALLERY**



**Session 8**  
**Modern methods for energy and construction**  
 Chair: Victoria Head, Archus, UK

**16.00 Passivhaus community healthcare: Lifetime operational savings for no additional cost**

**Bob Wills**, Medical Architecture, UK  
**Mark Barry**, Architype, UK

**16.20 Optimising solutions and bringing forward benefits – modular construction should be considered at the outset of every significant healthcare building project**

**Chris Blackwell-Frost**, Vanguard Healthcare Solutions, UK

**16.40–17.00 Panel discussion**

*Stream 2 will be brought to a close at 17.00, whereupon delegates are invited to return to the Wolfson Theatre for the day's closing plenary session (17.00–17.45).*

Stream 3 begins at 10.45 in the Council Chamber, after the day's opening plenary session (08.45–10.15).



### Session 9

**Clinical engagement: Learning across expertise**

Chair: **Dr Ganesh Suntharalingam**, London North West University Healthcare NHS Trust, UK

**10.45** **When clinical engagement becomes a necessity**

**Dr Clare Simcock, Dr Emma Stockton, Dr Lucy Waller**, Great Ormond Street Hospital NHS Foundation Trust, UK

**11.05** **Healthcare design education for medical directors: Mitigating communication gaps between stakeholders**

**Dr Nirit Piloosof**, Sheba Medical Centre; Tel Aviv University, Israel

**11.25** **Monklands Replacement Project: An adaptive strategy for future healthcare delivery**

**Graeme Reid, Donna McHenry**, NHS Lanarkshire, UK  
**Suzanne Tighe**, Keppie Design, UK

**11.45** **Problems and potential solutions for operating room environments in the USA**

**Dr Zhipeng Lu**, Texas A&M University, USA

**12.05** **Panel discussion**

**12.30–14.00** **LUNCH, EXHIBITION AND VIDEO+POSTER GALLERY**

**12.45–13.50** **Lunchtime design workshop:  
Design innovation in healthcare furniture**

See page 141 for the full abstract on the issues that will be discussed in this workshop.

**Panel: Rose Jago, Andrew Bertram**, MJ Medical, UK

Organised by:

**mjmedical**





### Session 10

Emergency care: Designing in agility and resilience

Chair: Dr Tom Best, King's College London, UK

**14.00 SEM headquarters: Transformative agility in healthcare infrastructure**

Eric Trillo, AECOM, Spain

**14.20 Keeping the machine running: Optimising resource allocation during phased construction**

Alex Griffin, Adrienne Erdman, EwingCole, USA

**14.40 Environmental barriers to safe and effective care for children with mental and behavioural health conditions in the emergency department**

Dr Anjali Joseph, Clemson University, USA

Professor Meera Narasimhan, Prisma Health; University of South Carolina, USA

**15.00 Panel discussion**

**15.30 COFFEE, EXHIBITION AND VIDEO+POSTER GALLERY**



### Session 11

Design innovation in children's hospitals

Chair: Harry van Goor, Radboudumc, Netherlands

**16.00 Learnscape hospital: Fostering patient empowerment through knowledge and transparency**

Dr Thomas Vraetz, Department of Paediatrics and Adolescent Medicine, Medical Center, University of Freiburg, Germany

Dr Charlotte M. Niemeyer, Initiative für Unsere Kinder- und Jugendklinik, University of Freiburg, Germany

Monika Purschke, Albert Wimmer ZT, Austria

**16.20 Translational research – designing for bench-to-bedside clinical care. A case study of the Sydney Children's Hospital Stage 1 and Minderoo Children's Comprehensive Cancer Centre**

Tara Veldman, Billard Leece Partnership, Australia

Kiri Collins, Children's Cancer Institute, Australia

**16.40–17.00 Panel discussion**

*Stream 3 will be brought to a close at 17.00, whereupon delegates are invited to return to the Wolfson Theatre for the day's closing plenary session (17.00–17.45).*

*Stream 4 begins at 10.45 in the Linacre and Sloane Room, after the day's opening plenary session (08.45-10.15).*



## Session 12

**Curing cancer by design**

Chair: **John Cooper**, JCA, UK

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### 10.45 **Curing cancer in the Middle East: A global approach**

**Catherine Zeliotis**, Stantec, UK

**Shams Rafik Maladwala**, Dubai Health, UAE

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### 11.05 **Outside the box – an innovative approach to vault design and the evolution of the radiation oncology environment**

**Sapna Bhat**, Perkins&Will, USA

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### 11.25 **Making the most of what we have: Fox Chase Cancer Center's transformation**

**Haley Driscoll**, NORR, USA

**Joel Helmke**, Temple University Health System, USA

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### 11.45 **The Christie Paterson Laboratories redevelopment in Manchester – a connected approach to cancer services**

**Matthew Hird**, BDP, UK

**James Chimeura**, Arup, UK

**Stuart Pepper**, CRUK, UK

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### 12.05 **Panel discussion**

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### 12.30–14.00 **LUNCH, EXHIBITION AND VIDEO+POSTER GALLERY**

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### Session 13

Humanising mental health environments

Chair: Brenda Bush-Moline, Stantec, USA

#### 14.00 **A shift in safety: Danish insights for shaping the future of mental and behavioural health design**

Madilyn DuBois, HKS, USA

Professor David Allison, Clemson University, USA

Hanne Kristiansen, Psykiatrien i Region Syddanmark, Denmark

#### 14.20 **Designing for mental health – the second wave of de-institutionalisation**

Codey Lyon, AECOM, Australia

Nick Bourns, NH Architecture, Australia

#### 14.40 **Designing hope: Learning from neuroscience to address the behavioural health crisis**

David Lewis, NBBJ, UK

#### 15.00 **Panel discussion**

#### 15.30 **COFFEE, EXHIBITION AND VIDEO+POSTER GALLERY**



### Session 14

Evaluating mental health design

Chair: Lianne Knotts, Medical Architecture, UK

#### 16.00 **A retrospective view of mental health design: What works, what doesn't and why?**

Teva Hesse, 4D Studio, UK

#### 16.20 **Small is beautiful: A flexible and empowering specialist eating disorders unit**

Rosemary Jenssen, Jenssen Architecture, UK

Laura Delgado, Medical Architecture, UK

#### 16.40– 17.00 **Panel discussion**

*Stream 4 will be brought to a close at 17:00, whereupon delegates are invited to return to the Wolfson Theatre for the day's closing plenary session (17:00–17:45).*

08.00 REGISTRATION OPENS



**Session 15**

Opening plenary, day two

Chair: Chris Liddle, HLM Architects, UK

08.45 Welcome and introduction

09.00 A different kind of public-private partnership in the health sector

This keynote session will present the story of Stavros Niarchos Foundation's \$1 billion Global Health Initiative and the role that philanthropy can play in future health projects.

**Panel:** Panos Papoulias, Chief operating officer, Stavros Niarchos Foundation, Greece  
Elianna Konialis, SNF Health Initiative, Grant manager, Stavros Niarchos Foundation, Greece  
Marios Themistocleous, Deputy Minister of Health, Hellenic Ministry of Health, Greece  
Mark Carroll, Architect, partner; Raffaella Parodi, Architect, associate, Renzo Piano Building Workshop, Italy

10.15 COFFEE, EXHIBITION AND VIDEO+POSTER GALLERY



**Session 16**

Innovation in hospital design: Lessons of scale

Chair: Michèle Wheeler, Lexica, UK

10.45 Ageing populations, pandemic preparedness, and construction standardisation:  
Three innovations from the Alexandra Hospital project, Singapore

Matthew Holmes, Jacobs, Australia/Singapore

11.05 The AIIMS, New Delhi, redevelopment mega-project: Pioneering new solutions in  
healthcare design

Greg Mare, AECOM, USA

Dr Randeep Guleria, Institute of Internal Medicine, Respiratory & Sleep Medicine, India

11.25 The healing power of place – New Footscray Hospital

Paul Curry, Patrick Ness, Cox Architecture, Australia

11.45 Building a naturally smart healing environment: Lessons from a pandemic era

Stuart Elgie, DIALOG, Canada

Ian McDermott, University Health Network, Canada

12.05 Panel discussion

12.30– LUNCH, EXHIBITION AND VIDEO+POSTER GALLERY

14.00





**Session 17**  
**Hospital functions and architectural form**  
 Chair: Jaime Bishop, Architects for Health, UK

**14.00 Holistic healing and the hospital as city**

**Alfonso Miguel Caballero**, Herzog & de Meuron, Switzerland

**14.20 The SNF Global Health Initiative – the role of the SNF hospitals in Greece’s healthcare sector**

**Moritz Spellenberg**, Llewelyn Davies, UK  
**Deirdre Foley-Woods**, Lexica, UK

**14.40 Embracing the circle: Realising functional efficiencies in contemporary hospital design**

**Mungo Smith**, MAAP Architects, Australia  
**Paul Yeomans**, Medical Architecture, UK

**15.00 Panel discussion**

**15.30 COFFEE, EXHIBITION AND VIDEO+POSTER GALLERY**



**Session 18**  
**System transformation by design**  
 Chair: Nicola Bertrand, Asklepios, Germany

**16.00 Innovative vision to transform healthcare in Jordan**

**Rachelle McDade**, Currie & Brown, UK  
**Oana Gavrilu**, Perkins&Will, UK  
**Eiad Haddadin**, Reine Chaccour, DAR, Jordan  
**Dr Mahmoud Sarhan**, Professor, oncology and stem cell transplantation, Jordan

**16.20 A building designed as a chapter in a lifelong patient relationship: Mercy Center for Performance Medicine and Specialty Care**

**Michael Pukszta**, CannonDesign, USA  
**Charis Trost**, Mercy, USA

**16.40–17.00 Panel discussion**



**Session 19**  
**Closing plenary and awards**  
 Chair: Jaime Bishop, Architects for Health, UK

**17.00 European Healthcare Design Awards 2024**

Presented by: Jaime Bishop, Architects for Health, UK

Supported by  
 (Lead Partner):



**17.45–18.00 Closing address**

**Sunand Prasad**, EHD programme director; Architects for Health, UK

**18.30–22.00 GARDEN PARTY AND LIVE MUSIC**

Supported by:



Stream 6 begins at 10.45 in the Seligman Theatre, after the day's opening plenary session (08.45-10.15).



## Session 20

The art and science of design

Chair: Paul Bell, Ryder Architecture, UK

### 10.45 **Obstacles to research translation: Piloting a new method to advance healthcare environments research**

Dr Rebecca McLaughlan, The University of Sydney, Australia

### 11.05 **The Space Kit approach: Ensuring evidence-based design knowledge uptake in large-scale complex building programmes**

Dr Peter-Willem Vermeersch, archipelago architects and KU Leuven, Belgium

Kris Loix, archipelago architects, Belgium

### 11.25 **Patterns for wellbeing**

Roddy Langmuir, Cullinan Studio, UK

### 11.45 **Case studies of experiential design: Supporting the mind before the body to stimulate the healing process**

Hala El Khorazaty, Amy Sickeler, Perkins&Will, USA

### 12.05 **Panel discussion**

### 12.30– **LUNCH, EXHIBITION AND VIDEO+POSTER GALLERY**

14.00

## The Art Room

Platt Room and Garden

Organised by:

**Art in Site**

### 10.45– **Sensory hospitals. Are they the future?**

12.00

See page 139 for the full abstract and details on this interactive session.

**Panel:** Peter Shenai, Louisa Williams, Martin Jones, Art in Site, UK

Paola Rozo, Artist, UK; Freddie Denham Webb, Director, Father, UK

### 14.00– **National Arts in Hospitals Network**

15.00

See page 139 for the full abstract and details on this interactive session.

**Panel:** Laura Waters, University Hospitals of Derby and Burton NHS Foundation Trust, UK

Ruth Charity, Oxford University Hospitals NHS Foundation Trust, UK



### Session 21

#### Workforce and wellbeing

Chair: **Dr Paul Barach**, Thomas Jefferson University; University of Birmingham School of Medicine; Imperial College School of Medicine, USA/UK

**14.00 Nurse burnout: A social listening study investigating the environmental factors contributing to the nursing crisis**

**Dr Deborah Wingle**, HKS, USA

**14.20 Applying and measuring design for staff wellbeing**

**Sophie Crocker, Michael Woodford**, White Arkitekter, UK

**14.40 Structurally embedding spaces for emotive conversations in hospital setting: Lessons from the Three Little Pigs**

**Dr Gareth Drake**, Great Ormond Street Hospital, UK

**15.00 Panel discussion**

**15.30 COFFEE, EXHIBITION AND VIDEO+POSTER GALLERY**



### Session 22

#### Transforming healthcare environments through the arts

Chair: **Vivienne Reiss**, Arts consultant, UK

**16.00 Art in healthcare environments: A comprehensive review of methodologies and patient perspectives**

**Darya Palityka, Dr Evangelia Chryssikou**, University College London, UK

**16.20 Children's day surgery: Transforming a daunting journey into the happiest of memories**

**Peter Shenai, Louisa Williams**, Art in Site, UK

**Liz O'Sullivan**, Guy's & St Thomas' NHS Foundation Trust, UK

**16.40-17.00 Panel discussion**

*Stream 6 will be brought to a close at 17.00, whereupon delegates are invited to return to the Wolfson Theatre for the day's closing plenary session (17.00-18.00).*

07.30–  
08.45 **Breakfast design workshop:  
Transformative military healthcare design –  
operating for military readiness**

See page 143 for the full abstract on the issues that will be discussed in this workshop.

**Panel:** Burkhard Musselmann, HDR, Germany  
Simon Trumble, David Kurten, Susana Erpestad, HDR, USA  
Christopher Kiss, Defense Health Agency, USA

Organised by:



*Stream 7 begins at 10.45 in the Council Chamber, after the day's opening plenary session (08.45–10.15).*



**Session 23**  
Design for remote and rural communities  
Chair: Jason-Emery Groen, HDR, Canada

10.45 **A new standard for Aboriginal primary healthcare: Post-occupancy data and experience from PAMS Healthcare Hub Newman**

David Kaunitz, Kaunitz Yeung Architecture, Australia  
Robby Chibawe, Puntukurnu Aboriginal Medical Service, Australia

11.05 **Designing with Country**

Julian Ashton, Kirstie Irwin, BVN, Australia

11.25 **Reconciliation and a net-zero carbon future: The new Cowichan District Hospital aims to give back to the people and the land it will serve**

Cameron Shantz, Shane Czyzyha, Parkin Architects, Canada  
Meagan Webb, H.H. Angus & Associates, Canada

11.45 **Redesign of adult health and social care services in Caithness**

Charlie McQuilkin, NORR, UK  
Nick Peaker, NORR, UK

12.05 **Panel discussion**

12.30–  
14.00 **LUNCH, EXHIBITION AND VIDEO+POSTER GALLERY**

12.45–  
13.50 **Lunchtime design workshop:  
Design standardisation vs innovation: Finding the right balance**

See page 145 for the full abstract on the issues that will be discussed in this workshop.

**Chair:** Matthew Holmes, Jacobs, Australia/Singapore  
**Panel:** Stephen Farrington Bell, PA Consulting, UK  
Jane McElroy, NBBJ, UK  
Dr Tom Best, King's College Hospital, UK  
Fiona Daly, NHS England, UK

Organised by:



**Session 24****Cross-generational design**

Chair: Professor David Allison, Clemson University, USA

**14.00 Ageing Right Care(fully): A comparative study of ageing in place and hospital care at home in the Netherlands, Israel, and Sweden**

Dr Jodi Sturge, University of Twente, Netherlands

Dr Susanna Nordin, University of Dalarna, Sweden

Dr Nirit Pilosof, Sheba Medical Centre; Tel Aviv University, Israel

**14.20 "oase.kleinbasel": A cross-generational care site combining hospice care for children and adolescents with dementia care**

Dr Minou Afzali, Swiss Center for Design and Health, Switzerland

Sabrina Gröble, Bern University of Applied Sciences, Switzerland

**14.40 Health House: Case study of Rijnstate Hospital in Elst**

Femke Feenstra, Gortemaker Algra Feenstra, Netherlands

**15.00 Panel discussion****15.30 COFFEE, EXHIBITION AND VIDEO+POSTER GALLERY****Session 25****Delivering integrated care**

Chair: Alice Green, Arcadis, UK

**16.00 Improved quality of life: The positive impact of a pioneering integrated care centre**

Paul Yeomans, Medical Architecture, UK

Erica Daley, NHS Humber and North Yorkshire Integrated Care Board, UK

**16.20 Castleford Integrated Health Hub – a catalyst for regeneration and Integrated local health system**

Patrick Kelly, Phil Bentley, P+HS Architects, UK

**16.40–17.00 Panel discussion**

*Stream 7 will be brought to a close at 17.00, whereupon delegates are invited to return to the Wolfson Theatre for the day's closing plenary session (17.00–18.00).*

Stream 8 begins at 10.45 in the Linacre and Sloane Room, after the day's opening plenary session (08.45–10.15).



## Session 26

### Design innovation in a living lab

Chair: **Göran Lindahl**, Chalmers University of Technology; Center of Healthcare Architecture, Sweden

**10.45** **One health system's journey of creating a culture of innovation: A living lab initiative for implementation of an extensive prototyping and testing process**

**Dr Deborah Wingler**, HKS, USA  
**Sumandeep Singh, David Huang**, HKS, Singapore

**11.05** **Outcomes from the NOVELL method: A living lab for rethinking rehabilitation design and services**

**Dr Ruby Lipson-Smith**, MARCS Institute of Brain, Behaviour and Development, Western Sydney University; The Florey Institute of Neuroscience and Mental Health, Melbourne, Australia  
**Dr Mark Lam**, School of Architecture and Design, Swinburne University of Technology; The University of Melbourne, Australia  
**Dr Marcus White**, Spatio-Temporal Research Urban Design and Architecture Lab; CDI School of Design; Swinburne University of Technology, Australia  
**Tianyi Yang**, Swinburne University of Technology, Australia  
On behalf of the NOVELL Redesign Collaboration

**11.25** **From VR to digital twin reality: Pioneering a human and experience-centric approach to healthcare architecture design**

**Mohammed Ayoub**, HDR, USA  
**Sarah Al Nashwan**, Almoosa Group, Saudi Arabia

**11.45** **Maximising end-user design for digitally advanced hospitals**

**Jon Reeve, Kevin Sureshkumar**, Spanswick, UK

**12.05** **Panel discussion**

**12.30–14.00** **LUNCH, EXHIBITION AND VIDEO+POSTER GALLERY**

**Session 27****Robotics in healthcare**Chair: **Jonathan Erskine**, European Health Property Network, UK**14.00 Logistic robots: Workforce shortage relief?****Levina Siswanto**, Independent, UK**Patrick Kershaw**, MJ Medical, UK**14.20 Home-based smart technology for improving gait in people with Parkinson's Disease in domestic space: A case study for domestic assistive smart technology****Professor Noemi Bitterman**, Technion, Israel**14.40 How robot interventions could support people with frailty in overcoming physical barriers in their homes****Dr Evangelia Chryssikou**, University College London, UK**15.00 Panel discussion****15.30 COFFEE, EXHIBITION AND VIDEO+POSTER GALLERY****Session 28****AI-powered healthcare**Chair: **Christopher Shaw**, writer and commentator, UK**16.00 The robot will see you now: Reimagining AI in the healthcare landscape****Sophie Lansbury**, Lexica, UK**Kevin Sureshkumar**, Spanswick, UK**16.20 AI-driven cancer detection and care: Bridging the AI learning gap for rural communities towards the equity of access to healthcare****Christine Chadwick**, Archus, Canada**David Nicholson**, Tektology, UK**16.40–17.00 Panel discussion**

*Stream 8 will be brought to a close at 17.00, whereupon delegates are invited to return to the Wolfson Theatre for the day's closing plenary session (17.00–18.00).*




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## **Ambulatory Diagnostic Centre (ADC), West Middlesex University Hospital**

Our integrated design team are  
transforming community healthcare  
and outcomes by doubling diagnostic  
capacity for the local community.

An architectural rendering of a modern, multi-story healthcare building with a curved facade and large windows. The building is surrounded by greenery and trees. A few people are visible walking near the entrance.

Hosted in the Royal College's historic Dorchester Library, the Video+Poster Gallery offers delegates the chance to learn about many wonderful research projects and design schemes, enriching the oral presentations taking place across the two days.

Supported by AECOM, the Video+Poster Gallery is a great place to spend time during the coffee breaks, lunch, and in the early morning before the Congress sessions begin.

Each poster is accompanied by a five-minute pre-recorded video by the authors, telling the narrative of the poster and bringing it to life. The videos are accessible on the mobile app and event platform (see p8 to download, go to 'Expo' and then Video+Poster Gallery), so delegates can watch the video on their own personal device as they view each poster, and then message and connect with the authors using the chat function in the app, if they wish to learn more.

Posters of the shortlisted projects for the European Healthcare Design Awards (see pp36-37; and pp45-56) will also be on display on the lower ground floor.

**P01 Engaging clinical stakeholders during the design process using simulation-based evaluation: A multi-phase evaluation of the patient room bathroom**

Anjali Joseph; David Allison, Clemson University, USA; Christi R Cornelius, Indiana University Health, USA; Teresa K Gibbs, Indiana University Health, USA

**P02 Dual-purpose emergency department: Cairns South Health Facility, Queensland**

Rebecca Johnston, Peddle Thorp, Australia

**P03 Prototype for a rural primary healthcare centre in Paraguay**

Maria Virginia Matiauda Schneider, healthcare architect, independent, Paraguay

**P04 How can new hospital programmes learn from national clinical transformation programmes to balance bottom-up and top-down transformation, and deliver locally owned, nationally supported improvement?**

Nicole Samuel, Samuel Rose, Joe Cruden, Chris Bradley, The PSC, UK

**P05 A 'clean room' approach to operating room design: A case study in the Netherlands**

Remko Noor, Maximuse, Netherlands

**P06 Digital hospitals – enabling designs that enhance patient care**

Jonathan Sylvester; Laura Harrop, Leeds Teaching Hospitals NHS Trust, UK

**P07 Design and optimisation of facilities for radioligand therapy – a 'game-changer' for cancer treatment**

Ziad Ben El Kadhi, NUVIA, France; Jason Gibbins, IHP VINCI Building, UK; David Price, NUVIA, UK

**P08 Health Hub Vienna: Vienna as a healthy and smart city**

Albert Wimmer, Semir Zubcevic, AWZT, Austria

**P09 Designing a habilitation centre – a multidisciplinary collaboration**

Oana Dumitrache, Jennie Bergman, Catherine Hugosson, Malin Caeser, Liljewall Arkitekter, Sweden

**P10 Zierik7 research**

Femke Feenstra, Gortemaker Algra Feenstra, Netherlands

**P11 BIJ ONS Method – creating ‘home’ in nursing homes**

Femke Feenstra, Gortemaker Algra Feenstra, Netherlands

**P12 The Live Well Campus concept**

Katherine Mathew, East Riding of Yorkshire Council, UK; Phil Bentley, P+HS Architects, UK

**P13 Designing efficient healthcare facilities – caring about the people who live and work within it**

Ulrika Olsson, Hans Lingegård, Arjo, Sweden

**P14 Maternity wards – smART delivery**

Martha MacKinnon, Martin Anderson, P+HS Architects, UK

**P15 Protected elective treatment – a design to reduce the waiting backlog**

Derek Shepherd, Sharon Cook, P+HS Architects, UK

**P16 An architectural validated tool for measuring institutionalisation in psychiatric wards and cross-country comparison results**

Evangelia Chryssikou, University College London, UK

**P17 An improved framework for inclusive public-patient involvement in healthcare infrastructure planning**

Clare Fitzgerald, Caroline Ivory, Deborah Hutton, Archus, Ireland

**P18 Synthesising stories of a multicultural community – empowering consumers to co-create healthcare environments that are meaningful to all**

Mark Mitchell, Tonya Hinde, Billard Leece Partnership, Australia; Julia Beckinsdale, Victorian Health Building Authority, Australia

**P19 Rethinking operating theatre suite design to reduce energy and achieve net-zero carbon**

Anne Symons, Ian Eames, University College London, UK; Jonathan Groome, The Royal London Hospital, UK; Remko Noor, Maximuse, Netherlands



Image: Freepik.com

- P20 The Ageing Well Village – a holistic approach for healthy communities**  
Katie Shepherd, Sharon Cook, P+HS Architects, UK
- 
- P21 Self-learning healthcare system: A design diagnostic research approach**  
Sophia Hami, Jane Ho, HKS, UK
- 
- P22 May the art be with you – an art space hospital**  
Monika Purschke, AWZT, Austria; Richard Klinger, Architects Collective, Austria
- 
- P23 The benefits of reflective practice (learning from nursing theory)**  
Ellie Richardson, Guy's & St Thomas' NHS Foundation Trust, UK
- 
- P24 Indigenous engagement as a self-learning system**  
Tracy Lord, Billard Leece Partnership, Australia; Liam Harte, GIRA, Australia
- 
- P25 Urgent design for emergency care**  
Tom Potter, P+HS Architects, UK; Jug Johal, Northern Lincolnshire and Goole NHS Foundation Trust, UK
- 
- P26 The beauty and challenges of AI tech in healthcare design**  
Hala El Khorazaty, Kalpana Kuttaiah, Amy Sickeler, Perkins&Will, USA
- 
- P27 Lightworks: Combining art and luminosity to improve patient sleep cycles, recovery and mood**  
Peter Shenai, Martin Jones, Art in Site, UK
- 
- P28 Design for healthy and active ageing: Understanding physical activity, social activity, and fall prevention in long-term care facilities**  
Xuemei Zhu, Seokyung Park, Hanwool Lee, Zhpeng Lu, Chanam Lee, Julian Benesch, Kaitlyn Higgins, Marcia Ory, Texas A&M University, USA
- 
- P29 Interruptions in trauma rooms during resuscitation: The role of the physical environment**  
Sara Bayramzadeh, Mary Anthony, Kent State University, USA
- 
- P30 A bold art strategy for a hospital of the future**  
Alec Musson, Leeds Teaching Hospitals NHS Trust, UK; Peter Shenai, Art in Site, UK
- 
- P31 Designing spaces for health celebration and gender-inclusive design**  
Marta Czachorowska, m+design, Poland
- 
- P32 Plans are worthless, but planning is everything (Dwight D Eisenhower)**  
Regina Kennedy, Lexica, UK; Peter Ward, Guy's and St Thomas' NHS Foundation Trust, UK
- 
- P33 Transforming inpatient care: Addressing gaps in optimal mental health treatment through regional collaboration and investment**  
Sandra Reading, Archus, UK; Mark Barriball, Devon Partnership Trust, UK; Anita White, Grainge Architects, UK; Lee Edwards-Smith, Kier Construction, UK
- 
- P34 How can the New Hospital Programme enable clinical reconfiguration to deliver sustainable services that meet population needs?**  
Nicole Samuel, Ellie Lane, Samuel Rose, The PSC, UK
- 
- P35 A kaimahi-focused approach to laboratory redesign**  
Natalie Parke, Iuliia Sankova, Nicola Ross, Auckland Hospital – Te Whatu Ora, New Zealand

**P36 Creating resilient, flexible and sustainable clinical casework fit for 21st-century healthcare**

Gerard Baxter, Hygenius, UK

**P37 Examples of use of colours and materials in environments for dementia**

Ahmed Sabri, Eric Berteau, Gerflor, France; Andy Gordon, Gerflor, UK

**P38 The contribution of patient experience design towards a more sustainable healthcare**

Eric Trillo, AECOM, Spain

**P39 Stoke Mandeville Hospital: An artistic transformation of children's and women's services**

Peter Shenai, Martin Jones, Chloe Northover-Naylor, Art in Site, UK

**P40 Learning, collaborating, improving: The Altnagelvin Hospital Refurbishment – a new lease of life**

Gonzalo Vargas, TODD Architects, UK

**P41 Harmony in healing: A paradigm shift in approaching healthcare design**

Frank Panici, NORR Architects & Engineers, Canada; Siamak Hariri, HPA Architects, Canada

**P42 Enhancing CCU healing at St Thomas' Hospital**

Christina Andersen, Guy's & St Thomas' NHS Foundation Trust, UK; Moritz Spellenberg, Llewelyn Davies, UK

**P43 The devil is in the details: Using data to inform healthcare estate configuration**

Anya Shah, Reece Philliskirk, Regina Kennedy, Lexica, UK

**P44 Neurodivergent design by default**

Gareth Banks, AHR Architects, UK; Martin Jones, Art in Site, UK; Karen Breese, Shrewsbury and Telford Hospital NHS Trust, UK

**P45 Improving value in healthcare: What truly matters**

Bernadette Bhakti, Regina Kennedy, Lexica, UK

**P46 Enhancing spatial user experience at a supervised safe consumption site adopting a user-defined design strategy – speculative design theory approach**

Swati Katyarmal, SK Architects India; OCAD University, Canada; Gurjap Deol, ScribeCanada Healthcare, Canada; Rayhaan Yehiya, OCAD University, Canada; Anna Nowacki, University Health Network, Canada

**P47 Healthcare technologies and space: Therapeutic built environment as a health technology according to the WHO definition**

Evangelia Chrysikou, University College London, UK

**P48 What we need is a revolution! Redefining healthcare design: Embracing WELL standards and humanistic principles for societal wellness**

Rachel Vig, Sada Studio, UK

**P49 Re-evaluating service user representation and PoE in (maternity) hospital design**

Sarah Joyce, University of Leeds, UK





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**P50 Exploring visual connectivity in stroke rehabilitation through virtual reality**

Tianyi Yang; Mehrnoush Latifi, Swinburne University of Technology, Australia; Marcus White, Spatio-Temporal Research Urban Design and Architecture Lab, CDI School of Design, School of Architecture and Design, Swinburne University of Technology, Australia; Ruby Lipson-Smith, MARCS Institute of Brain, Behaviour and Development, Western Sydney University; The Florey Institute of Neuroscience & Mental Health, Australia; On behalf of the NOVELL Redesign Collaboration, Australia

**P51 Castleford Integrated Health Hub – a catalyst for regeneration and integrated local health system**

Patrick Kelly, Phil Bentley, P+HS Architects, UK

**P52 Equipment planning: Business as usual**

Jill Baker, MJ Medical, UK

**P53 The impact of medical equipment on net-zero carbon**

Ruth Strickland, Maria Chiekhwafa, MTS Health, UK

**P54 Designing efficient healthcare facilities – caring about the people who live and work within it**

Ulrika Olsson, Hans Lingegård, Arjo, Sweden

**P55 Simulation-based hospital design testing through extended reality**

Minou Afzali, Jan Eckert, Rahel Inauen, David Wollschlegel, Swiss Center for Design and Health, Switzerland



Image:  
Freepik.com

**P56 Optimising environments and spaces to support clinical service planning strategies**

Lara Kaiser, Perkins&Will, Brazil

**P57 Elevating Maastricht University Medical Center as a self-learning healthcare system: A design diagnostic research approach**

Peyton Fort, Sophia Hami, Deborah Wingler, HKS, USA



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## Healthcare Design (Over 25,000 sqm)

- A01** Glasblokkene at Haukeland University Hospital, Norway
- A02** Louisa Martindale Building, UK
- A03** University Children's Hospital Freiburg, Germany

## Healthcare Design (Under 25,000 sqm)

- A04** The Catkin Centre and Sunflower House, UK
- A05** Helmsley Cancer Center, Israel
- A06** Oak Cancer Centre, UK
- A07** Yutjuwala Djiwarr – Nhulunbuy Flexible Aged Care, Australia

## Future Healthcare Design

Category sponsor:



- A08** Cavell Passivhaus Community Health and Wellbeing Hub, UK
- A09** Children's Cancer Centre, Great Ormond Street Hospital (GOSH), UK
- A10** Cluj Napoca Children's Hospital, Romania

## Design for Health and Wellness

- A11** Helmsley Cancer Center, Israel
- A12** Sinai Health – Circle of Care: Adult Day Program, Canada
- A13** Yutjuwala Djiwarr – Nhulunbuy Flexible Aged Care, Australia

## Interior Design and Arts

- A14** Louisa Martindale Building, UK
- A15** Oak Cancer Centre, UK
- A16** Psychological and Mental Health Services (PAMHS Unit), GOSH, UK

## Mental Health Design

- A17** Aspen Wood – Low Secure Learning Disabilities Unit, UK
- A18** Kimmeridge Court, UK
- A19** Montage Health Ohana Center for Child and Adolescent Behavioral Health, USA
- A20** Stella's Place Young Adult Mental Health, Canada

## Design for Adaptation and Transformation

- A21** 18 Mole Business Park, UK
- A22** Chengdu Gleneagles Hospital, China
- A23** Doctor Muñoz Cariñanos Hospital, Spain
- A24** Sinai Health – Circle of Care: Adult Day Program, Canada

## Design for Health and Life Sciences

- A25** BCIT Health Sciences Centre, Canada
- A26** The Christie Paterson Redevelopment, UK
- A27** Oak Cancer Centre, UK

In collaboration with:



## Design for Sustainable Development

- A28** The Jean Bishop Integrated Care Centre, UK
- A29** Omagh Hospital and Primary Care Complex (OHPCC), UK
- A30** Wexham Park Hospital Redevelopment, UK

## Design Research Project

Category sponsor:



- A31** Blueprint for mitigating nurse burnout: A social listening perspective
- A32** Revolutionising digital engagement: Effects of an app enabling persons with dementia to lead activities for peers

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## WELCOME DRINKS RECEPTION

The Welcome Drinks Reception takes place immediately after the close of the first day's proceedings on the evening of Monday 10 June, in the Osler and Long Rooms, offering a fantastic chance to network and unwind.

The European Healthcare Design 2024 exhibition will also be open during the Welcome Drinks Reception. Throughout the evening, a jazz trio from the Royal Academy of Music will provide a captivating musical performance.

The Welcome Drinks Reception will be hosted by Architects for Health, which has co-organised the Congress since its inception in 2015. Since 1992, Architects for Health has been a forum for sharing best practice, knowledge, innovation and thought leadership relating across the healthcare built environment. Today, its membership is open to all who share its aims, not just architects. Its work reaches across the UK and internationally in equal measure: it is a world leader in promoting healthcare design and it proudly partners with SALUS Global Knowledge Exchange to present the European Healthcare Design Congress.

Hosted by: Supported by:

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**Venue:** Osler and Long Rooms

**Date:** Monday 10 June

**Time:** 18.00–20.30



## GARDEN PARTY

Held outside in the informal surroundings of the medicinal gardens of the Royal College of Physicians, the Garden Party will immediately follow the end of the Congress and the European Healthcare Design Awards ceremony, giving delegates the chance to celebrate with the winners.

Opened in 1965, the medicinal gardens were extensively replanted in 2005–06, thanks to a generous grant from the Wolfson Foundation, and they now feature more than 1300 plants.

Throughout the evening, a jazz quartet from the Royal Academy of Music will give a captivating musical performance. Featuring spectacular garden lighting, lanterns and candles, the Garden Party will offer a great opportunity at the close of the Congress to network and socialise, and enjoy the British summer!

To reflect the surroundings, and as a relaxing end to an intense two days of Congress activity, the dress code will be smart casual, with delegates treated to a gourmet barbecue buffet dinner and drinks.

**Venue:** Medicinal Gardens

**Date:** Tuesday 11 June

**Time:** 18.30–22.00



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Participants in the European Healthcare Design 2024 Congress get the opportunity to choose one of three study tours featuring some of the UK's latest benchmark healthcare projects and architectural landmarks. All tours are now fully booked.

## Study tour 1: Brighton

**Departure point:** Melia White House Hotel Lobby

**Date:** 12 June 2024

**Time:** 06.45–18.30

### Louisa Martindale Building (Brighton 3Ts Phase 1)

BDP's multidisciplinary team, in collaboration with Laing O'Rourke, has designed and delivered a major addition to the Royal Sussex County Hospital site in Brighton's Kemptown conservation area.

The £480m Teaching Trauma and Tertiary Care Centre (3Ts), now known as the Louisa Martindale Building, constitutes the first of three phases in the redevelopment of the southern half of the campus. The overall development will double the healthcare accommodation to 361 beds, (75 per cent single, en-suite rooms), while also providing a new HQ, university teaching / research facilities, and 390 basement parking spaces. A campus-wide logistics and engineering strategy also includes a central FM hub and energy centre. Use of modular and offsite construction anticipated the NHP drive for standardisation, reducing build costs without compromising on design quality or the ability to respond to the sensitive site context. Floors, columns, facades, bathrooms, service risers, and horizontal distribution are all pre-fabricated, improving site safety, construction quality and installation times.

### 18 Mole Business Park

18 Mole Business Park in Leatherhead is the latest in a network of nine community hubs to be opened since 2016 by Surrey and Borders Partnership NHS Foundation Trust across Surrey and North East Hampshire. The programme supports most of the Trust's community mental health and learning disabilities services.

Following a full strip-out of the existing 1980s building back to its shell and core, the building reopened in June 2023. The central aim of this project was to provide a centrally located, modern and therapeutic clinical hub for people who use the Trust's services, their families, and carers, across central Surrey, and to provide good-quality office accommodation for the Trust's corporate services.

Following the full strip-out, a Cat A office refurbishment involved upgrades to toilet cores and circulation areas, and the renewal of mechanical and electrical engineering services, including primary plant and equipment. A Cat B office refurbishment was also undertaken, which provided a variety of rooms and open-plan working environments, meeting rooms, breakout areas, staff rest and cafe areas, and training facilities.





## Study tour 2: Bath

**Departure point:** Melia White House Hotel Lobby

**Date:** 12 June 2024

**Time:** 06.45–19.00



### Dyson Cancer Centre

Arcadis is the architect of the new Dyson Cancer Centre at the Royal United Hospital (RUH), in Bath. The Royal United Hospitals Bath NHS Foundation Trust’s vision calls for a “state-of-the-art facility for cancer diagnostics and treatment set within an enhanced greenspace for the campus. The new cancer buildings will house all elements of the cancer pathway under one roof, enabling the provision of holistic care and efficiencies in service pathway design”. In 2010, Arcadis began developing the RUH’s estates strategy and development control plan to orchestrate renewal of the southwest and north of the estate.



### Royal National Hospital for Rheumatic Diseases

The new centre on the RUH Combe Park estate combines existing therapies services at the RUH with those of the Royal National Hospital for Rheumatic Diseases, known to many as ‘The Min’.

Situated next to the main entrance of the RUH, the building accommodates general therapies, hydrotherapy, rheumatology, and pain management services. Different therapies required treatment spaces to be designed with quite different atmospheres. For example, a gym connects to a patients’ courtyard where, weather permitting, patients are encouraged to exercise. These ‘active’ spaces contrast with more ‘therapeutic’ ones, such as the hydrotherapy pool hall, where bathers overlook a tranquil secret garden.

### Dyson Neonatal Centre

The Dyson Centre for Neonatal Care has been transferred from a small, cramped facility into a pioneering new home. The project has resulted in a much improved environment, in which the RUH can care for the 500 premature and sick babies who arrive each year.

A holistic approach has generated a low-carbon building within which the careful use of materials, light, scale and intimacy of spaces generates a calm and caring atmosphere, allowing staff to care for patients and enabling parents to be part of the process. The Dyson Centre presented the rare opportunity to quantify the impact of a new building by collecting data sets in the old facility and repeating the exercise on completion of the new building.



### Study tour 3: Birmingham

**Departure point:** Melia White House Hotel Lobby

**Date:** 12 June 2024

**Time:** 06.30–18.00

#### Midland Metropolitan University Hospital

The new Midland Metropolitan University Hospital will enable the Sandwell and Birmingham NHS Trust to bring together acute care and emergency services currently provided at two separate hospitals.

The new hospital, located between Sandwell and Birmingham, will create a central hub for emergency care and support collaboration between care teams. It will also encourage renewal in a designated regeneration zone. Designed by HKS, Edward Williams Architects and Sonneman Toon Architects, the hospital will provide emergency department, maternity, children's and adult acute inpatient services, in an environment purpose-built for teams to work together.

Innovative features include a fully enclosed space called the Winter Garden, which people can use to access the majority of visitor amenities, such as restaurants, family overnight stay areas, and a multi-faith centre. Selected interior materials and finishes are stylish, contemporary, durable and cleanable, for a comfortable, safe, non-institutional environment. The design of the paediatric department incorporates play areas, places to display children's artwork, and a colourful palette. Separate circulation routes for patients, staff and clinical services will increase operational efficiency and improve the patient experience.

#### Maggie's Centre at the Royal Free

Maggie's Royal Free brings the charity's expert care and support for people with cancer to north London, complementing Maggie's in west London, at Barts, and at the Royal Marsden in south London.

The 454 sqm centre is part of Maggie's visionary mission to bring world-class architecture and interior design to cancer support in the UK. Designed by Studio Libeskind, the design of the centre draws visitors in with an approachable and welcoming timber form. The exterior's curves evoke a calm and peaceful interior space that offers visitors an inviting, private, and light-filled environment.

The building is clad in weathered timber panels that expand outwards as it rises. Double and triple-height glazing at the entry cut across the form, ushering in light to the interiors. An elevated garden at roof level creates a serene and private enclosure for visitors.

Operable skylights flood the core stairs and central circulation area with light and allow for fresh air circulation. Spaces flow freely from one programme area to the next, enabling moments of quiet and repose, and encouraging dialogue and socialisation with others. Both form and materiality embody a nurturing quality – one that provides a sense of calm and relief as visitors cross the centre's threshold.





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# Celebrating the finest in global healthcare design

The European Healthcare Design Awards 2024 celebrate and recognise professional and research excellence in the design of healthcare environments, both in Europe and around the world.

The awards aim to have a significant influence on the creation of environments that promote health and wellbeing, embed quality improvement, and support the delivery of treatment and care in an accessible, economic and equitable way. They will contribute towards the development of knowledge and standards in the design of healthcare environments around the world.

Organised by SALUS Global Knowledge Exchange and Architects for Health, the awards comprise ten categories across primary, community, secondary and tertiary levels of international healthcare provision and delivery, in addition to the Susan Francis Design Champion Award. They will be presented at an illustrious ceremony during the final session of the Congress on Tuesday 11 June.

Recipients of the awards will be multidisciplinary project teams demonstrating outstanding vision, leadership and knowledge in the design, development and implementation of projects that have positively transformed the delivery and experience of healthcare for the patients and community they serve.

Live judging webinars of the shortlisted entries for each category were broadcast on SALUS TV in May. Visit the event platform and app to view recordings of the presentations by the shortlisted projects.

All award entries are featured on a searchable map of healthcare projects at [www.salus.global/projects](http://www.salus.global/projects).

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## The Susan Francis Design Champion Award



The signature prize of the European Healthcare Design Awards, the Susan Francis Design Champion Award, is presented to a visionary healthcare leader who has championed, advocated and monitored the value of design across one or more major healthcare projects, working in close collaboration with multiple stakeholders to deliver excellence and set new standards in design quality. The award also honours the legacy of Susan Francis, co-creator of the European Healthcare Design Congress, who sadly passed away following illness in April 2017.



## Healthcare Design (Over 25,000 sqm)

An outstanding healthcare project in a secondary or tertiary care setting that demonstrates high levels of sustainability and urban integration, creates an effective clinical environment, promotes service improvement, and provides a supportive environment for staff, patients and their families.



**Lead judge:**

Kate Copeland,  
Australian Health  
Design Council, Australia

**Panel judges:**

Ben Bassin, Massey Family  
Foundation Emergency Critical  
Care Center, USA

Paul Bell, Ryder Architecture, UK

### Shortlist

**Glasblokkene at Haukeland University Hospital, Norway**

Commissioned by Helse Bergen HF  
Designed by the Architect group consisting of KHR Architecture,  
PKA Arkitekter and Henning Larsen Architects

**Louisa Martindale Building, UK**

Commissioned by University Hospitals Sussex  
NHS Foundation Trust  
Designed by BDP  
*(pic: top)*

**University Children's Hospital Freiburg, Germany**

Commissioned by Vermögen und Bau  
Baden-Württemberg Amt Freiburg and  
Universitätsklinikum Freiburg  
Designed by Health Team Vienna: Albert  
Wimmer Architects and Architects Collective  
*(pic: bottom)*



## Healthcare Design (Under 25,000 sqm)

An outstanding healthcare project in a community, primary or tertiary care setting that demonstrates high levels of sustainability and urban integration, transforming the quality of care services in an accessible location, and supporting the integrated needs of staff, patients and the community.



**Lead judge:**  
Brenda Bush-Moline,  
Stantec, USA

**Panel judges:**  
Jaime Bishop, Architects for  
Health; Fleet Architects, UK  
  
Sunand Prasad, UK Green Building  
Council; Perkins&Will, UK

### Shortlist

**The Catkin Centre and Sunflower House, UK**

Commissioned by Alder Hey Children's NHS  
Foundation Trust  
Designed by Cullinan Studio  
*(pic: bottom)*

**Helmsley Cancer Center, Israel**

Commissioned by Shaare Zedek Medical Center  
Designed by Farrow Partners and Rubinstein  
Ofar Architects

**Oak Cancer Centre, UK**

Commissioned by The Royal Marsden NHS  
Foundation Trust  
Designed by BDP

**Yutjuwala Djiwarr – Nhulunbuy  
Flexible Aged Care, Australia**

Commissioned by Australian  
Regional and Remote Community  
Services  
Designed by Kaunitz Yeung  
Architecture  
*(pic: top)*



## Future Healthcare Design

A future healthcare project that can demonstrate the potential for outstanding outcomes in masterplanning, place making, wellness, pandemic preparedness and sustainable development, in alignment with the strategic requirements of the healthcare provider to transform their services within the wider community, regional or national health system.



**Lead judge:**

Clifford Harvey,  
Grand River Hospital / St Mary's  
General Hospital, Canada

**Panel judges:**

Nicola Bertrand, Asklepios,  
Germany  
Bill Hercules, WJH Health, USA

### Shortlist

**Cavell Passivhaus Community Health and Wellbeing Hub,  
UK**

Commissioned by NHS England  
Designed by Medical Architecture and Architype  
*(pic: bottom)*

**Children's Cancer Centre, Great Ormond Street Hospital  
(GOSH), UK**

Commissioned by Great Ormond Street Hospital for  
Children NHS Foundation Trust  
Designed by BDP  
*(pic: top)*

**Cluj Napoca Children's Hospital, Romania**

Commissioned by Consiliul Județean Cluj  
Designed by Planho Consultores, Dico si Tiganas and 4B





## Design for Health and Wellness

An inspirational project that encompasses services outside of traditional healthcare settings and, through an alignment of the care philosophy with the design of the environment, helps promote positive behaviours towards healthy living and wellness.



**Lead judge:**  
John Cooper,  
JCA, UK

**Panel judges:**

Ruairi Reeves, Medical  
Architecture, UK

Charlotte Ruben, White Arkitekter,  
Sweden

**Helmsley Cancer Center, Israel**

Commissioned by Shaare Zedek Medical Center, Israel  
Designed by Farrow Partners and Rubinstein Ofer Architects  
*(pic: top)*

**Sinai Health – Circle of Care: Adult Day Program, Canada**

Commissioned by Sinai Health, Circle of Care  
Designed by ARK (Architects + Research + Knowledge)

**Yutjuwala Djiwarr – Nhulunbuy Flexible Aged Care, Australia**

Commissioned by Australian Regional  
and Remote Community Services  
Designed by Kaunitz Yeung Architecture  
*(pic: bottom)*



## Mental Health Design

A mental health project that, through innovative design thinking, achieves a reconciliation between the needs of the patient/resident for a humanistic environment that supports ongoing therapy, care and recovery, and the requirement for appropriate levels of safety, security and supervision.



**Lead judge:**

Beatrice Fraenkel,  
Design in Mental Health Network,  
UK

**Panel judges:**

Danny Gibson, MJ Medical, UK  
Femke Feenstra, Gortemaker Algra  
Feenstra, Netherlands

### Shortlist

**Aspen Wood – Low Secure Learning Disabilities Unit, UK**

Commissioned by Mersey Care NHS Foundation Trust  
Designed by Gilling Dod Architects

*(pic: left)*

**Kimmeridge Court, UK**

Commissioned by Dorset HealthCare University NHS Foundation Trust  
Designed by Medical Architecture

**Montage Health Ohana Center for Child and Adolescent Behavioral Health, USA**

Commissioned by Montage Health  
Designed by NBBJ

*(pic: right)*

**Stella's Place Young Adult Mental Health, Canada**

Commissioned by Stella's Place Young Adult Mental Health  
Designed by Stantec Architecture and Stantec Consulting



## Design for Adaptation and Transformation

An outstanding healthcare project that has had a transformational impact on resolving complex and difficult service design challenges.



**Lead judge:**  
Jim Chapman,  
Manchester School of  
Architecture, UK

**Panel judges:**  
Christine Chadwick, Archus,  
Canada

Christopher Shaw, Past chair,  
Architects for Health, UK

### Shortlist

**18 Mole Business Park, UK**

Commissioned by Surrey and Borders Partnership NHS Foundation Trust  
Designed by tp bennett

**Chengdu Gleneagles Hospital, China**

Commissioned by Perennial Holdings and Parkway Pantai  
Designed by HKS Asia Pacific Design Consulting  
*(pic: top)*

**Doctor Muñoz Cariñanos Hospital, Spain**

Commissioned by Servicio Andaluz de Salud (SAS)  
Designed by Planho Consultores  
*(pic: bottom)*

**Sinai Health – Circle of Care: Adult Day Program, Canada**

Commissioned by Sinai Health, Circle of Care  
Designed by ARK (Architects + Research + Knowledge)



## Interior Design and Arts

An inspirational project that demonstrates exceptional skill in creating a compassionate healthcare environment that reflects and communicates the values of the healthcare provider through the integrated application of interior design with the visual arts.



**Lead judge:**

Ruth Charity,  
Oxford University Hospitals  
NHS Foundation Trust, UK

**Panel judges:**

Birgitte Gade Ernst, Arkitema,  
Denmark

Marte Lauvsnes, Sykehusbygg,  
Norway

### Shortlist

**Louisa Martindale Building, UK**

Commissioned by University Hospitals Sussex NHS Foundation Trust  
Interior Design by BDP  
Art Curation and Integration by Willis Newson  
*(pic: right)*

**Oak Cancer Centre, UK**

Commissioned by The Royal Marsden NHS Foundation Trust  
Designed by BDP

**Psychological and Mental Health Services (PAMHS Unit), UK**

Commissioned by Great Ormond Street Hospital for Children NHS  
Foundation Trust  
Designed by DAY Architectural with artwork by Giles Round  
*(pic: left)*



## Health and Life Sciences

An outstanding health and life sciences project that promotes the development of medical knowledge and innovation in areas such as training and education, clinical research, informatics and artificial intelligence, drug discovery, and healthcare delivery, with a focus to improve patient and population health outcomes.



**Lead judge:**  
Peter Ward,  
King's College London and Guy's  
and St Thomas' NHS FT, UK

**Panel judges:**  
Mohammed Ayoub, HDR, USA  
Richard Mann, AECOM, UK

### Shortlist

**BCIT Health Sciences Centre, Canada**

Commissioned by British Columbia Institute of Technology  
Designed by Stantec  
*(pic: top)*

**The Christie Paterson Redevelopment, UK**

Commissioned by The Christie Trust, University  
of Manchester and CRUK  
Designed by BDP

**Oak Cancer Centre, UK**

Commissioned by The Royal Marsden  
NHS Foundation Trust  
Designed by BDP  
*(pic: bottom)*







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## Design Research Project

An independently assessed, completed and novel research study that can demonstrate innovation, relevance and practical application. The research should be original, showing critical thinking in a new field of investigation or by applying innovative methods and analysis to existing issues.



**Lead judge:**

Göran Lindahl PhD,  
Chalmers University of  
Technology; Center of Healthcare  
Architecture, Sweden

**Panel judges:**

Grant Mills, UCL, UK

## Shortlist

**Blueprint for mitigating nurse burnout: A social listening perspective**

Authored by:

Dr Deborah Wingle, HKS and CADRE, USA;

Dr Michelle Ossmann, MillerKnoll, USA;

Dr Rutali Joshi, HKS, USA; and

Edward Hunt, MA, CADRE, USA

**Revolutionising digital engagement: Effects of an app enabling persons with dementia to lead activities for peers**

Authored by:

Michael Skrajner, MA, Hearthstone Alzheimer Care, USA;

Gregg Gorzelle, Hearthstone Alzheimer Care, USA;

Dr John Zeisel, Hearthstone Alzheimer Care, USA; and

Drew Walker, Hearthstone Alzheimer Care, USA



## Design for Sustainable Development

An exemplar healthcare project completed over five years ago that has demonstrated fitness for purpose, flexibility and high performance over time, adapting to new service configurations and meeting international standards in sustainability, including social, economic, human and environmental factors.



**Lead judge:**

Jonathan Erskine,  
 European Health  
 Property Network, UK

**Panel judges:**

Matthew Holmes, Jacobs, Australia/  
 Singapore  
 Warren Percival, RSK Group, UK

### Shortlist

**The Jean Bishop Integrated Care Centre, UK**  
 Commissioned by NHS Humber and North Yorkshire  
 Integrated Care Board  
 Designed by Medical Architecture  
*(pic: top)*

**Omagh Hospital and Primary Care Complex (OHPCC), UK**  
 Commissioned by Western Health & Social Care Trust,  
 Northern Ireland  
 Designed by TODD Architects  
*(pic: bottom)*

**Wexham Park Hospital Redevelopment, UK**  
 Commissioned by Frimley Health NHS Foundation Trust  
 Designed by BDP and built by Kier Construction





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**Professor Shafi Ahmed**  
(UK)

Surgeon and chief executive  
officer,  
Medical Realities

### **Keynote: Innovation in the future hospital**

Professor Shafi Ahmed is a world-renowned, multi award-winning surgeon, teacher, futurist, innovator and entrepreneur. He has been dubbed “the virtual surgeon” and uses technology to make healthcare more equitable, accessible and affordable to all.

He is also chief executive and co-founder of Medical Realities, a software company based in London that offers medical training products, specialising in virtual reality and augmented reality. The company was formed in 2015 by a team of surgeons, designers, and technologists to address the shortcomings of traditional 2D curricula with cutting-edge immersive teaching and training solutions. It claims to be the world’s largest publisher of 360° video surgeries.

Among its portfolio of projects, Medical Realities worked with Coloplast to help modernise a training course focused around stoma skincare. The software firm transformed traditional learning materials, such as slideshows, video and diagrams, into an XR-focused experience with an interactive virtual instructor created from recordings of Coloplast’s education manager. The interactive experience not only teaches the same material but does so with much higher levels of engagement and clarity of information, says Medical Realities.

In another project, working in collaboration with Clatterbridge Cancer Center, the company built a VR gamified experience focused around the prevention and identification of sepsis within a cancer trust setting. The solution allows remote multi-user training, making it possible to train with other people and producing a fun, interactive experience. Trainees learn how to use sepsis screening tools similar to those used in both public and private UK healthcare settings. Medical Realities says it is currently working to enhance this solution with advances in AI conversational technology, to allow delegates to train in the key conversations involved in this critical screening procedure and ensure high-quality patient outcomes.

According to the company, in recognition of the power of its training content, the Medical Realities platform has been accredited by the Royal College of Surgeons.

## Keynote: UNBROKEN: Designing for physical, psychological, and psychosocial rehabilitation in a European war zone

The UNBROKEN Charitable Foundation is a charitable body whose main goal is to raise funds for philanthropic and social projects to support the activities of the Unbroken National Rehabilitation Center, within the First Medical Union of Lviv.

The Unbroken National Rehabilitation Center is a place where adults and children affected by the war in Ukraine receive comprehensive qualified medical care: emergency medical care, reconstructive surgery, orthopaedics, and robotic prosthetics. Prostheses are manufactured at the Center, where patients are also fitted with new body parts. In addition, the Center deals with physical, psychological and psychosocial rehabilitation of injured military personnel and civilians. All patient care is provided free of charge.

The main task of the Foundation is to ensure that Ukrainians are treated at home in Ukraine and do not seek help abroad or in various medical institutions. For this, it is necessary to ensure the material and technical base, as well as the availability of state-of-the-art medical equipment within the hospital itself.

Another task surrounds the professional development of doctors and nurses. To achieve this aim, attention focuses on the organisation of educational programmes, exchange of experience, internships, and the arrival of colleagues from abroad.

The Foundation's mission is to create the conditions for professional medical, rehabilitation, and psychological support, in addition to the comprehensive treatment of patients in Ukraine. Its activities are based on accountability, transparency, responsibility, and the involvement of citizens from all over the world in order to achieve the main goal – access of every Ukrainian to modern medicine and the guarantee of receiving qualified care in their country.

The Foundation's activities are delivered by a team of professionals and active citizens of Ukraine.



**Mariana Svirchuk**  
(Ukraine)

Chief executive director, First Medical Union of Lviv; head of project management, UNBROKEN



**Brian Kowalchuk** (USA)

Design global director,  
HDR



**Brian Niven** (UK)

Technical principal,  
global health,  
Mott MacDonald

## Transforming health systems and infrastructure

Owing to pre-election sensitivity, the advertised session in the programme on Monday 10 June will no longer be presented. Involved personnel are unavailable for comment. We thank you for your understanding. The following presentation and panels have replaced the original content in Session 2.

The way in which global health systems have independently and interdependently evolved over time is an incredibly diverse study of competing priorities and interests. At one extreme is the open, privatised healthcare market in the United States, where more resources are invested per-capita to achieve modest health outcomes, and a significant health disparity exists across a broad socio-economic spectrum. At the other extreme is China, where healthcare has been optimised for throughput, resulting in a monolithic response that often lacks a humanistic experience. Canada, Australia and other Commonwealth countries are somewhere in the middle and more akin to the dynamics of European healthcare systems, but these markets are not without their own challenges in delivering quality healthcare at scale.

What are the common challenges and factors that should be considered in the design of an effective, climate-smart healthcare system, to deliver quality care efficiently, accessibly and equitably to those who need it most? In this session, a multi-dimensional framework of design-drivers will be outlined to contextualise each major global healthcare system. They will question them at three key scales:

- Global – How do we responsibly design, build and maintain the most technically advanced and humanistic facilities at the same time as promoting planetary health? How do we apply a two-way knowledge transfer of lessons learned between high- and middle/low-income countries, and between wealthy and poorer communities in the same country, to improve global and population health overall?
- Community – How does a healthcare system or facility benefit diverse communities at a local, regional and national level? How do communities most effectively invest their finite resources in healthcare solutions that return the highest social value?
- Human – How do patients and providers personally experience healthcare? What are their expectations, hopes, fears and aspirations?

### Panel 1: Global perspectives

This panel replaces the planned presentation on the New Hospital Programme, which has been withdrawn owing to pre-election sensitivity.

Please refer to page 60 for the updated abstract. On the right-hand side are the speakers of the first panel, which will discuss global perspectives.



**David Allison** (USA)

Director of graduate studies  
in architecture + health,  
Clemson University



**Harry van Goor**  
(Netherlands)

Professor of surgical education,  
Radboud University  
Medical Center



**Tania Wee** (Singapore)

Executive director,  
National University  
Health System



**Kate Copeland** (Australia)

Chair,  
Australian Health  
Design Council





**Hank Adams** (USA)

Global director of health,  
HDR



**Clare Wildfire** (UK)

Global cities lead,  
Mott MacDonald



**Robby Chibawe** (Australia)

CEO,  
Puntukurnu Aboriginal Medical  
Service



**Nicola Bertrand**  
(Germany)

Head of architecture and  
construction,  
Asklepios Kliniken

**Panel 2: Community and human perspectives**

This panel replaces the planned presentation on the New Hospital Programme, which has been withdrawn owing to pre-election sensitivity.

Please refer to page 60 for the updated abstract. On the left-hand side are the speakers of the second panel, which will discuss community and human perspectives.

## Closing remarks

The session chairs, Sunand Prasad and Sasha Karakusevic, will draw together some of the key threads and learnings from the preceding panel discussions and presentations.

Please refer to page 60 for the updated abstract.



**Sunand Prasad** (UK)

EHD programme director,  
Architects for Health; Chair,  
UK Green Building Council



**Sasha Karakusevic** (UK)

Project director, NHS Horizons;  
Senior fellow, Nuffield Trust



**Antonio Weiss** (UK)

PhD, Senior partner,  
The PSC

**Co-authors:**

**Nicole Samuel** (UK)

Associate partner,  
The PSC

**Samuel Rose** (UK)

Partner,  
The PSC

**Joe Cruden** (UK)

Senior manager,  
The PSC

**Nouha Zahiri** (UK)

Senior manager,  
The PSC

## How can we expedite the capital business case development cycle and approvals process?

Analysis of recent capital programmes for new hospitals in the UK reveals it can take as long as 20 years from conception to delivery. This duration, significantly longer than lead times in other sectors and for other capital investment, has two main impacts on the delivery of new health and care facilities. Drivers for investment, population needs, and the development of new digital technologies all mean that schemes require continued re-working over this duration to stay relevant, driving up unnecessary costs and delaying the new facilities required to meet population needs.

Our analysis estimates that trusts can incur up to an additional £1 million in costs for every year of delay and rework in the approval process. Moreover, delays and rework negatively impact the motivation and momentum of teams involved in the project, potentially hindering the transformation necessary for future building openings.

The analysis focuses on the first eight hospitals (Cohort 1) planned under the New Hospital Programme (NHP) in the UK, comparing the elapsed time from the approval of the strategic outline case to the actual delivery. The findings indicate that over 60 per cent of the time is spent on the delivery of business cases and approvals, suggesting that the decision-making process is the primary cause of delays. Lack of clarity on capital budgets and the need for support from multiple stakeholders further hinder the timely progress of construction projects.

The NHP's own analysis underestimates the pre-construction phase, leading to underestimated cost and time estimates. It emphasises the importance of efficient planning and delivery, facilitated by the NHP's forward view of spend and delegated capital budgets to integrated care boards. However, the inefficient process of business case creation and approval imposes significant financial costs on providers and health systems, as well as on assurance teams.

This paper highlights three major factors contributing to these delays: uncertain capital budgets, discontinuous capital availability, and stakeholder misalignment – and offers practical steps to take for both central governments planning capital investment, and local health systems and organisations seeking to draw down funding for investment in the built environment.

## The future district general hospital: Harnessing the power of data science for resilient clinical service and space design at the new Leighton Hospital Campus

The new Leighton Hospital, part of Mid Cheshire Hospitals NHS Foundation Trust (MCHFT), is one of five RAAC (reinforced autoclaved aerated concrete) hospitals to be rebuilt by 2030, as part of the New Hospital Programme. Recognising that this offers a rare opportunity to reimagine the traditional district general hospital model, MCHFT has arranged governance and management to drive transformation across all facets of the project, placing service co-design and citizen-centred care at its heart.

Key to this has been a move away from arithmetical approaches to modelling and towards a dynamic and integrated process combining data science and healthcare planning, using data-driven learning to better reflect and respond to ever-changing innovation in clinical delivery. This talk discusses the methodology used, including:

- Developing advanced insight: Gathering and processing whole-hospital datasets and surfacing insights to support focused discussions with clinical and operational teams on trends in service delivery.
- Integrating modelling with strategic transformations: Combining hospital records, demographic growth factors, and operational assumptions to model future demand; understanding the impacts of no transformation; creating and quantifying the value of targeted interventions to support development of a roadmap; and capitalising on KPI tracking and reporting to mitigate risks.
- Using the above to define a citizen-centred and system-wide clinical brief for the new hospital; accurately reflecting the needs of each department to deliver its clinical service; and ensuring exemplary clinical delivery within the new estate is assured.

This approach to healthcare planning, rooted in data science and population health, has supported more efficient, in-depth engagement and decision-making in co-developing new clinical service models for both the trust and system partners. As well as identifying up to 30 per cent of conventional non-elective and outpatient spaces for reduction or movement within the hospital and across the system, it has empowered leaders to create a system-wide transformation roadmap with identification of critical success factors and tracking measures to enable ongoing course correction and improvement.

We must ensure future hospitals are fit for purpose throughout their lifespan. The new Leighton Hospital is an exemplar for achieving this through a data-driven and risk-stratified approach to healthcare planning.



**Alison Sanders** (UK)

Senior consultant,  
Archus



**Nicola Clemo** (UK)

Head of strategic advisory,  
Archus



**Clare Hammell** (UK)

Chief medical officer and deputy  
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## Smart, safe and efficient use of clinical technology in hospital design

With the New Hospital Programme (NHP) looking at standardisation and modern methods of construction, the role that medical technology can play in the design of these new hospitals is vital.

Advances in AI and increasing reliance on medical technology will require these new hospitals to be designed for flexibility, and the equipment within, right-sized. The role that integrated care boards (ICBs) are playing in developing standardised clinical technology across health systems and multiple trusts will underpin efficiency, cost, and benchmarking to right-size hospitals.

Working across a wide section of NHP schemes, in partnership with multiple architectural and project management consultancies and NHS trusts user groups, we're working to identify the most technologically appropriate equipment; the future use of rooms and flexibility (radiology command centres off site); the increase in virtual wards and consultation rooms; and collaborating with NHS Digital.

Being able to provide evidence of benchmarking of quantities and types of equipment in typical hospital departments; identifying equipment that will in future be networked and have links to cyber security and electronic patient record systems on a hospital-wide basis, and right-sizing the equipment portfolio all influence the design and efficiency of hospitals.

Post-Covid, hospitals are full of equipment that has been redistributed and is sitting in stores or corridors, either incompatible or not able to be accurately connected. Audits of existing equipment can provide greater clarity for NHS trusts in the NHP, particularly when planning the location of key services (e.g., imaging and diagnostics, which make up nearly 30 per cent of the overall hospital asset value and spend).

Projects such as Cambridge Children's Hospital are at the planning phase of physiology and mental health technology requirements; other projects, such as Oriel, have focused on the opportunity to share equipment across areas for maximum flexibility. Understanding the current portfolio of medical and non-medical equipment assets in a hospital planning a new-build design, and to be able to interface this information at an early phase, alongside visibility of new technologies (smaller and more efficient equipment), means that the planned use of technology is brought into the early design process.

## Social value in healthcare planning and design

Embedding social value considerations in healthcare planning can support sustainable, quality-led design choices. Social value encompasses the economic, social and environmental benefits associated with an investment, above and beyond financial considerations. Since the 2012 Social Value Act, tools have emerged for identifying and measuring social value. However, they fail to capture many important positive outcomes arising from healthcare investments.

A successful business case must demonstrate an array of benefits, including clinical effectiveness and social value. It's easy to subjectively describe the social value created by healthcare projects, but objective measurement is complex, meaning societal benefits from improved health outcomes are under-represented in economic appraisal. Quantitative social value analysis can help align strategic goals with the requirement to show return on investment, allowing healthcare providers, planners, and architects to better illustrate that achieving social and environmental progress can also provide value for money.

In supporting an NHS trust with the business case for a major capital project, we developed a methodology for appraising and monetising the proposed investment's social value. Building on established tools like the RIBA Social Value Toolkit and HMT Green Book guidance on wellbeing, and referencing accumulated knowledge on evidence-based design, our framework captures a breadth of health sector-specific benefits and uses tools like the QALY and WELLBY to monetise outcomes. This allows societal benefits to be captured within quantitative economic analysis, giving a broader and fairer assessment of the value created by the project.

Our framework articulates the relationships between elements of planning and design and the associated social value outcomes, enabling planners and architects to explore opportunities to maximise value and justify investing in solutions that benefit local communities.

This presentation will explore how we've used our methodology to bolster clients' value for money analysis and how this capability can be developed in future, as access to robust, relevant evidence grows. We draw on recent project experience to illustrate how social value has informed the way we plan and brief healthcare spaces. We also touch on international perspectives on social value and different prisms used to explore the same core ideas.



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## Post-occupancy evaluation of hospitals in Norway

Post-occupancy evaluation (PoE) is a systematic evaluation of hospitals after they have been built and occupied for some years.

The purpose of PoE is to assess and achieve knowledge about the building's performance in use, from the perspectives of management, staff, patients, and hospital planners. Learning from hospitals in operation can improve cost efficiency, as well as being a means to improve workplace design. The objective is to present methods and results from PoEs performed in Norway.

**Methods:** Lately, we've aimed to develop and establish several tools to achieve a common evaluation method. A common method is a prerequisite to transfer knowledge between the hospital projects and a foundation for knowledge-based practice. Both quantitative and qualitative methods are used during the evaluation process.

**Results:** By use of questionnaires, observations and interviews, document studies and statistics, we've gained insight into how to design hospital wards and intensive care units (ICU) to achieve operational efficiency and staff wellbeing. Additionally, the flexibility of hospitals during the pandemic between 2020 and 2022 is highlighted.

**Conclusions:** Design that facilitates short distances and close collaboration between colleagues, in addition to an overview of patients, seems to contribute to efficiency and wellbeing among healthcare personnel, as well as better outcomes for patients. In order to meet future pandemics, the flexibility to establish cohorts is important in hospital buildings.

PoE is a useful and important measure to gain knowledge about hospitals. Our recommendation is that PoE should be carried out in all new hospital buildings. Furthermore, the results should be implemented in guidance for functional planning.

**Implications:** In summary, the overall messages to ensure implementation of knowledge are:

- include a systematic plan for PoE in the early phase of hospital projects;
- results from PoEs must be transferred to early-phase planning; and
- close collaboration is necessary between hospital planners, hospital staff and those in charge of construction and building.

## Post-occupancy evaluations in practice

Last year, we investigated the degree of prevalence of post-occupancy evaluations (PoEs) in the healthcare design and construction industry and found that this is an area where there could be further improvement. Our research concluded that evaluating the performance of buildings after occupation, analysing how occupants assess the built environment, and obtaining feedback on a building's performance in use are all powerful tools to help in improving design and decision-making and reducing inefficiencies.

However, while there appears to be general agreement about the value of PoEs in the industry, there doesn't seem to be a consistent level of uptake of this invaluable vehicle for self-learning and improvement. We found that there is no mandatory requirement to undertake a PoE and the completion of one may depend on several factors, including the size or value of a project, the way in which the project is funded, and simply a lack of time and resources.

Our research also uncovered that even when undertaken, the feedback gained from a PoE was very rarely shared within the NHS which, in an industry that focuses very much on evidence and best practice, should be considered essential to the design and delivery of future projects.

In the absence of a standardised approach, we've created a light-touch PoE process. This includes obtaining feedback using staff and patient questionnaires, interviews with key members of staff, and observational studies of day-to-day operations. The process looks at how the design of the building works for different groups of people, both clinical and non-clinical, assessing its clinical functionality, and how and if spaces are used as intended.

In the last 12 months, we've undertaken several post-occupancy evaluations. To buck the trend of not sharing feedback gained from PoEs, we'll share the successes and lessons learned from these projects with others in the healthcare industry to promote systemic learning from one project to the next.



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**THE BIG DEBATE:  
AI in healthcare – Utopia or Dystopia?**

AI has the potential to transform the future of healthcare, but what will be its impact on people, process and place?

As global health systems struggle to cope with a tsunami of threats and challenges – from ageing populations, rising levels of chronic disease, underfunded physical infrastructure, and a workforce crisis, does artificial intelligence herald a new utopian era of personalised health, empowered patients, and exciting new therapies or a dehumanised technological dystopia?

## The future of healthcare design will be regenerative

The future of design is moving beyond sustainability as we know it. While great strides in reducing greenhouse gas emissions are being made, there is untapped potential in bridging the gap between buildings and the natural environment. Connecting human activity with the evolutionary enhancement of natural systems is the strategy we've been missing. It's the basis for regenerative development.

For healthcare, we design spaces that optimise the experience and wellbeing of patients, families, and caregivers. There are considerations for energy and water use, and the health of the facility and occupants. By introducing regenerative design principles when developing a healthcare project, we can enhance the ability of living beings and the surrounding ecosystem to co-evolve and thrive.

Regenerative design and development is about rethinking the concept of sustainability itself. It's about creating a self-sustaining system with a positive effect on nature. It's a holistic process, and it requires buy-in across multiple stakeholder groups responsible for the success of the project. The regenerative design process emphasises a holistic understanding of place, finding potential to enhance larger ecological systems, and finding a distinctive role for the project using a whole system-thinking approach.

In this presentation, we'll use examples of recently built healthcare projects to demonstrate recommended changes to design solutions that align with regenerative design and development concepts in urban and semi-urban settings. The strategies align with the end-goal of evolving the adjacent natural systems and the overall ecosystem.

We'll use the following principles to guide us as we look at the example projects through a regenerative lens:

- achieve net-positive impacts for ecology, health, and society;
- continuously evolve and renew;
- holistically connect to goals for resilience, health, equity, inclusiveness, and decarbonisation; and
- renew natural systems, rather than take individual measures to sustain an equilibrium.



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## A hospital in a health-food-park – RZ Tienen (Belgium)

The mid-sized regional hospital in Tienen, Belgium is part of a larger network and will renew its healthcare facility over the coming five years. With about 340 combined beds, the hospital will unite its two existing campuses into a singular, cohesive hub. This strategic consolidation promises streamlined healthcare services and elevated patient care while prioritising medical wellbeing, environmental consciousness, and community engagement.

The building embraces sustainability with a high-performing and recyclable facade composed out of prefabricated aluminium and terracotta elements. Designed to minimise environmental impact, its compact, cost-effective, and flexible architecture employs distinct structural grids for the varied strategically grouped functions in the hospital, facilitating both operational efficiency and adaptation to future needs. Despite tripling bed capacity, this approach allowed for limiting the building's footprint and maximising green space.

The freestanding building offers 360-degree views, with wards and daycare units 'hovering' over the surroundings. Small-scale agricultural activities are integrated on the site and take up nearly one-third of the surface, contributing to sustainability and allowing residents and patients to participate in or observe the cultivation of fruits, vegetables and herbs. Offering fresh, locally sourced produce in the hospital's restaurant and organising a farmers' market on the campus enhances this connection, encouraging a shared responsibility for personal health and the environment.

Sustainable urban planning takes centre stage as the hospital prioritises pedestrians and cyclists, reshaping the entrance zone to discourage car usage. A mobility strategy reduces car dependency by 29 per cent, favouring an embedded parking building over surface parking, and providing ample bicycle storage, while green spaces and pathways occupy more than two-thirds of the site, inviting individuals to explore the campus on foot or by bike.

The facility collects and stores rainwater from all roofs and roads for various purposes. Every drop of rainwater will be either buffered and reused or locally irrigated, showcasing responsible water use in an era of growing scarcity.

This new hospital transcends the conventional notion of a healthcare facility. It emerges as a vibrant community hub, intertwining health with sustainability. This illustrates that hospitals can be catalysts for a healthier, connected, and environmentally conscious future.

## Sustainable hospitals of the future

Leeds Teaching Hospitals NHS Trust (LTHT) is developing a design for one of the largest hospitals in the UK Government's New Hospitals Programme, and it will be one of the first major acute hospitals in the UK to meet sustainability and net-zero carbon targets by 2030.

This paper will explore the challenges for NHS trusts in balancing the need for efficient and purposeful clinical estate with the need to reduce carbon emissions within design and operation to meet NHS Net Zero Building Standards.

We'll provide context of how we'll achieve these dual aims in an acute specialist hospital that serves patients locally, regionally and beyond. We'll demonstrate how embedding sustainability principles at the earliest stage of the process has resulted in a net-zero design developed to meet standards against future climate scenarios. It will discuss how the design has considered the embodied carbon and energy use, and how this has influenced the selection of structures, facades, materials, technologies, and development of an electrical hospital strategy. It will also outline how the need to provide healthy spaces that impact patient and staff wellbeing has defined the orientation and massing of the building to provide natural daylight throughout; include healing green spaces; and maximise solar gains without overheating.

We'll also demonstrate how information developed during design (BIM models) can be utilised, not only to provide a record of what will be constructed but also to support carbon reduction in operation through use of digital twins. By combining static BIM models with real-time data and Internet of Things (IoT) sensors, LTHT will deliver solutions that provide real-time monitoring of spaces and assets, to automate environmental controls; reduce energy demands; and deliver sustainability initiatives. Digital twin data will also enable proactive management and maintenance for efficient use of spaces based on occupancy levels, to positively impact HVAC and energy strategies for the new building.

Our approach at LTHT will deliver a building that remains sustainable throughout its life-cycle. This will see the building achieve BREEAM Excellent and WELL Gold accreditations for design, construction, and ongoing operation of environments that support health and wellbeing.



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## Designing the US' first all-electric hospital: Key considerations and benefits

Decarbonising the healthcare sector is a global challenge. Can electrification be part of the solution? By aligning with decarbonising electricity grids, the increased use of electricity in healthcare can contribute significantly to achieving operational net-zero outcomes.

This presentation focuses on designing the world's first all-electric hospital, highlighting the necessary considerations and benefits, and providing valuable insights to inspire sustainable practices in healthcare design.

An all-electric hospital represents a transformative approach to healthcare infrastructure. Integrating renewable energy sources, advanced energy storage, and smart grid technologies not only reduces carbon emissions but also enhances energy efficiency and resilience. This presentation explores the technical feasibility, environmental benefits, and economic viability of this approach.

The talk examines design considerations that optimise energy consumption, reduce waste, and enhance overall sustainability, showcasing innovative architectural and engineering strategies, such as passive design principles, energy-efficient lighting, advanced HVAC systems, and intelligent building automation, to create an environmentally friendly and comfortable healing environment.

Transitioning to an all-electric hospital involves reimagining daily operations. The presentation explores electrifying essential functions like medical equipment, transportation, and heating/cooling systems. By integrating renewable energy systems, such as solar panels and wind turbines, hospitals can power their energy-intensive activities sustainably. Attendees will discover significant carbon emission reductions and improved energy resilience through electrification.

The presentation emphasises the importance of energy management systems and advanced monitoring technologies. These solutions optimise energy usage, track performance, and identify areas for improvement. Hospitals can make informed decisions, increase operational efficiency, reduce costs, and prioritise sustainability.

In addition to environmental benefits, the economic advantages of all-electric hospitals are highlighted. By reducing energy consumption and maintenance costs, healthcare institutions achieve long-term savings. Revenue generation through grid interaction, such as demand response programmes or selling excess renewable energy, is also explored, helping to understand the economic viability and return on investment of all-electric hospital designs. Beyond financial and environmental aspects, the presentation underscores the positive impact on patient care and employee wellbeing.

## CIO – nature at the heart of the hospital

Human beings have evolved close to nature since the dawn of time. In recent years, it has become apparent that reconnecting with the outdoors and natural elements is a primary physiological need, as many people experienced first-hand during the lockdowns.

Following the concept of biophilia, we encourage patients to connect to nature by embedding it inside the building and inviting them to venture out and discover the diversity of the surrounding natural landscape.

**Practical application:** The Integrated Oncology Centre at the University Hospital of Liège is an ambulatory tumour treatment centre located on the hills of Sart-Tilman in Liège, Belgium. The centre gathers all care services related to cancer (screening, treatment, psychological follow-up, day hospital, radiotherapy, and wellness centre). To make optimal use of the qualities of the site, we conducted an in-depth study to connect the building and its surrounding areas with the natural landscape.

**Outcomes:** We've designed a total healing environment centred on user-experience and nature, including:

- healthcare entirely designed around the practical and sensory experiences of patients;
- the care provided in each different phase of the treatment receives a specific, soothing atmosphere that supports the healing process;
- plenty of natural light for patients and staff, especially in high-tech medical services such as radiotherapy, which is more commonly located below ground;
- natural light is brought to the heart of the project and reaches lower levels via a series of courtyards carved into the building;
- the building is largely open to the valley, offering panoramic views on the hillside of Sart-Tilman;
- integrated greenery and planting ensure continuity with the surrounding environment; and
- the wooded area around the building will eventually be a place where patients can seek out nature and a place for quietness and calm.

**Implications:** Sustainable healthcare systems should have a positive impact on both the environment and the wellbeing of users. An architecture that is deeply connected to nature supports this vision, resulting in healthier indoor climates, less energy use, reduction of stress, and greater biodiversity. Through a holistic design approach, combining architecture, landscape and user experience, we aim for a total healing environment.



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## The first all-mass timber hospital in North America – the Prince Edward County Memorial Hospital

This case study aims to exemplify the creation of a self-learning health system through natural intelligence by telling the story of the development of the first approved, non-encapsulated, all-mass-timber hospital in North America.

**Framework:** The framework demonstrates research into the centuries of material knowledge in the use of wood to create spaces that feel familiar to humans. The framework also includes the definition of a conceptual approach that prioritises human comfort and material resiliency through embodied carbon, the values of a community with agrarian roots, and the desire to represent these clearly through the healthcare architecture of a vital healthcare institution in rural Canada.

**Practical application:** Focusing on how Quinte Health Care, a public healthcare organisation in Ontario embarked, along with its architects, on a multi-year journey with the Ontario Ministry of Health and Infrastructure Ontario to design what will be the first approved non-encapsulated all-mass-timber hospital: Prince Edward County Memorial Hospital. Additional applications will be discussed in the context of creating a self-learning health system that can evolve with future energy requirements, including the development of a complete geothermal plant and solar readiness to complement operationally the embodied carbon and carbon sequestration strategies, and help set up the facility for future net-zero capabilities.

**Outcomes:** Key outcomes included identification of the approvals required throughout the journey, from code compliance and preliminary meetings with the regional fire marshal to community engagement meetings and a highly positive impact on the fundraising of the local share of the capital funds for the project.

**Implications:** These include the potential to impact the normalisation of the use of engineered wood and mass timber, along with complementary technologies in the future practice of healthcare architecture in North America and beyond.

## Design through life: Humanistic environments for better health and wellbeing

The climate crisis and economic uncertainty are straining national health and social care across Europe. Collaboration is vital, as are humanistic environments that promote wellbeing, identity and dignity, and support and empower patients. Landscapes offer a valuable opportunity.

Therapeutic horticulture and green prescribing empower people, as do sensory gardens and biophilic environments in care settings. Such spaces unlock a similar sense of empowerment to how artistic expression or arts therapies can support treatment of certain conditions.

People-centric design in healthcare settings is a return to nature, which can be realised through place-led design and the activities such design can support. It's also about preventive healthcare through nature-based design through life – from early learning and using the natural world as the setting for every stage of our lives.

This paper is a call to action to embed this humanistic thinking in every stage of the healthcare design and commissioning process. To achieve this, place-based, collaborative, evidenced design is key. Now, more than ever, we must escape silos and bring connections to the table from the outset, such as the links between design and environmental economics. Employing methods tailored to achieving humanistic design will provide improved health and wellbeing outcomes for patients. A holistic approach with a circular, regenerative design process ensures the design is right for context, by looking closely at these interconnections and wider benefits, drawing on targets in the UN Sustainable Development Goals and the Five Capitals evaluation model, through all stages of planning, business case and evaluation. This provides a framework for humanistic design thinking.

Healing courtyards, community spaces and edible landscapes woven into a wider network provide outdoor social interaction. Underpinning these are a rich framework of ecosystem services, which we can measure to evaluate benefit.

Design of such reflective landscapes is innately inclusive, allowing patients independence and to journey through the landscape without risk of becoming lost. Circular loops and natural sensory elements aid decision-making and self-determination. This is the bigger picture of modern healthcare – inclusive design within natural and community spaces, affording us opportunity to create humanistic spaces that reaffirm our connection to nature.



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## Passivhaus community healthcare: Lifetime operational savings for no additional cost

The NHS Net Zero Carbon Building Standard (NZCBS) is now mandatory for most healthcare design projects in the UK. While a step in the right direction when it comes to the environmental performance of the NHS estate, do the standards go far enough, and what potential benefits are there to adopting principles that exceed the standard? This paper draws on lessons from the design of a new class of primary and community care facilities.

Our findings sit within the context of the Cavell Centre programme, which proposed a blueprint for the transformation of primary and community care facilities in England. These proposed Cavell Centres pioneered an approach to standardised yet adaptable planning, capitalising on modern methods of construction (MMC), net-zero design, and high-quality patient environments for health and wellbeing. One of the six pilot schemes commissioned for the programme was required to be designed to Passivhaus standards.

**Proposition:** The building provides a model for the next generation of primary and community health facilities. It will offer ultra-low, net-zero aligned operational energy performance, while delivering a healthy, comfortable internal environment. An optimised structural grid and services strategy, and a standardised, MMC-ready facade have enabled embodied carbon to be reduced below the NZCBS limits. Judicious design and detailing and a focus on buildability have resulted in industry-leading thermal performance being achieved using standard building regulation levels of U-values for the main building elements. To maximise flexibility and repeatability, the design team developed a site-agnostic scheme that would enable Passivhaus certification, regardless of which way the building was orientated.

**Conclusions:** This ambitious approach to sustainability demonstrates how the NZCBS can be achieved simply and effectively through fabric-focused efficient design. Exceeding the standards, the design ensures Passivhaus accreditation at no additional cost, while guaranteeing significant operational savings over the building's life.

This pilot provides early evidence of the long-term cost benefits to be achieved by adopting an ambitious approach to sustainable design from the earliest stages. Furthermore, through careful planning, and mandated Passivhaus design, such buildings have the potential to deliver these benefits at no additional upfront cost.

## Optimising solutions and bringing forward benefits – modular construction should be considered at the outset of every significant healthcare building project

How successfully healthcare organisations meet key challenges, including quality improvement, healthcare resilience and net zero, is impacted by the way the healthcare estate is developed. Modular construction offers clear advantages during construction, throughout occupancy, and beyond.

**Method:** Drawing on case studies, we'll examine ways in which modular builds provide benefits that enable healthcare providing organisations to reach their objectives more quickly and more completely, when used as an alternative to, or in conjunction with, traditionally built facilities.

**Results:** A clear benefit of modular construction derives from building work starting off-site at the same time as groundworks, bringing forward occupancy and return on investment. The surgical hub at Queen Mary's Hospital in Roehampton, for example, was performing 600 procedures per month within five months of the original inquiry, helping reduce waiting times and improving lives far sooner compared with traditional building methods.

Speed of delivery also enables healthcare providers to improve service while reacting quickly to changing needs. A significant backlog of patients needing cataract surgery was exacerbated by the Covid-19 pandemic. The three-procedure room at Newcastle Westgate Cataract Centre was designed to optimise safe patient flow, reducing average time spent from 3-4 hours in the replaced building to around 45 minutes in the new modular facility. Performing 1000 procedures per month, the centre was installed in just four months.

New technology can be adopted sooner, directly benefiting patients and staff, and enabling the healthcare provider to make an earlier start to achieving targets on reducing emissions. St George's University Hospital NHS Trust's new, modular intensive treatment unit, built as an extension to an existing hospital building, has a highly advanced building management system and is expected to achieve a 'Very Good' BREEAM rating.

**Conclusions:** With shorter lead times, design flexibility, and lower carbon impact, modular builds offer viable solutions when judged as standalone projects. Incorporated into new or existing buildings, providing the high-end specialist infrastructure required for critical clinical areas, modular facilities transform traditionally constructed buildings and improve the care provided in them. Modular construction should be considered at the outset of every significant healthcare building project.



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## When clinical engagement becomes a necessity

The clinical champion group was established in 2020 at Great Ormond Street Hospital to ensure clinical engagement permeated the design for the Children's Cancer Centre (CCC). This comprised a group of clinicians across disciplines who could input into the design process. During 2022, financial and engineering constraints necessitated further clinical involvement.

**Purpose:** To maximise the quality of each department and develop innovative services to optimise experience/safety, and for the design to support the intended clinical function. Responsibilities for RIBA stage 4 included co-ordination of stakeholders, plan sign-off, communication and partnership with the project team, and delivering to the timetable.

**Methods:** All staff were invited to apply for the role of clinical champion and were appointed via a competitive process. Subsequently, lead-clinical champion posts were created to represent each level of the building. Staff were given the opportunity to create new models of patient care, linked to the design to improve patient outcomes. One example is the 'Get Active' initiative to help keep patients and their families get active before, during and after cancer treatment. As the design progressed and complexities arose, clinicians were recruited to join the design team.

**Results:** Concentrated clinical involvement allowed RIBA stage 4 to get back on course after a significant technical hitch. Dedicated time has enabled wider engagement, research, benchmarking, and evidence-based design to be incorporated. The design has significantly improved through greater clinical engagement, with patients benefiting from co-located facilities. Holistic models of care are being implemented prior to the opening of the children's cancer centre, changing the way we deliver care ahead of building.

**Conclusions:** At one of the most challenging times of working in the NHS, the clinical champion team project has united staff groups, who would not usually come together through this innovative model. While staff are struggling with increased clinical demands and escalating waiting lists, this project has provided a time to stop, review and make positive change for the future. Prospectively ringfencing a small percentage of the construction budget to 'buy back' clinical time from the organisation is an efficient method of getting the design right first time.



## Healthcare design education for medical directors: Mitigating communication gaps between stakeholders

Medical directors play a crucial role in the planning and design of healthcare facilities, often leading the process in collaboration with the architectural design team. Occasionally, communication challenges between medical professionals and architects can arise due to their different knowledge, expertise, and terminologies, leading to suboptimal designs. It's important to bridge this interprofessional gap and ensure effective communication to avoid any negative impact on the process and its outcome.

**Objectives:** A new course on healthcare design in the MBA in Healthcare Management Program at Tel Aviv University was specifically designed for medical directors. This course aims to equip future healthcare leaders with the knowledge of planning and design of healthcare facilities, strategic planning, and decision-making tools in this era of transformations. The course has been developed by two experienced professionals: a medical director and an architect.

**Methodology:** The course is centred around evidence-based design (EBD) and showcases ground-breaking designs for healthcare facilities. It also covers design processes and tools, decision-making methods, and economic and management aspects related to planning, design, and construction phases.

**Results:** The course draws parallels with evidence-based medicine (EBM) and promotes the active participation of students in gaining experience in an EBD process. The final assignment involves:

1. defining a topic, question, or context for a design project;
2. finding and analysing evidence from research publications;
3. providing references to architectural global design projects;
4. defining two possible design strategies and discussing the tradeoffs between stakeholders; and
5. defining evaluation criteria for post-occupancy evaluation (POE) in the event their project is accomplished.

The course is attended by students with diverse backgrounds, including physicians, nurses, and paramedical professionals from various hospitals and health organisations. They're encouraged to select a research topic based on real workplace issues. Selected topics included nurse burnout; patient movement; reducing violence in psychiatric care; community and family support in palliative care; challenges in radiologists' work; holistic cancer care; and more.

**Conclusions:** The students' feedback on the course indicated their interest in the field of healthcare design and their recognition that EBD provides a new and significant tool to improve and manage challenges in their organisations and professional practices.



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## The Monklands Replacement Project: An adaptive strategy for future healthcare delivery

The Monklands Replacement Project (MRP) is NHS Lanarkshire's exciting vision for University Hospital Monklands (UHM) and the community it serves, proposing a major investment in Lanarkshire's hospital estate by rebuilding the hospital on a new site at Wester Moffat, near Airdrie. A new, state-of-the-art, net-zero carbon UHM will support the required clinical model to meet objectives set out in NHS Lanarkshire's healthcare strategy, 'Achieving Excellence'.

**Methods:** To respond to the agreed clinical model for the new hospital, flexibility in design is key. The ability to treat and care for patients in an acute setting without multiple transfers to different departments improves safety and quality of experience.

The clinical model was developed by a multi-stakeholder group across NHS Lanarkshire. From this emerged several improvements to clinical pathways and new ways of working. Discussions focused on a hierarchy of decision-making, whereby clinical requirements were agreed followed by the operational response and, finally, the building design.

**Results:** Repeating room designs and spaces enhances safety, maximises capacity, and optimises efficiency of service provision. Our outpatient department is a good example of this; the ward design also responds to the repeatable brief. Repeating flows and adjacencies not only improve safety in relation to staff orientation but also maximise flexibility as services change over time. The most significant example of optimising space is the new peri-op model. As the project moves to full business case stage, we'll begin testing some of the new models of care and flows in the current hospital. This will allow us to consider early adaptations to the flows and enable design updates accordingly.

**Conclusions:** The MRP Repeatable Room Process drives component design from the ground up by exploiting repeatability as a product of proportion, layout, material selection, ergonomics, data, and engineering. The MRP will offer NHS Lanarkshire a facility that is state-of-the-art in its built environment, but by design, we will also be able to ensure that as services evolve over time in response to demography and epidemiology, the wards and departments will remain fit for purpose.

## Problems and potential solutions for operating room environments in the USA

Previous studies have identified OR environment challenges, such as surgical site infections and issues with room temperature, humidity, and noise. This paper examines data from the Facility Guideline Institute's (FGI) 'Reimagining OR Workshop' to identify prevalent problems and potential solutions for OR environments in the USA from both designers' and clinicians' perspectives.

**Objectives:** The FGI Workshop, facilitated by the Sextant Foundation, was a collaboration between the Association of Operating Room Nurses and the FGI. It applied human-centred design principles to address challenges in OR environments. The process involved about 100 participants, including clinicians, designers, students and researchers, taking part in various stages, including engagement; empathy; challenge definition; process mapping; ideation; prototyping; testing; presentation; and assessing code implications. Participants were grouped into ten multidisciplinary teams, each developing a prototype to address specific OR challenges.

**Methods:** The researchers conducted a qualitative analysis of the workshop data and identified patterns and themes. They also critically reviewed the proposed prototypes, considering practical and policy barriers.

**Results:** The workshop identified a wide range of OR challenges, encompassing logistical issues, staff workload and wellbeing, and patient and family experiences. The teams proposed ten prototypes, including robotics for efficient supply and equipment delivery; an AI-driven drone-based system for inter-hospital supply management; smart case carts tailored to surgeons' preferences; AI and sensors for real-time OR monitoring; a self-learning case cart system; AR for OR set-up assistance; flexible OR designs; environments to improve staff experiences and wellbeing; pre- and post-operation spaces for family engagement; and an iPad app-supported standardised itinerary for enhancing patient and family communication.

**Discussion:** The workshop highlighted an urgent need for OR environment improvements. Prototypes involving advanced technologies may be challenging owing to technological development needs. However, technologies such as tablet apps and robots are already being used in healthcare settings. Drone-based systems might face regulatory challenges, while concepts like adaptable ORs and spaces for family engagement are immediately applicable. Collaboration between clinicians and designers led to innovative concepts and potential solutions. However, most prototypes require further development and rigorous evaluation to ensure feasibility and effectiveness in real-world healthcare settings.



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## SEM headquarters: Transformative agility in healthcare infrastructure

The emergency medical services in Catalonia (Sistema d'emergències Mèdiques, SEM) co-ordinate all medical emergencies in the region, serving a population of about 7.8 million. The SEM headquarters, being built on the campus of the ICO (Institut Català d'Oncologia – Cancer Hospital), has been designed as flexible infrastructure for the CatSalut healthcare system.

The 25,000m<sup>2</sup> facility houses different services, including a 24-hour ambulance emergency base; training facilities; an SEM response call centre; and a 112 emergency call centre, all of which are part of CatSalut. The ground floor is at street level and includes the lobby, training facilities, and auditorium. Also at this level is the 24-hour ambulance emergency base.

Building on CatSalut's experience during the pandemic with the Sant Joan Primary Care Centre, the new facility can be transformed for future healthcare or research use. It's designed to enable future expansion through a prefabricated construction system that can add an entire floor and increase space. The facility is championing its move to create a climate-smart healthcare system, along with delivering new service and asset models that strengthen resilience. It's also creating humanistic environments that promote wellbeing.

The project will be delivered in a record 11 months to be eligible for funding through the Next Generation Catalunya programme, based on the European Union's Regional Development funds. Previous fast-track construction experience is proving key. The project is also applying Design for Manufacture and Assembly (DFMA) and industrialisation, Lean methodologies, BIM co-ordination, and Integrated Project Delivery (IPD) to achieve efficiency and quality.

The structural system of large spans in the whole building creates pillar-free floors, allowing adaptability for current operations and future uses. Active and passive sustainability strategies to minimise the carbon footprint are integral to the proposal. In this sense, compactness, proper orientation, and passive measures are critical to the energy function of the building and comfort of its users.

The SEM headquarters demonstrate how to create a healthcare system infrastructure that can respond to changing needs and challenges in healthcare. It demonstrates how learning from previous projects helps create the best facility for the community's needs.

## Keeping the machine running: Optimising resource allocation during phased construction

This research explores the optimisation of resource allocation, specifically treatment and observation beds, in a specialised emergency department (ED) during phased construction and renovation. Underpinning this study is a three-year historical patient data analysis, which informs the development of a simulation model integrating advanced optimisation algorithms. These algorithms play a crucial role in identifying efficient strategies for construction phasing and resource deployment, focusing on bed utilisation and patient wait times.

This study incorporates considerations of design and layout and deals with project complexity where renovations involve multiple phases requiring significant collaboration among interdisciplinary teams. A major challenge is maintaining ED operations during renovations.

The methodology involves detailed pre-processing and analysis of patient data, focusing on arrival timestamp data, Emergency Severity Index (ESI) levels, disposition status, and length of stay (LOS). By understanding the historical data, predominantly ESI 2 and ESI 3, the model adjusts to reflect the impact of splitting patients based on ESI levels across two floors on overall ED efficiency during construction phases. This data, combined with future projections for patient volume growth, facilitated the iterative development and validation of the two-floor simulation model, incorporating regular feedback from clinicians and designers. Application of a local search algorithm in the optimisation tool provides nuanced insights into two operational scenarios: the "pull till full" model and the "universal utilisation of beds", meaning the interchangeable use of observation and treatment beds.

A key conclusion is the quantification of potential bed reductions for each mentioned scenario on each floor during multiple phases of construction. Additionally, separating patients between different floors based on ESI levels enhances operational efficiency, allowing for targeted resource allocation and specialised patient care, with a high-acuity floor focusing on intensive care and a mid-acuity floor optimised for throughput and diagnostics.

This study informs strategies to maintain ED functionality during renovations, reduce patient wait times, maximise capacity, ensure future flexibility, and improve productivity. Its findings offer insights for healthcare facilities undergoing construction and renovation, providing a framework to guide effective resource management and enhance operational efficiency in complex healthcare environments.



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## Environmental barriers to safe and effective care for children with mental and behavioural health conditions in the emergency department

In the US, about half a million children receive care in the emergency department (ED) for mental and behavioural health (MBH) emergencies. Children and their families often have prolonged stays in chaotic ED waiting rooms and hallways that potentially exacerbate their anxiety and disorientation and cause further trauma.

Many EDs are ill-suited to assess and manage MBH patients and the ED environment can be counter-therapeutic to children experiencing an MBH emergency. The problem is especially severe in rural EDs, which lack the space, resources, or trained staff to provide care for this population. To address these challenges, a multidisciplinary research team is conducting a multi-year patient safety learning lab project, funded by the Agency for Healthcare Research and Quality, to develop safer and more human-centred environments for children with MBH conditions in the ED.

**Purpose:** The purpose of this study was to understand the patient journey and staff workflows related to MBH caregiving in the ED and to identify environmental barriers to providing safe and efficient care.

**Methods:** Observations were conducted at four EDs within Prisma Health, with 55 staff members across these facilities interviewed to understand staff and patient flows, and environmental barriers to caregiving and patient experience. Interviews were transcribed and coded using Atlas Ti software. Codes were developed based on the Systems Engineering Initiative for Patient Safety (SEIPS) framework and seven transcripts were initially coded to identify potential themes and to finalise the code book. Coders were trained and three rounds of Inter-Rater Reliability (IRR) evaluation were conducted to finalise the coding protocol until an IRR of 0.79 was achieved.

**Results:** Key barriers related to the built environment included reduced situational awareness for nurses due to poor sightlines and crowded workspaces; exposure of kids to inappropriate content due to lack of spatial separation; lack of privacy for confidential and sensitive conversations; few positive distractions for kids boarding in the ED; and challenges in safely transitioning regular ED rooms to ligature-minimised MBH rooms.

**Implications:** The findings of this study will support design and process improvement in participating sites and other facilities across the US experiencing similar challenges.

## Leanscape hospital: Fostering patient empowerment through knowledge and transparency

This paper explores the symbiotic relationship between clinical service planning strategies and architectural spatial concepts, emphasising the role of well-designed spaces in optimising healthcare. Introducing the concept of 'epicentric design' as a dynamic platform for interactive patient empowerment and knowledge exchange, the study investigates the transformative potential of carefully crafted environments as educational hubs.

This research investigates how carefully crafted environments can serve as learning facilities, fostering an agora-like setting where patients actively engage in forums and discussions. By examining case studies, the paper delves into the transformative potential of creating spaces that encourage collaborative learning, information sharing, and transfer of medical knowledge between healthcare professionals, patients and relatives.

Healthcare planners can create environments that not only support clinical service planning strategies but also empower patients through enhanced education and active participation in their healthcare journey. The interconnected dynamics of knowledge transfer, patient empowerment, and establishment of trust in the healthcare ecosystem define basic design ideas. From understanding diagnoses to comprehending the potential benefits and risks of various treatments, informed patients become partners in their recovery process. As the paradigm of healthcare continues to shift towards patient-centred models, empowerment of individuals in managing their own health becomes increasingly crucial.

This task rises to another level in the particular complexity of a paediatric hospital, as the usual duality between doctor and patient no longer exists but the special relationship of the parent-child-patient triangle must be taken into account. Lifestyle changes must be learnt to continue the healing process in home care. Addressing the potential benefits of demystifying complex medical concepts, this research enhances health literacy and facilitates more effective patient-provider communication.

The paper concludes by outlining practical strategies and recommendations for healthcare organisations to enhance patient empowerment through knowledge, open communication, and transparency. It offers insights into the tangible advantages of making science and medicine more visible to patients. By embracing these principles, healthcare projects can empower individuals to actively participate in their healthcare journeys, leading to improved health outcomes, enhanced trust in healthcare systems, and a more collaborative and patient-centric healthcare ecosystem.



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**Translational research – designing for bench-to-bedside clinical care. A case study of the Sydney Children's Hospital Stage 1 and Minderoo Children's Comprehensive Cancer Centre**

Translating research into clinical care has always required collaboration between researchers, clinicians, patients and educators. Research processes have traditionally been physically siloed from care environments, often owing to different space requirements, adversely impacting on the timeliness and focus needed to realise the benefits of bedside research.

Research techniques are becoming more sophisticated and specific to individual patients, requiring a personalised approach and direct access to patients. Treatment plans are relying increasingly on specific information for individual patients, and clinicians and patients are seeing improved clinical outcomes from this approach.

The "bench-to-bedside" approach – which describes the co-location of healthcare, research and education environments – uses co-location to: engage clinical innovation with bedside care; optimise health outcomes; accelerate learning discoveries; engage patients in the treatment process; and provide an ongoing feedback loop between science and care.

The project partner of the Sydney Children's Hospital, Randwick, Minderoo Children's Cancer Institute, has a rich culture of collaboration, blended with a commitment to transforming health through integrated research and care, and a key focus on inclusive design to promote wellness outcomes. It also pioneered the bench-to-bedside concept to enable better health outcomes.

The Sydney Children's Hospitals Network worked closely with the Children's Cancer Institute, Kids Research, and the University of New South Wales, together with Health Infrastructure NSW and the project team, in the conception, briefing, design and integration of the project, which has been co-located and co-created to optimise health outcomes. It's designed as a holistic place of healing for children, their families, carers, and hospital and research staff, while seamlessly incorporating the latest technology.

The design response is a "head and heart" approach to create an atmosphere of clinical excellence within a human-focused environment. Advanced research labs and dedicated clinical spaces sit alongside biophilic designs for patients and carers. Researchers, clinicians, patients and their families all benefit from close proximity of shared facilities housed in one building. Deep collaborations between clinicians, researchers, educators, patients and the design team have resulted in a building where research seamlessly flows from bench to bedside.

## Curing cancer in the Middle East: A global approach

Cancer, which is the third-leading cause of death in the United Arab Emirates (UAE), is complex, varied and personal, particularly in this region of the world. The Hamdan Bin Rashid Comprehensive Cancer Centre (HBRCH) in the UAE represents a new vision for a transformational and comprehensive cancer care model that brings together cohesive screening for early detection, state-of-the-art diagnostics, and treatment excellence in a single, holistic centre.

**Objectives and method:** This paper offers a guided journey through the many nuances of creating oncology care at the HBRCH, where the full complement of services complete with research and a progressive approach to learning will be fully integrated within the detection, treatment, and survivorship model. The paper aims to present:

- the major challenges the UAE faces for cancer prevention and treatment, with clarity of intentional solutions;
- forward-looking best practices in oncology planning and the process for creating culturally relevant solutions that might apply to other regions;
- how to achieve an elevated care model in clinical planning through the lens of stakeholders with strong mission-based intentions; and
- creative considerations for integrated philanthropic support that inspires quality care.

**Results:** The project sets a new standard for Dubai Health, focused on three pillars – care, learning, and discovery underpinned by giving. Philanthropic support is intrinsically connected to the success of this vision and sits at the forefront of discussions to ensure that the full complement of this evolved model of care is realised.

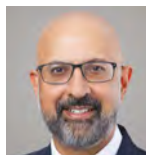
**Conclusions and implications:** The influence of the HBRCH transcends the project itself, with Dubai Health Leadership committed to infusing these new paradigms over time into the extended health system. Best practices from around the world are being applied inclusive of best-in-class innovations from world-renowned institutions.

The result will be an evolved care model combined with attention to cultural cohesion in clinical planning, and new design considerations for patient-centric care models. To that end, the design aims to propel research and training, empower providers, and foster philanthropic giving. Elegantly and harmoniously designed to combine history and legacy with contemporary expression, the centre will promote innovation and precision performance.



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## Outside the box – an innovative approach to vault design and the evolution of the radiation oncology environment

Modern-day cancer facilities are not only continually moving closer to the heart of the communities they serve but they're also paying much greater attention to the patient and staff experience.

Strong design principles built around both the healing influence of nature and knowledge of the local community are refining physical and operational features of these centres, alongside technological advances in research and treatment. At the same time, the prevalence of cancer is growing and operational demands are rising. Interdisciplinary patient-centric teams are becoming more common, thereby placing greater demand on well-designed spaces encouraging collaboration and interconnectedness. The more effective and responsive the care facility, the more likely a client can meet operational goals, and the best tool for designers to support this effort is a careful evaluation of operational and technological trends in cancer care.

This paper evaluates a promising new design model to enhance the overall experience of radiation oncology for both the patient and the care team. The design team, in collaboration with the clinical and medical technology team, investigated methods to improve the wellbeing, comfort and safety of patients undergoing this therapy, as well as caregivers' workflow and the ability to adapt to changing technology and care. The research method included a case study of the client's existing cancer facilities and literature reviews, followed by design explorations.

At the core of a radiation treatment space is the treatment vault. The new design model reimagines this vault, along with care team spaces grouped by specialty. It proposes ways to integrate a culture of interconnectedness through physical spaces, fostering enhanced learning and breaking silos. It capitalises on the benefits of natural light and views, as well as the integration of technology. With evidence provided by a post-occupancy evaluation conducted five years post-implementation, the model not only generates a more positive patient experience and helps improve patient outcomes but it also provides efficiencies in the clinical, operational, and treatment model, and increases flexibility.

This new model has been incorporated into two additional radiation oncology facilities in Texas, and this paper will highlight improvisations in these next-generation designs.

## Making the most of what we have: Fox Chase Cancer Center's transformation

The Advanced Treatment Center project at Fox Chase Cancer Center is a strategic response to the escalating demand for innovation in outpatient infusion therapies. The primary objective is to strategically repurpose, maximise, and revitalise the existing hospital campus, envisioning its transformation into an advanced treatment centre with a modern, patient-centric design, seamlessly aligned with world-class clinical treatments provided. This vision also seeks to breathe new life into the institution's brand.

The advanced treatment centre project was devised to address challenges arising from increasing demand for outpatient infusion services. Its vision includes enhancements in infusion services, the introduction of a purpose-built theranostics centre, and establishment of a dedicated day hospital tailored for bone marrow transplant (BMT) patients.

The project's multifaceted goals encompass a proactive response to innovations in cancer treatment, optimising outside views for infusion chairs to create a therapeutic environment, maintaining operational continuity without reducing cases, and implementing phasing of a series of smaller, manageable endeavours, while ensuring uninterrupted patient care throughout construction. Recognising the importance of patient experience, the project aims to update the arrival and registration processes while optimising space usage of hospital-based clinical programmes.

The phased construction plan is designed to ensure continuous operation of critical services. Emphasis on cost-effective adaptive reuse demonstrates that thoughtful programming, planning, and building analysis can yield a beautiful, dynamic space that responds to treatment innovations, improves clinical care delivery, and enhances positive patient experiences and healing. In close collaboration with Fox Chase's leadership, NORR Architects employed advanced 3D visualisation tools and storytelling techniques to communicate the goals of the project and garner support.

The overarching strategy of the advanced treatment centre project goes beyond meeting clinical needs; it endeavours to create a buzz around transformative efforts, encouraging philanthropy and engaging the loyal patient community. This strategic engagement aims to secure the necessary support for the project's ambitious goals and reinforces Fox Chase Cancer Center's position as a leader in cancer care. This holistic transformation not only revamps the physical infrastructure but also positions Fox Chase Cancer Center as a modern, patient-centric facility dedicated to continual innovation in cancer care.



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## The Christie Paterson Laboratories redevelopment in Manchester – a connected approach to cancer services

The design and infrastructure of the new Paterson Laboratory building at the Christie Hospital in Manchester aims to redesign cancer healthcare systems by bringing together both clinicians and researchers, transforming and improving the quality of cancer care services regionally.

The new £150m cancer research centre is the result of a partnership between the Christie NHS Foundation Trust, the University of Manchester, and Cancer Research UK. The development will be one of the world's leading cancer research facilities. The new research centre, situated on the Christie campus in Manchester, replaces a previous building that was severely damaged by fire in 2017. It will be the first Cancer Research UK scientific institute to be directly attached to a comprehensive cancer centre.

At over 25,000m<sup>2</sup>, the building is twice the size of the previous facility, allowing experts to deliver discovery research and translate their discoveries into innovative clinical trials at scale within the partnership's Manchester Cancer Research Centre (MCRC).

Together, a multidisciplinary team of more than 300 scientists and 400 clinicians and operational staff – practising what is known as 'team science' – will deliver clinical trials covering the full extent of the patient pathway, from prevention and novel treatments to living with and beyond cancer. The ambition will be to drive team science and double the number of cancer patients taking part in clinical trials by 2030.

A central component of the building will be the new Cancer Research UK National Biomarker Centre (NBC), which will be situated on the third floor. The NBC's focus will be on biomarkers to aid in early cancer detection and diagnosis, and biomarkers that enable personalised management of a patient's cancer, including which therapy will bring the most benefit.

We aim to demonstrate that the development provides a dynamic model for other providers worldwide to emulate, and forms part of a wider, long-term strategy to constantly drive regional cancer care services forward.



# Improving health worldwide through the power of design

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## A shift in safety: Danish insights for shaping the future of mental and behavioural health design

While mental illness continues to increase globally, affordability, stigma and barriers to access persistently hinder individuals from obtaining treatment. In recent years, Scandinavia has made significant investments in modern and progressive psychiatric healthcare environments. In 2022, the lead investigator toured six Danish psychiatric institutions and documented practical and scalable design strategies to draw inspiration for future environments.

A common theme across all facilities was emphasis on giving patients agency through design by fostering trust, choice and belonging. Discoveries included effective design and operational standards, such as the incorporation of alternatives to traditional seclusion rooms and a heightened level of trust bestowed on patients compared with similar psychiatric institutions in the USA. Further, five of the six institutions deliberately employed the building envelope to establish outdoor courtyards, integrating accessible outdoor spaces within the building footprint.

Instead of integrating expensive surveillance systems, metal detectors and ligature-resistant fixtures, Danish clients heavily invest in operational and clinical benefits centred on a hospitality-driven approach. The shift in focus of Danish psychiatric design is on the prevention of escalation via calming spaces and self-soothing environments. Although specific design considerations vary depending on geographic location, trends, data and building codes, research consistently demonstrates that the built environment influences human behaviour and operational outcomes.

The reduction in applied force observed at Esbjerg Psychiatric Hospital following its transition from a highly secured patient ward to a hospitality-driven design highlights the positive impact of design. By prioritising patient exploration and biophilic experiences over reliance on pharmacological treatment, sedation and mechanical restraint after a patient escalates, a shift in the traditional approach to safety is emerging. Instead of lockdown units and enclosed nurse stations, the focus has moved towards comfort and expanding options for nutritional, recreational, and personal experiences.

While recognising and addressing zones of risk remain essential, we're learning from Scandinavia that overly restrictive approaches appear to uphold the stigma that mental health patients are inherently dangerous, which compromises their dignity and motivation to get well. Shifting from "high-risk" design standards to a hospitality-driven, salutogenic clinical model has proven to reduce traumatic patient escalation and retaliation in Denmark



## Designing for mental health – the second wave of de-institutionalisation

The Victorian Government responded quickly to recommendations from the Royal Commission into Victoria's mental health system (RCVMHS) by providing early funds to deliver an uplift in acute public mental health bed capacity. The Government has since committed additional funds to further increase capacity in response to recommendations in the Commission's 2021 final report.

The Commission identified legacy infrastructure built in the era of "de-institutionalisation", and still in use, as an inhibitor to implementing contemporary care models. Other policy changes relating to sexual safety, reducing and eliminating seclusive practices, trauma-informed care, and growing evidence regarding therapeutic design in mental health settings had started to be worked through in the design of a small number of mental health inpatient projects over the past decade. These new projects represent the "second wave" of de-institutionalisation, co-designed with people with "lived experience", in line with the Commission's recommendations for greater consumer agency over their care and the places they receive care.

The project team used evidence-based design to translate new models of care into physical environments that embed salutogenic and biophilic principles. Delivered through a co-design partnership, the methodology included interactive workshops; large-scale engagement with physical building prototypes; building projection walk-throughs; and surveys and videos to engage participants.

The outcomes set new benchmarks in mental health design by restoring agency, autonomy, independence and control to service users through a recovery-oriented experience. Designed over multiple levels, these projects turn 'inside out' to eliminate the need for visible fencing by using the building 'as boundary'. Access to landscape is provided on each floor as courtyard spaces step up across the buildings, so the Australian cultural expectation of 'indoor/outdoor' lifestyle is seamlessly integrated into the outcomes.

Designed for 'familiarity' in support of a trauma-informed response, the buildings can 'shift' across service user acuity and gender identity continuums, providing a critical sense of safety. Ideas of identity, healing and recovery are represented by diverse, integrated artwork. These buildings are the first tranche of investment in acute mental health projects in Victoria and represent co-designed outcomes focused on recovery. Lessons learned are paving the way for future projects.



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## Designing hope: Learning from neuroscience to address the behavioural health crisis

As the number of people reporting behavioural health issues has risen sharply post-pandemic, the US mental health crisis has been compounded by a lack of psychiatric beds and high-occupancy rates at mental health facilities.

The Montage Health Ohana campus seeks to address this need and upend the narrative that mental healthcare must be relegated to institutional settings that isolate rather than heal.

Its visionary programme seeks to amplify positive outcomes for young people through connections with nature. This prototype behavioural health facility engaged brain science research, curated by molecular biologist Dr John Medina, to shape an environment that boosts executive function and personal agency, increases immune system health, and combats arousal fatigue in caregivers.

Ohana is one of the largest healthcare buildings to use cross-laminated timber, a material traditionally reserved for commercial projects. The facility benefits from its low-carbon impact, its modular components that can be assembled off-site to reduce resource use and schedules, and its anxiety-lowering properties.

Opened in late 2023, in Monterey, California, the centre offers a full spectrum of accessible behavioural health resources for the community, regardless of patients' ability to pay for treatment.

## A retrospective view of mental health design: What works, what doesn't and why?

The South West London and St George's Mental Health NHS Trust provides mental healthcare, treatment and recovery support for a catchment of approximately 2 million Londoners, as well as providing regional and national specialist mental health services. The two new Springfield University Hospital buildings, Trinity and Shaftesbury, opened in December 2022 and September 2023, respectively. The previous inpatient/outpatient accommodation on the 33-hectare former asylum site dated from the 1840s. The campus was inefficient and underutilised; and, as an alternative to an outright land disposal, the Trust embarked on a wholesale transformation of its estate.

The resulting estates modernisation programme has focused on the de-stigmatisation and integration of mental healthcare in a community. It places outpatient and training facilities, as well as secure and acute inpatient wards, in the midst of a development of new homes, a new 13-hectare public park, retail shops, and community spaces for an emerging South London neighbourhood.

In the one-year period since the first building was handed over to the Trust, initial post-occupancy data shows incidents down by over 36 per cent. But the intention of this presentation is to take an unvarnished look back; using both recent incident data and feedback interviews, it will examine the nuances of what has worked and what hasn't in the design of mental healthcare facilities.

Designers live in a bubble partially of our own making. We believe in the therapeutic power of positive, beneficial environments full of daylight, fresh air, and gardens. But when this vision meets the reality of understaffed, underfunded and risk-averse healthcare institutions, how do these ideals stand up?

The presentation will look at how the new wards have been adapted after handover to address practical concerns about control and security. It will look at what features of the new hospital are valued (or not) by service users, clinical staff, and management. Lastly, the talk will examine the way a major healthcare project is co-produced between designers and clinicians through a multi-year process of design and delivery, and how stakeholder(s) can uphold the vision of better, safer and more therapeutic mental healthcare facilities.



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## Small is beautiful: A flexible and empowering specialist eating disorders unit

Kimmeridge Court demonstrates the whole-system health benefits of small being "beautiful". This new facility empowers service users, carers and staff in a humanistic, therapeutic environment.

This ten-bed sheltered retreat for the specialist treatment of eating disorders sets a new standard of carefully crafted quality, respecting its natural setting and creating a private and therapeutic environment. Through close consultation with building users, facilities have been specially designed to enable service users to re-establish a positive relationship with food, exercise and wellbeing. This scheme has the qualities to support a system-wide rethink across all planned mental health inpatient services.

Attractive and homely activity spaces allow service users to practise life skills in an environment that mirrors everyday life, providing the confidence to complete these tasks independently. Sliding doors allow these spaces to be opened-up to promote social connection, or separated for more private, focused activity.

Generously sized corridors throughout are designed as an additional room, providing informal places to sit, rest and speak with other service users and the clinical team. These places are highlighted and enhanced by feature windows and rooflights, to create pleasant moments in the day. Natural materials, neutral colours, and integrated artworks throughout the building complement ever-present views to nature.

Opened in May 2023, a full post-occupancy evaluation is being undertaken in close collaboration with the Trust, its stakeholders and the architects, capturing and sharing lessons learned across service user, carer and staff experience, and clinical and building performance outcomes. We'll present the hypothesis that this approach represents the future for specialist mental health inpatient services, challenging the norm, and truly delivering on the non-institutional, recovery-focused model of care for many services from eating disorders and beyond.

"It's so beautiful," says Jess Griffiths, an eating disorders therapist and former eating disorders service user at St Ann's Hospital. "I think the environment will increase your chances of recovery."

"We've been long awaiting a modern, fit-for-purpose building, and now we have it – it's beautiful," says consultant psychiatrist Dr Carla Figueiredo. "I've looked at other units and what we've created here makes me very proud."

## A different kind of public-private partnership in the health sector

For over 25 years, the Stavros Niarchos Foundation's (SNF) approach to empowering humanity has guided more than 5400 grants totalling \$3.7 billion to nonprofit organisations in 134 countries.

At the heart of SNF's grantmaking is its \$1 billion Global Health Initiative (GHI), which aims to improve access to quality healthcare for all and empower frontline providers.

Since 2017, the GHI has grown to encompass more than 50 projects in Greece and worldwide, ranging from the design, construction, and outfitting of three new hospitals in Greece, to new medical training programmes, procurement of state-of-the-art equipment, pioneering mental health initiatives, and a suite of collaborations that capitalise on international expertise to strengthen healthcare infrastructure and capacity across the world.

Delivered through private philanthropy, in a public-private partnership underpinned by a common vision shared with Renzo Piano Building Workshop and the Hellenic Republic, three new state-of-the-art public hospitals are being built in geographic peripheries of Greece and will offer equitable quality medical care for all. The three hospitals seek to help establish a new standard in public healthcare – one that is baked into their design and clinical and operational planning.

This keynote session will present the story of Foundation's GHI and the role that philanthropy, more broadly, can play in future health projects.



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## Ageing populations, pandemic preparedness, and construction standardisation: Three innovations from the Alexandra Hospital project, Singapore

Singapore is experiencing a rapidly ageing population and growing demand on the public health system. Concurrently, there is a decreasing supply of healthcare staff in the nation. Alexandra Hospital is a 280,000m<sup>2</sup> hospital expansion that seeks to innovate the Singapore healthcare system and find a new way to address future health demands. The project features three areas of innovation.

**Model of care change:** A patient's journey in Singapore often comprises seeing multiple specialists, being moved across different departments, and transferring between acute and community hospitals. This can cause difficulties in information transfer, delays, and suboptimal care. Alexandra Hospital proposes a patient-centred model of care with the ethos 'One patient, One bed, One care team, One principal doctor, One with the community, Healthcare redesign' (OOOOH). This sees the patient at the centre of the wellness journey and influences health planning strategies. Additionally, the caregiver's role is prioritised in health planning by providing significant amenity, like family respite spaces.

**Pandemic planning:** Singapore's Changi airport is among the world's top-ten busiest, while the country is also one of the world's most densely populated – both factors influence the introduction and speed at which an epidemic could spread. Alexandra Hospital is designed to accommodate several stages of pandemic readiness: a command centre to identify potential pandemic risk and control patient demand; space provision for mass screening and entry point control; prioritising integrated green spaces for natural ventilation and mental wellness; and technological innovations for hospital deliveries and cleaning.

**Construction standardisation:** The Building and Construction Authority in Singapore enforces a buildability and constructability appraisal system to respond to the challenges of the availability of construction labour, as well as reducing construction time. The appraisal system enforces standardisation across delivery of all infrastructure projects and has helped develop a supply chain aligned to rapid project delivery.

**Conclusion:** These system challenges reflect complex issues many nations experience with ageing populations and decreasing healthcare staff, and the innovations provide learning opportunities for health systems around the world.

## The AIIMS, New Delhi, redevelopment mega-project: Pioneering new solutions in healthcare design

The imperative to address outdated infrastructure, rapidly growing demands, and the integration of advanced medical methods prompted the All India Institute for Medical Sciences (AIIMS), New Delhi to embark on a transformative journey.

Situated on a 194-acre campus, originally suburban but now engulfed by urban development, AIIMS seizes an opportunity for change – to become an IGBC Platinum-rated sustainable medical university. Encompassing healthcare, education, and research components, the redevelopment totals 1.51 million square metres of newly built space. It includes 3000-plus inpatient beds; a 300-bed emergency department; 90-plus operating theatres; a new outpatient clinic tower; expanded teaching facilities; and state-of-the-art infrastructure. The campus not only caters to the medical requirements of New Delhi but also serves patients from across India and internationally.

The sheer magnitude of change necessitated that capitalising on collective knowledge and global expertise. The collaboration spanned medical, academic and laboratory planners, urban designers, engineers, and sustainability experts from the US, China, Australia, and India, bringing insights and innovations from diverse perspectives and ensuring a comprehensive approach, informed by a toolkit of best practices, developed from experience on three continents. Seamless international integration enabled work to run around the clock, handing off between time zones, as a truly fast-track initiative.

The project employs best practices for large-scale institutions. Against the historical backdrop of Edwin Lutyens' grand masterplanning, AIIMS' mega-project emerges as a sustainable, fully integrated urban solution, positioning itself at the forefront of 21st-century healthcare in India. This endeavour addresses immediate challenges and marks a quantum leap in capabilities, setting the stage for AIIMS to become a beacon of health and education excellence among the top ranks of global medical universities.

This presentation invites a closer examination of AIIMS' transformative journey, showcasing how the amalgamation of cutting-edge design principles and sustainable practices resolved client requirements and paved the way for self-learning health systems on a monumental scale. Delegates will gain insights into the future of healthcare design, discovering how collaboration with international clients can redefine standards for transformative healthcare.



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## The healing power of place – New Footscray Hospital

Nearing completion, with a planned occupation in the second half of 2025, the New Footscray Hospital will set a new benchmark for hospitals as public architecture and places for people that are centred around nature and their connection to community and the healing power of place.

Reflecting the important history of 'The People's Hospital' – a hospital that was created and funded by the local community – the design for the new \$2bn hospital provides Melbourne's West with a new state-of-the-art facility that remains true to its heritage as a hospital, in and of its community, with the engagement of local community members and artists throughout the design process.

The design approach is centred on the experience for everyone, seeking to create a design that is efficient, enduring, sustainable, calm and inspiring through the integration of local artwork, natural materials, and a personal familiarity while being 'never far from nature'. A new village green at the heart of the hospital and a permeable precinct design seeks to break down and de-institutionalise common perceived barriers for members of the community to create a precinct that blurs the lines between living well, general wellbeing, and getting better.

Throughout the precinct, a deliberate focus on the 'healing power of place' throughout the design creates opportunities for storytelling and art integration, providing for reflection of the local environment, people and culture. Each of the artists' migration stories or their 'Journey to Footscray' have been considered through their artwork, linking to the rich cultural diversity of contemporary Footscray.

## Building a naturally smart healing environment: Lessons from a pandemic era

University Health Network's (UHN) Toronto Western Hospital (TWH) has evolved into an acute care neuroscience centre, expanding physically across a city block and becoming a research and education hub, while maintaining comprehensive diagnostic and treatment services, including a bustling emergency department. The new patient tower at TWH emerged as a response to surging patient volumes, increased need for complex surgical interventions, and pandemic-changing requirements for inpatient facilities.

The objective was not solely to expand clinical space but also to innovate the design process. How could a more prototypical approach evolve, free from the constraints of current hospital contexts, and enable future operational innovations, while integrating lessons from the pandemic's impact on community and wellbeing?

Our discussion centres on TWH's new patient tower as a prototype for enabling a holistic healing environment. Focal points include:

- 1. Smart design evolution:** UHN initiated a value-stream mapping exercise during the pre-design phase, shaping the evolution of service delivery within departmental programmes. This exercise emphasised specific configurations within each functional programme and floor plate, ensuring alignment of the design with the envisioned clinical/operational future.
- 2. Innovative technology integration:** Derived from the mapping, prioritised "use cases" emerged, guiding implementation of real-time location systems (RTLS). When operationalised, the RTLS would continually collect data, streamline, and communicate the patient care experience, enhance infection prevention, optimise supply chains, and foster a self-learning healthcare environment.
- 3. Healing spaces and functional integration:** The new patient tower encompasses a demanding functional programme, housing 20 operating rooms with three hybrid; a medical device reprocessing department; a campus-wide pharmacy; an intensive care unit; 66 inpatient beds; and a new public "front door" for the TWH campus. Its vertically configured design maximises daylight exposure and provides serene vistas of the cityscape. Prioritising safety and comfort, the design fosters inviting and secure environments. An 11th-floor terrace offers a patient, visitor and staff oasis for respite and rejuvenation, drawing lessons from the pandemic's spatial limitations.
- 4. Natural intelligence in design:** Embracing "natural intelligence", the design integrates technological advancements with biophilic principles, addressing current needs and envisioning future possibilities, while setting precedent for self-learning health systems.



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## Holistic healing and the hospital as city

In contemporary healthcare, healing is increasingly seen as a holistic process, where hospital architecture plays a crucial role. The authors have created concepts for healthcare buildings that differ clearly from the huge and, at times, intimidating hospital complexes of the 1960s to 1980s. Starting with REHAB Basel in 2002, and including larger hospitals such as the Children's Hospital in Zurich and the New North Zealand Hospital in Hillerød, Denmark – both of which are currently under construction – we've developed a horizontal hospital type that addresses the human scale.

The hospital is conceived as a city in itself – a network of streets and squares provide short connections and informal gathering places, and planted exterior courtyards provide daylight and orientation. Modular structures combine efficiency with flexibility. A finely tuned spatial flow offers patients, visitors and staff varying degrees of privacy. Wherever possible, natural and sustainable materials, such as wood, are used to create an atmosphere of warmth. Low mechanical interventions and Minergie standards (the Swiss building standard for comfort, efficiency and climate protection) are respected, while still providing the precise environmental conditions required for various hospital functions.

In the hospitals themselves, integration of artworks, the majority of which have been developed by artists specifically for these projects, enriches the healthcare environment and expands our perception of architecture's capabilities. Art plays a key role in making the hospital setting more human-centric, offering patients, their families, doctors, and staff the opportunities for contemplation and mental respite from health-related or daily stresses. In a similar vein, having visual and physical access to landscaped courtyards and gardens offers an additional pathway for relaxation and healing in the hospital environment.

This paper highlights the essential role of architecture in healthcare settings, encouraging a re-evaluation of hospital design in the European context. It advocates for an architectural approach that prioritises patient-centred care, environmental sustainability, and urban and community integration, contributing significantly to the future of healthcare infrastructure.

## The SNF Global Health Initiative – the role of the SNF hospitals in Greece’s healthcare sector

This paper aims at providing an overview of the Stavros Niarchos Foundation Global Health Initiative (GHI), which encompasses more than 40 projects, expanding access to health services, strengthening quality of care for all, and empowering providers at the front line. The GHI, with a budget exceeding \$1 billion is based on wide-ranging collaborations in Greece and worldwide.

This paper will explore how a decade of financial crisis in Greece has set the agenda for change and how the team’s transformational approach can be utilised in different contexts and environments, where public services are hollowed out by financial, socio-economic and human hardship. The GHI has five main pillars:

- Infrastructure projects: The GHI’s infrastructure projects include the design, construction and outfitting of three new state-of-the-art hospitals in Komotini, Thessaloniki, and Sparta, as well as major facilities expansion and renovation projects at large public hospitals in Athens, paediatric cancer and rare paediatric disease centres in Barcelona, and orthopaedics and stem cell hubs in New York. The three new hospitals for Greece will create a blueprint model for a new generation of hospitals, achieving high sustainability criteria and digital enablement.
- Mental health: With a vision for improving the lives of children and youth, and helping catalyse sector-wide transformations in how child and adolescent mental healthcare is delivered, the GHI includes the nationwide Child and Adolescent Mental Health Initiative (CAMHI) in Greece, as well as a series of global partnerships.
- Procurement of equipment.
- Training, knowledge exchange and partnerships.
- Science, technology and innovation.

**Method and conclusion:** A small panel of representatives from the client bodies, healthcare planners and designers will demonstrate that transformational change can be achieved by true collaboration. The session will focus on the implementation of the Global Health Initiative, an innovative model of private public partnership, necessitated by a national crisis followed by a global pandemic.



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## Embracing the circle: Realising functional efficiencies in contemporary hospital design

There is a tradition of circular geometry in hospital design – form following function to promote efficiency through reduced travel distances and localised panopticon planning (by maximising observation through direct lines of sight). Some architects have utilised it for specific functional components or whole facilities to substantiate perceived functional efficiency, others have made it their signature.

If efficiency does follow specific geometric forms and vice versa, does scale matter? What can we learn from geometry in developing efficient clinical settings in a digital age? Are other design principles more important and, furthermore, does form matter at all? Given that hospitals require such a high degree of servicing and involve complicated cellular relationships, is a looser fit and longer life more important – or relevant in the 21st century?

The opportunity for this case study arose in a design competition to extend and improve a recently opened hospital. The UK's first specialist emergency care hospital at Cramlington, Northumbria (NSECH) comprises 29,000m<sup>2</sup> and was completed in 2015. It's designed to deal purely with emergencies and life-saving procedures, with most patients expected to arrive by a 'blue light' vehicle from a regional catchment area, covered by several local hospitals. The new hospital includes emergency care; fracture clinic; operating department; endoscopy unit; critical care wards; paediatric and maternity units with theatre and special care baby unit; and imaging, together with all the usual support facilities.

Procured through PFI, the hospital was later brought back into public ownership and, through receipt of additional capital funding, will be making its second round of expansion.

Laid out in a plan that combines radial and concentric connections, the hospital uses space in a highly efficient way. However, it's a bespoke design without a consistent spatial planning or structural system, and now that the Trust wishes to improve its services, it's faced with the challenge of how to expand.

This paper reviews use of circular hospital planning, how the trust organised a competitive dialogue with shortlisted design teams, and how a flexible and affordable solution was conceived to meet its expansion requirements.

## Innovative vision to transform healthcare in Jordan

The Kingdom Health – Academic Medical Campus is a new healthcare and medical university facility in Amman, Jordan. The client's vision is to create a medical community that will redefine the way healthcare is delivered, taught, and evolves, by integrating clinical, education and research in a shared campus. This will enable implementation of new models of care and attract clinicians, patients, scientists and students from the region and around the world.

The new campus is situated on a greenfield site just south of Amman, and it comprises an acute hospital building of 70,000m<sup>2</sup>, a medical school of 14,500m<sup>2</sup>, and a shared education building of 7000m<sup>2</sup>, along with students' and nurses' residences in the first phase. Services will be delivered by UCLA Health and UCL Medical School.

The focus is on tertiary care, with mental health facilities, cancer care, care of the elderly, and women and children's services at the heart of the clinical model. Preventive care for patients with complex needs and long-term conditions reflects the ambition to address future healthcare challenges and reduce the need for acute hospital care.

The design establishes the cornerstone of a dynamic community, placing clinical care, education, and research within purpose-built structures that interconnect meaningfully, strategically arranged around a welcoming plaza. The masterplan design has also defined a framework for future growth – by 50 per cent for the hospital and by 400 per cent for the university – while also factoring in potential for growth in research and the introduction of enterprise and commercial developments.

Collaboration between the client, design team, advisors, service providers, and project managers has been key to the project's success. The project demonstrates how the right marriage of healthcare expertise and strategic investment (here, by the Saudi Jordanian Fund for Medical and Educational Investments) can deliver a new, flexible model of care and education. The campus is designed to adapt and grow with the needs and strategic direction of the services and masterplan.

The project is a reminder that, with the right vision, will and funding, excellent projects can be designed efficiently and delivered on site seamlessly and at speed.



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## **A building designed as a chapter in a lifelong patient relationship: Mercy Center for Performance Medicine and Specialty Care**

Patient experience ranks among the top objectives for virtually every new healthcare venture. For Mercy, experience is not about a transaction or a moment in time, it's about the cultivation of a lifelong relationship between the patient and their health system.

This idea was the driving force behind Mercy's 25,300-square metre Center for Performance Medicine and Specialty Care. The destination health centre was envisioned to not only elicit delight but also establish itself as an integral place along a continuum of care that extends beyond the building's walls and traverses both digital and physical touchpoints.

The shift in mindset from moments within a building to lifelong relationships represented a design opportunity for the project design team. It recognised that a traditional design approach would fall short in achieving the project's ambition, so the design process kicked off with a six-month study focused on the evolving interplay between technology, operations and the built environment across Mercy's care continuum. Engagement included experiential innovation tours, one-on-one interviews with patients and providers, and interactive visioning workshops that, together, would depict the essential elements of the Mercy patient experience. These findings and ideas were documented in a comprehensive experience playbook that spanned the entire patient journey, well before a building was encountered. The experience playbook provided the framework for the programming, planning and design phases that followed.

The experience-first approach resulted in a building that functions as a living prototype capable of integrating and enabling new technological interfaces, clinical programmes, and patient flows in a world where digital meets physical without disruption to its core clinical programmes. In its first year of operation, the Center has established itself as a new design and experience benchmark for the system and already activated new partnerships, like the Center for Precision Medicine with Mayo Clinic.

This paper will discuss the novel experience and design interventions implemented as a result of the experience playbook. The authors will share key insights and learnings gained from translating experiential concepts into built form, as well as how Mercy prepared for and adapted to changes in culture and operations.



## Obstacles to research translation: Piloting a new method to advance healthcare environments research

In the procurement of large, publicly funded healthcare facilities, design solutions that are anticipated or known to support wellbeing are often compromised (Nettleton et al, 2020; Hay, 2018; Zadeh et al, 2015). But the assumption that this is necessary to reduce construction costs is an oversimplification.

Compromises arise in relation to perceptions of risk related to innovation; conflicting stakeholder preferences; constraints of government supplier agreements; or the desire for short-term savings over longer-term economic returns (McLaughlan & Kirby, 2021; McLaughlan & Richards, 2023; Rowden & Jones, 2018; Stevens, 2020). As Kent et al (2022) observed, while we can measure the built environment's impact on health and wellbeing, "evidence is not enough" to secure positive change. Rather, we require a deeper understanding of how research translation is occurring, where it's failing, and the factors that influence translation.

**Methods:** This paper reports preliminary findings from a methodological innovation aimed at building a better understanding of where opportunities to optimise research are being missed; and to identify and prototype strategies to improve this – an innovation that enhances ethnographic observation (Cuff, 1992; Yeneva, 2009) using participatory action research (PAR) (Koshy et al, 2010; Myer, 2000). This approach was informed by three industry research partnerships (2018-23); attendance at 17 monthly meetings held by two separate industry-focused research interest groups (2019-23); and semi-structured interviews with six practices engaged in research-led design (2021-22).

**Results:** While an ethnographic approach places researchers at the coalface of the design and procurement of healthcare projects, the addition of PAR generates the conditions where common obstacles to research translation arise. This allows for iterative testing of practical solutions in response to challenges encountered in academic-industry research partnerships.

**Conclusions:** Beyond improvements to research translation, this method can reveal the relative influence of academic research versus that produced by architects themselves in the design of healthcare environments. A greater understanding of the relationship between these research types, their relative impact on design decisions, and the procurement factors that hamper research translation can assist both academic and practice-based researchers to create future research capable of having greater impact on design outcomes relative to end-user wellbeing.



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## The Space Kit approach: Ensuring evidence-based design knowledge uptake in large-scale complex building programmes

For large-scale complex programmes like hospitals, designers face the challenge of incorporating knowledge from multiple design domains, ranging from urban to interior detail. One strategy is to move from decisions on the large scale towards the small scale. However, we know that early design decisions are the most efficient and impactful, and correcting later design mistakes are costly. Thus, we risk knowledge for smaller-scale levels being introduced too late in the process.

**Objectives:** Some evidence-based design (EBD) knowledge does concern design at smaller-scale levels, while designers' visual language forms an extra challenge when incorporating EBD knowledge, often expressed numerically and categorically. The question arises: how can designers incorporate EBD knowledge relating to smaller scales from early conceptual design phases of large-scale complex programmes?

**Method:** We're developing a design method called the Space Kit approach, which allows interior design concepts to be introduced in early design phases typically reserved for programmatic and urban design decisions. In this paper, we'll present application of Space Kit in the hospital design strategy for the Helora network. This client has asked for a design system applicable on five different sites, ranging from 250- to 700-bed hospitals. Demand for flexibility was answered by a grid design approach, supplemented with the Space Kit.

**Results:** In this approach we developed a modular design language for specific situations of use, based on scientific knowledge. For instance, creating modular social spaces based on ethnographic findings in the fields of nursing, waiting room management, and therapeutic environments, within the context of large-scale logistic flows and relations to the urban environment. This allows us to organise a knowledge exchange from large to small scale, and vice versa, allowing EBD factors to be considered in high-level decisions, such as structural grid and functional module dimensioning.

**Conclusion:** The Space Kit approach improves EBD knowledge uptake from early design phases, both for medical and psychosocial knowledge, in a design-led way. Next, we'll investigate the potential of the modular space design in the adaptation to progressive knowledge acquisition, both at project level and the progression of the EBD field.



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## Patterns for wellbeing

Fifty years ago, Christopher Alexander wrote his seminal work, *A Pattern Language*, to categorise the qualitative characteristics of spaces, rooms, houses, streets and cities – in the belief that they are critical to our individual wellbeing and to the collective health of society.

Based on our cross-sector work in designing buildings to promote wellbeing and better mental health, this presentation will consist of a series of diagrammatic and descriptive patterns that categorise how the design of one element in a space and the connections it sets up, can contribute towards the creation of a therapeutic environment.

The presentation will look at design elements such as: adaptable devices (eg, sliding doors that default open to offer flexible privacy); niches and bay windows or 'rooms within rooms' as contemplative or refuge spaces; 'slow' stairs that encourage active use; waiting spaces that promote dignity; circulation spaces that 'reach out' for daylight and encourage social interaction; and so on.

Each pattern will be explored for the variety of contributions it makes to wellbeing: physical health; mental health; sociability; for the choices made on material detail and the spatial connections established to harness fresh air, daylight, sunlight, flora, and natural systems. These 'patterns for wellbeing' will express, and begin to code, the interconnectedness of complex design intentions and features found in every healthcare environment.

The presentation will conclude in the form of a proposition, or hypothesis, put forward through discussion with our clients and presented diagrammatically and then in use.

## Case studies of experiential design: Supporting the mind before the body to stimulate the healing process

The concept of healing environments can be traced back as far as Hippocrates, who referred to the environment as the fourth most significant factor in the healing process, after the disease itself, the patient, and the physician.

In a healthcare system that is constantly changing and more demanding every day, finding innovative ways to provide better service and improve patient outcomes is of utmost importance. Humans are complex organisms who thrive in the delicate balance between body and emotions.

Research has shown that the neurological function of the brain translates the sensory input from the environment into reactive emotions that trigger physical responses (Sternberg, 2001). Since the source of these sensory input is the surrounding environment, the next logical step is to explore new design models that support healing environmental designs. These designs focus on engaging patients on a cognitive level that puts them in a more active rather than passive mindset, and enable them to become more engaged in their healing process. As stated by Bate and Robert (2007): "The lesson for designers is that they need to be designing not only a product or a service but a total cognitive-emotional experience, which requires cultivated insight into, and appreciation of, people's fundamental human needs, hopes, fears and aspirations."

The outcome of these designs has been proven to be positive and supportive to the healing process. These models of design have been successfully implemented in healthcare facilities for children. These designs have focused on creating positive distractions and excitement for children to escape their somewhat hard reality. Designs that support the cognitive functions for children were proven to promote their mental and physical health, while re-signifying the body for healing and recuperation. Here, we share examples from three healthcare designs for children:

- physical and tactile play areas: the Ronald McDonald House and motivating children to move;
- nature and connection to the gardens: NCH, the garden and interactive light – the MUSC, the fish tank; and
- AI and interactivity – (confidential client) and NCH.

This research questions the feasibility and practicality of adopting similar experiential designs for adults in healthcare.



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## Nurse burnout: A social listening study investigating the environmental factors contributing to the nursing crisis

According to the World Health Organization, demand for nursing worldwide will reach 12.9 million by 2035. Not only is nurse burnout associated with worsening safety and quality of care but also with organisational commitment and productivity.

**Objectives:** This study aims to investigate the impact of the physical healthcare environment on nurse burnout from the perspective of nurses' lived experiences. It will address the following objectives: understand what contributes to nurse burnout; identify components of the physical healthcare environment that contribute to nurse burnout; and understand how the physical healthcare environment can be utilised to help mitigate nurse burnout.

**Methods:** Data was collected from r/nursing, a subreddit where nurses discuss experiences of their profession. The Reddit comments are tagged by subjects such as "gratitude", "rant", and "burnout". Comments under the "burnout" tag posted between September 2022 and June 2023 were extracted. The cleaned data set included 13,736 comments. Natural language processing was used to conduct a three-step coding of comments and tags:

1. nurse sentiments (positive, negative, and neutral);
2. fatigue types associated with physical, cognitive, emotional, and psychosocial domains of fatigue (Wingler and Keys, 2019);
3. Systems Engineering Initiative for Patient Safety (SEIPS) factors: environment, tasks, organisation, tools and technology (Holden, et al., 2013).

The environmental factors identified in the SEIPS framework were analysed using conventional content analysis to understand which factors in the physical environment contribute to nurse burnout.

**Results:** Over 75 per cent of comments had a negative sentiment. The fatigue tags that made up the majority (56 per cent) of total tags were hierarchy (psychosocial); desensitisation (emotional); barrier (emotional); mental (cognitive); and distance (physical). About 28 per cent of the tags pertained to the environment. This presentation will discuss environmental factors, including layout and ergonomics, which impacted patient and co-worker interaction and contributed to nurse burnout. Considerations for designing healthcare environments to help mitigate nurse burnout will be discussed.

**Implications:** This study sheds light on nurse burnout, not only highlighting the systemic challenges that contribute to the issue but also illustrating the power of design in creating healthcare spaces that enhance nurses' wellbeing.

## Applying and measuring design for staff wellbeing

There is a need to improve staff wellbeing in the NHS, but policy rarely considers the impact of the built environment.

There is a correlation between staff engagement and patient experience – if staff engagement is high, patient experience is better; if staff are unhappy, patients are unhappy. However, current staff space provision is generally poor. Facilities are institutional, uncomfortable, and frequently over-occupied. Typically, priorities are functionality and durability over comfort and respite.

The new Velindre Cancer Centre provides an opportunity to design a hospital with both patient and staff wellbeing at its core, focusing on the experience and health of all users, with a post-occupancy evaluation planned on completion to ensure that the impacts of design features can be measured and the findings disseminated.

The Trust's brief stipulated that staff wellbeing be carefully considered. During the design process, users were engaged to ensure that the provisions served them, while close working with the Authority to prepare for effective change management has been critical. Design strategies and features alongside evidence-based rationale have also enabled outcomes to be clearly measured against our hypotheses.

In tandem, a mini staff survey with the Trust has been developed, focusing on the built environment, to gather baseline data on the existing facility. The same survey will be deployed on completion for comparisons to be made. Data from the annual staff survey and Trust data on staff satisfaction, engagement, sickness, and more will also be reviewed.

Trusts need to improve their existing staff spaces and the New Hospital Programme needs to prioritise staff experience, as it will impact staff sickness, retention, and turnover, as well as patient wellbeing and experience. There is existing research on the impact of workplace environments on mental health, retention, absenteeism, productivity, etc, but this has been overwhelmingly focused on traditional office environments and desk jobs. These studies have helped companies understand the importance of the working environment on their bottom line.

This project proposes to be an exemplar in designing for staff wellbeing and contribute to the body of research on the impact of the healthcare workplace on staff satisfaction and wellbeing.



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### Structurally embedding spaces for emotive conversations in hospital setting: Lessons from the Three Little Pigs

There is growing recognition, particularly since Covid-19, that healthcare workers are unavoidably affected by the emotional nature of their work. While its impact is not in itself harmful, without appropriate organisational support, the consequent stress can manifest in suboptimal patient care, staff sickness, burnout, and retention difficulties. Many hospitals lack protected spaces in which staff can have and reflect on emotive conversations about care.

It would be absurd to think that a medical procedure would not require an appropriate setting as well as key skills, but that is an assumption made about emotive conversations in hospitals, which often end up happening around a bedspace or in a corridor. The medical model and, more recently, a neoliberal model of healthcare on the architecture and utility of healthcare buildings may be contributing factors.

Historically, the medical model conceptualises the relationship between patient and clinician as that of a detached expert treating a passive body – therefore, private spaces for relational subjective experiences aren't required. Attempts to remedy the situation often come after a healthcare building has already been built.

More recently, a neoliberal model of healthcare places immense pressure on staff to meet top-down targets, invisible in which is the wraparound work of emotional containment – for example, the sensitive building of rapport with patients or the time needed to process anxiety, anger and loss. The long-term negative impact of eroding staff members' time and space is not factored into such a model because it drastically undervalues the humanistic and relational reality of frontline healthcare work.

In the face of such pressures, staff feel guilty when carving out space for anything other than direct patient care, and any ad hoc spaces that are created for intimate conversations – pulling a curtain across a bedspace; sourcing an unused medical storage cupboard – are often the equivalent of building a house of straw or a house of sticks: hastily put together and easily blown away.

This paper proposes that healthcare organisations need 'houses of brick' that can robustly contain the unavoidably emotive aspects of healthcare work, and that such an approach begins at the architectural design stage.

## Art in healthcare environments: A comprehensive review of methodologies and patient perspectives

This research examines the role of art in healthcare facilities as a tool to improve patient experiences and contribute to positive treatment results. Although the advantages of incorporating art in healthcare environments are widely recognised, new evaluations have revealed contradictory results, making it difficult to apply existing findings in the real world.

**Methodology:** The study will utilise a two-step methodology consisting of a systematic review of existing literature on the integration of art in healthcare facilities, as well as surveys conducted with patients to determine their preferences for art. The review focuses on examining the various research approaches used in studies. The main goal is to analyse repetitive patterns, identify existing gaps, and evaluate the methodological advantages and disadvantages commonly found in present literature. Following that, the study proceeds to conduct a survey targeting around 300 hospital patients. This survey aims to gather information about patients' preferences for art in healthcare spaces, considering the holistic design of the built environment.

**Results:** Expected results consist of a comprehensive analysis that identifies the primary methodological approaches in healthcare art research, providing a critical examination of their suitability. The survey results are anticipated to advance the discussion on the most effective use of art in healthcare environments, highlighting a comprehensive approach to healthcare design.

**Conclusions:** This research seeks to contribute to the discussion on incorporating art into healthcare facilities. The study offers knowledge of the complex role of art in healthcare settings by thoroughly analysing current material and incorporating insights from contemporary hospital users. The systematic review is expected to provide insight into important methodological trends, which will aid future research.

The outcomes of the survey will provide valuable input to continuing conversations regarding the optimal utilisation of art in healthcare environments. Implications of the results underscore the need for nuanced approaches in implementing art interventions, guided by a comprehensive understanding of patient preferences and the broader healthcare environment.

This study offers practical insights to inform future initiatives, utilising the advantages of art to improve patient experiences and treatment results in hospital environments.



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## Children's day surgery: Transforming a daunting journey into the happiest of memories

The new Children's Day Surgery unit at Evelina London Children's Hospital will enable 2300 additional surgeries per year. Patients will go to theatre, recovery, and discharge – all in one "big" day. In collaboration with Guy's & St Thomas' NHS Foundation Trust, we developed an art, interiors and wayfinding scheme to transform the experience. Here, art and design go beyond aesthetics – they're a tool for clinical explanation, helping guide patients through a daunting experience, and bringing the "looked-after effect" across the journey. Design highlights included:

- Working with an illustrator to develop a gang of friendly figures, based on real patients, alongside illustrations of outer space, which appear in brightly coloured panels at bedsides and in rooms.
- Each panel features a corresponding space fact, like "astronauts can't burp in space" – bringing humour, learning and wonder.
- Our facts and artwork provide a tour of the universe, astronomical history, and the cosmic mythologies of global cultures – all signed off by NASA.
- Large, back-lit constellation panels appear at each lift lobby, providing a moment to take a "selfie".
- "Infoslices" provide information in simple, accessible language – helping to manage expectations and reduce anxiety.
- All artwork is colour-co-ordinated with interior design decisions.
- In staff-focused areas, we developed "grown-up versions of the artwork", which feature calming patterns and colours.
- We combined art and construction materials effectively, creating a cost-effective, collaborative project.

We ran workshops and forums with young people. The illustrator gave an online masterclass sharing how to draw in their style. Patients entered a drawing competition, interpreting the 'outer space' theme. The illustrator took direct influence from every entry, e.g., the anaesthetic room artwork features eminent space professionals, as patients' suggested. Patients were shown how their ideas and designs influenced the final environment. They also met astronomers, astronauts, and Royal Geographic Society members.

Feedback from families has been positive. Comments include: "It's stunning, the bright artwork and interiors helped put our son at ease... Excellent atmosphere for young children."

The Trust is measuring the impact of this "complementary narrative" model, with the environment serving as the focus of research, e.g., how virtual reality can reduce anxiety before surgery.

## **A new standard for Aboriginal primary healthcare: Post-occupancy data and experience from PAMS Healthcare Hub Newman**

The Puntukurnu Aboriginal Medical Service (PAMS) Healthcare Hub in Newman, Western Australia was designed through a participatory design process with elders, community and the PAMS Board.

The project has become the physical embodiment of the client ethos, placing wellness at the centre of community – community-focused, connected to Country, incorporating culture and providing high-quality care. It incorporates a primary health clinic, a head office, and four haemodialysis chairs. The clinic includes general practice, child / maternal health, dental, treatment and allied health facilities for visiting clinicians from Perth. A key aim was to minimise the large cost and negative mental health impacts of Martu and Niaboli people leaving Country and family for treatment in Perth.

The architectural response is imbued with Country, cultural and people for the objective of placing wellness at the centre of community and physically representing the PAMS ethos. This was underpinned by the co-design process and underpinned by the architect spending significant time in the communities through the projects. This facilitated iterative consultation and a genuine co-design process with the community and specific user groups. Importantly, it enabled impromptu 'yarning' under a tree, at the petrol pump, or on the way to the shop. This enabled all voices to be heard from a nomadic culture that is not always comfortable speaking within the mob. The result is a fine-tuning of the architecture that resonates with the community, enriching the architecture by making it subtly more appropriate to people, place and culture.

Several years on, the project has exceeded all expectations and set a new benchmark in regional and remote Aboriginal healthcare service delivery and architecture. The project and the service have been embraced by the community and exceeded all demand forecasts. It has also received several awards. However, post-occupancy data and experience have not been fully shared.

Post-occupancy data and experience will be presented to outline the lessons learnt and how they can be applied to improve future services and infrastructure delivery, drilling down into what makes good cultural design and service delivery, and how all projects and services can apply these lessons.



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## Designing with Country

When First Nations people in Australia speak of country, it's about the place of their ancestors, stories, lore and knowledge. Acknowledging that a site belongs to a specific country on a particular part of this continent enables us to draw inspiration, ideas and opportunities directly from that place and the people who belong to it.

**Objectives:** This paper will provide insight into how case studies of the designs of recent healthcare projects have benefited from the application of a 'Designing with Country' framework, developed to guide the way we think about projects that engage with First Nations communities and contexts.

**Methodology:** The framework's approach is threefold. Firstly, through the early engagement and consultation with community that enables and creates an environment of listening learning and understanding of history, country and place. Secondly, by exploring what makes a unified place in the creation of inclusive spaces for all people, our 'Designing with Country' principles ask us to consider not only the critical clinical and functional needs but also the principles of caring for the land, using sustainable materials, and incorporating Indigenous connections that examine and make connection to multiple layers of context, as well as responding to the clinical and functional needs of the project. Our third approach to 'Designing with Country' is a focused investigation using our 'opportunities lens', which explores through the concepts of spatial settings (track, camp and ritual), country palettes (material, colour, flora), and caring for country (energy and carbon).

**Results:** The framework enables connections to site, people and programme in a manner that is all-encompassing and contextualised. It offers an opportunity for hospitals to meet not only a clinical demand but also an emotional demand and need – a need to belong. At the intersection of clinical medicine and design, we can start to think about hospitals as places of clinical confidence that are welcoming, promote wellbeing, and embody spiritual and cultural connection for all.

**Conclusions:** This analysis and framework has successfully informed the urban design, architecture, interior design, public art, and landscape architecture opportunities and approach for all our projects.

## Reconciliation and a net-zero carbon future: The new Cowichan District Hospital aims to give back to the people and the land it will serve

The Cowichan District Hospital Replacement Project stands as a testament to a revolutionary healthcare approach. More than a medical facility, it embodies a pioneering design philosophy centred around patients and staff.

It comprises three distinct structures: a diagnostic and treatment block; an inpatient tower; and a two-storey, heavy, timber-frame building named the 'Reach Out' building. All three buildings are connected by a central community hall, where all circulation pathways converge, creating a single place for staff collaboration and for patient families to meet and foster a common bond.

The new Cowichan District Hospital is the very first vertical project to be delivered by the Alliance project development model in Canada, and it aims to be the first Canada Green Building Council (CaGBC) net-zero carbon hospital in Canada, and the first fully electric hospital in British Columbia.

This presentation will offer insights into the Alliance model – a three-stage partnership procurement model – and its strategic utilisation in optimising key result areas (KRAs) associated with staff wellbeing, the nurturing of healing environments, and the fostering of local Indigenous representation and inclusion. Furthermore, the presentation will delineate the reasons underpinning the shift towards embracing the 'best-for-project' delivery model as the preferred approach for healthcare construction in British Columbia.

Secondly, patient-centred design and reconciliation will be addressed. Our team worked closely with the local Quw'utsun Peoples to ensure that the facility would not only meet patients' clinical needs but also address the community's cultural sensitivities and significance. The building features elements aimed at improving Indigenous health, including an Indigenous food kitchen, traditional healing gardens with medicinal plantings, and accommodations for traditional Indigenous burning ceremonies in more than 185 rooms – exceeding the original project requirement of just one space.

Lastly, we'll focus on environmental sustainability and resiliency. This section will highlight specific approaches from the project, emphasising the balance between the healing environment, healthcare worker and cultural needs, and energy and sustainable goals. The project has developed innovative solutions, aiming to become Canada's first CaGBC net-zero carbon hospital, the first fully electric hospital in British Columbia, and achieving LEED Gold certification.



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## Redesign of adult health and social care services in Caithness

Caithness is a remote and rural district in the far north of Scotland. It has around 25,000 residents with a relatively low population density, and roughly one-third of the population lives in rural areas.

Ambitious service change proposals seek to modernise all adult health and social care services in the district. The focus is on prevention, working with partners to build resilient communities, and moving away from hospital-based care as the default.

The Caithness redesign is one of three national pathfinder schemes to test how to implement local care, supported by the Scottish Futures Trust and specialist healthcare planners. A key aspect is the local care model. This is place-based, focusing on population cohorts with high needs, and centred on addressing the priorities of the individual.

A multidisciplinary team, supported by a single point of access, will provide targeted community-based support for individuals with complex needs, and there is compelling evidence that this reduces hospital admissions and length of stay. This is a more sustainable and flexible model of health and social care, achieved through integration of services, utilising technology, and embracing the 'place principle'.

Advancements in technology are a key enabler, with improvements in e-health systems, remote working, and greater virtual consultation. During the Covid-19 pandemic, Caithness was at the forefront of NHS Near Me technology, reducing the need for patients to travel long distances to attend appointments.

A place-based investment strategy is underway in Caithness with hub North, NHS Highland, the University of the Highlands and Islands, Scottish Futures Trust, and other partners. This involves collaboration sitting at the heart of a better future, to improve services and enhance quality of life in a changing Caithness. This will take a whole systems view, enabling more efficient public services through better use of resources, a faster pace of service transformation with more opportunities for community empowerment, and capitalising on investment opportunities to improve jobs.

In a post-Covid world, this collaboration ensures a more effective approach to economic recovery, more resilience to shocks, and more effective transition to a low-carbon future.



## Ageing Right Care(fully): A comparative study of ageing in place and hospital care at home in the Netherlands, Israel, and Sweden

Ageing Right Care(fully) is a transnational research project that explores and maps an understanding of the care pathways between ageing in place and hospitalisation of older adults in the Netherlands, Israel, and Sweden.

Countries are suited to be compared where they have growing, ageing populations, a focus on healthcare reform, and several policies to reduce the cost of care for older populations. For instance, ageing in place is a government-led policy often associated with choice, however, there is a debate about whether ageing in place is a universal desire for all older adults. Research shows that the care pathway between the hospital and the home, associated with ageing in place, can impact wellbeing, especially if the built, social and technological environments do not meet the healthcare needs and preferences of older adults. This is significant as new programmes for at-home-hospitalisation and hybrid wards are being developed as part of a healthcare system transformation.

**Purpose:** The aim of the study is to compare the different approaches to ageing in place and at-home hospital care in the Netherlands, Israel, and Sweden. The study explores the demographics, policy structure, decision-making process, and the role of the built, social and technological environments along the hospital-to-home care pathways of older adults.

**Methods:** The study includes a three-phase research method to understand the care pathways between the home and hospital of older adults ageing in place. The first phase compares each country's population and policy structures relating to ageing in place, hospital discharge, home hospitalisation, and at-home care for older adults. The second phase, based on a citizen science approach, maps patient journeys of older adults living in each country through the perspective of the older adult, caregivers, and care professionals. The third phase explores commonalities between the knowledge gained through phases one and two, and mobilises the knowledge into policy recommendations and implementation guidelines.

**Results:** The comparative study can support the development of innovative, person-centred, distributed care models for older adults. Results will be shared with end-users, including citizens, carers, healthcare policymakers, planners, architects, and designers, through a range of media.



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**"oase.kleinbasel": A cross-generational care site combining hospice care for children and adolescents with dementia care**

In Basel, Switzerland, a cross-generational palliative and hospice centre for children and adolescents is planned on the extended site of a specialised dementia nursing home. The project "oase.kleinbasel" aims at utilising operational synergies among two service providers by expanding the facility services of the nursing home, making specialised hospice services available to the nursing home, creating a commonly used protected garden/playground, and using other properties on the site for additional care services.

"oase.kleinbasel" aims to be an extensive, sheltered location primarily for children and adolescents with a palliative diagnosis and persons with advanced dementia. The site should be accessible to the neighbourhood, and various stakeholders should be able to use the infrastructure and benefit from offered services (e.g., GPs, home care services, children's daycare centre).

**Methods and outlook:** An interdisciplinary research team accompanied the planning and development process of the ongoing project by moderating the negotiation of multifaceted aims and needs of the parties involved at various points in the process. The team comprises experts in health, architecture, and design.

Through workshops and feedback rounds, various stakeholders and extended interest groups will be involved in the planning process to ensure participation in an early stage. The aim is to identify the needs of different users and providers, to integrate their needs in the planning process, and to harmonise the envisaged operational concepts of the providers with the construction process. Scientific findings from health research, architecture and design are incorporated in the process.

In a first preparatory workshop held in 2023 with representatives and staff members of the dementia nursing home and representatives of the hospice association, participants discussed first sketches and blueprints of the site and its buildings. It illustrated that the expertise and perspectives of the future users provide valuable input for the definition of the requirements of the planned extensions and buildings, including the services they will incorporate. It also became evident that additional stakeholders need to be involved in the future process. These stakeholders, as well as other interest groups, to be determined during the process, will be included in workshops and feedback rounds during 2024.

## Health House: Case study of Rijnstate Hospital in Elst

The new Rijnstate hospital in Elst marks a transition from the traditional hospital to a health house – an ambitious project driven by research into the development of hospitals and the healthcare landscape. The context in which this takes place is the growing recognition of the need to integrate healthcare into the broader framework of a healthy living and care environment.

The project's objective is clear: to create a health house that not only provides medical care but also serves as a centre for meeting, information, prevention, and education for the community. Rijnstate in Elst is designed as a compact outpatient 'health hub' of 13,000 square metres, located in the heart of Elst along the railway and a thoroughfare. This building acts as an easily accessible facility where one can seek not only medical care but also engage in social interaction and educational activities.

The methodology applied includes not only architectural design but also a holistic approach to sustainability, green design, and user-friendliness. The green welcome is emphasised by the creation of a green area with fruit trees, as a nod to local fruit cultivation. Visitors can check-in from home, reducing waiting times and giving the building a hospitable character.

The project's results showcase an innovative design that transforms the traditional hospital environment into a more accessible, sustainable, and green health hub. The green design and interactive check-in procedure contribute to a positive user experience. The building, with clever twists in the facade, natural ventilation, demountable materials, and flexibility for future adjustments, embodies sustainability at various levels.

This project highlights the potential of health houses as an evolution in healthcare. The new Rijnstate in Elst is not just a medical facility but also a community centre that reaches out to and supports the surrounding environment. The implications go beyond architecture and design; they suggest a shift towards a more inclusive and holistic approach to healthcare, integrating social, economic and environmental factors in the pursuit of wellbeing. The project shapes the future of healthcare, where the health of a community is supported and promoted through an innovative and sustainable healthcare infrastructure.



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## Improved quality of life: The positive impact of a pioneering integrated care centre

In 2018, the Jean Bishop Integrated Care Centre (JBICC) opened as a response to several challenges faced by Hull and North Yorkshire ICB (HNYICB). Hull is the fourth most deprived local authority in England; around 25,000 residents are living with frailty, and 3200 with severe frailty. As a result, the health system was overwhelmed with non-elective hospital admissions, struggling to find beds for elderly patients.

HNYICB developed an anticipatory care model to create an out-of-hospital service to help local people stay at home. Using population health management tools, the model offers preventive integrated health and care planning by bringing together NHS, social care, voluntary sector, and fire and rescue services to work together to improve outcomes. As the model developed, a new kind of building was designed to deliver this type of care. The JBICC contains community healthcare services alongside the relocated East Hull Fire Station, supporting the integration of rescue services, including safe and well checks, and emergency responses to falls.

A study assessed the wellbeing of patients who received comprehensive geriatric assessment (CGA) at the centre compared with those who didn't. Findings included:

- For those living in their own home, there was a 15-20 per cent reduction in emergency department (ED) attendances and a 10-25 per cent reduction in emergency admissions for the 12 months after assessment, compared with 12 months prior.
- For residents in care homes, there has been a 20-25 per cent reduction in ED attendances. For the frail cohort, ED attendances and admissions consistently fell by more than half in the following 12 months.
- The centre believes it is saving more than £100 per patient, per year, on the cost of medication. It believes if this were replicated for all frail people across the UK, it could represent a £270m annual saving to the NHS.

A year on from the establishment of integrated care systems across England, the JBICC provides evidence of the benefit of partnership working between the NHS, local councils, community and voluntary organisations. This presentation will review the role of design and clinical innovation in the centre's success.

## Castleford Integrated Health Hub – a catalyst for regeneration and integrated local health system

The Castleford Integrated Health Hub, a joint effort of NHS Wakefield CCG and Wakefield City Council, aligns with the Strategic Regeneration Framework (SRF) for long-term intervention. The aim is to establish a facility that not only aligns with five-year plan objectives but also tackles persistent health inequalities in Castleford, prioritising services to address longstanding disparities.

**Objectives:** The SRF envisions a renewed Castleford, with a new facility acting as a regeneration catalyst by uniting three GP practices and local authority spaces in the town centre. The project prioritises collaboration, joint learning, and development of an integrated health system for the community. The facility is designed for resilience in future health emergencies. Accommodation is optimised for flexibility, adaptability, and retention of knowledge. The project fosters collective learning through collaborative clinical and non-clinical practices.

**Methodology:** Early involvement with key stakeholders was vital to understand their present needs and future aspirations. The building's design prioritised collaboration, both clinically and non-clinically. Using workshops and interactive 3D models, we explored scenarios to enhance efficiencies and clinical pathways, integrating best practices from each GP. Lessons from the pandemic informed our approach.

**Results:** The courtyard-centric plan ensures access for each GP practice, challenging the outdated shared waiting room concept, and recognising the risks of a crowded, infectious space. Patient separation for acute conditions fosters a safer environment, offering alternatives such as garden waiting areas or smaller reception spaces. A unified access route encourages future collaboration and clinical integration. The shared urgent treatment suite accommodates planned and unplanned treatments, accessible to all three GPs through bookings, addressing acute cases, including Covid symptoms. The design emphasises cross-disciplinary collaboration, fostering informal communication through shared communal areas and restrooms. Shared meeting rooms enhance teamwork. The flexible use of shared spaces includes considerations for after-hours vaccination centres or external service providers, enhancing adaptability of design principles.

**Conclusion:** The new health facility introduces a healthcare delivery model promoting community health. Flexibility, collaboration and shared knowledge aim to enhance services, offering strategic planning for health emergencies. Partnering and collaboration foster best practices and cross-disciplinary work in both clinical and non-clinical domains.



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## One health system's journey of creating a culture of innovation: A living lab initiative for implementation of an extensive prototyping and testing process

As part of SingHealth's regional health initiative around care innovation, workforce transformation, and resilient design, a 1500-bed, state-of-the-art health campus is currently being designed in the eastern region of Singapore.

**Objectives:** To support an evidence-based approach, the system's first living lab was built on the new Eastern Integrated Health Campus to implement an extensive prototyping and testing process during design.

**Methods:** Over 40 room types were evaluated during the early phases of the design process by more than 300 clinicians, hospital and government representatives, and consultants using scenario-based simulations in low- and medium-fidelity physical mock-ups, as well as virtual reality and immersive Cave Automatic Virtual Environments (CAVE). Each room type underwent two rounds of evaluations in low-fidelity using physical and virtual mock-ups during concept design, followed by two rounds of evaluations in medium-fidelity virtual reality and CAVE environments during schematic design.

**Results:** The Systems Engineering Initiative for Patient Safety (SEIPS) framework was used to capture, categorise, and prioritise user insights from the evaluations. More than 300 comments were catalogued, resulting in minor changes in the rooms, such as the placement of furniture, as well as major changes to the design, such as rearrangement of zones and reconfiguration of ancillary spaces. After each round of evaluations, refinements were made to the design. High-fidelity physical mock-ups are being constructed to test 12 of the most repeatable and complex room typologies during design development, including selected inpatient, outpatient, emergency department, and operating rooms. It's expected that three rounds of evaluations will be conducted in the high-fidelity mock-ups using the same approach.

**Conclusions:** Participants will hear about one health system's journey and commitment to a culture of continuous testing and evaluation to address the rapidly changing needs of care delivery. Participants will also learn about one of the largest prototyping and testing efforts currently underway, globally, and hear from the design team about the challenges of implementing an effort of this scale. The benefits of engaging end users early and often during the design process will be discussed, along with how to integrate this type of engagement into traditional design processes.

## Outcomes from the NOVELL method: A living lab for rethinking rehabilitation design and services

Innovation in healthcare is notoriously difficult to achieve. Timelines are often pressured, yet healthcare environments are complex with intertwined physical environments and services, and there are complex and contradictory perspectives. There are few avenues to generate evidence-based, co-designed learnings. This paper will present the designs and outcomes of the NOVELL method, a living lab framework for innovating built environment and service design.

**Purpose:** The Neuroscience Optimised Virtual Environment Living Lab (NOVELL) project aims to improve the way we plan, design, and evaluate healthcare environments, with a focus on stroke rehabilitation.

**Methodology:** The NOVELL method brings together processes from co-design, architecture, design science, and neuroscience to deliver evidence-based, end-user engaged innovation in healthcare design. It provides a framework for self-learning health systems to meaningfully engage end-users through design-based processes. In this project, we defined core values and objectives for stroke rehabilitation in partnership with stroke survivors, clinicians, architects and designers, policymakers, and researchers. We created a performance-focused brief to inform the environment and the service, and establish a best-practice standard. We used these briefs to design three exemplar bedrooms and wards, illustrating the variety of design solutions that can be generated for a particular healthcare context. These designs have been rendered in virtual reality and evaluated by stakeholders using a mixed-methods evaluation process that enables complex arrays of variables to be investigated and tested against predefined core values.

**Results:** The new designs have been systematically evaluated by 40 stroke survivors, clinicians, architects and designers, policymakers, and researchers. Quantitative results reveal a clear pattern, with some designs meeting the core values to a greater extent than others, providing evidence of the success of this method of evaluation. Data indicates which values are driving the overall evaluation or preference for certain designs. Qualitative results from focus groups, interviews, and immediate 'think aloud' responses to the rendered designs reveal how particular design features contributed to outcomes.

**Conclusions:** The NOVELL method can be used as a model for collaborative healthcare innovation and learning. Bedroom and ward designs generated in this project, and the evaluation and feedback, can inform future designs for stroke rehabilitation.

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## From VR to digital twin reality: Pioneering a human and experience-centric approach to healthcare architecture design

The journey from virtual reality (VR) models to digital twins signifies a profound shift, with the transformative impact evident in the completion of the Al-Moosa Rehab Hospital.

This presentation delves into the use of VR models, offering a human-centric perspective in shaping this cutting-edge facility. Seamless integration of parametric design and high-fidelity modelling not only streamlined the design process but also elevated the user group experience.

Completed in 2023, the Al-Moosa Rehab Hospital is a culmination of immersive design technologies and stands as a testament to the potential of these advancements. The VR model served as both a catalyst and a cornerstone for the creation of the digital twin. The high-fidelity model played a crucial role in expediting decision-making and fostering a deeply informed design environment. This initial virtual representation seamlessly evolved into a digital twin, capturing the essence of the hospital's architecture, operations and environment. Parametric modelling ensured the building's features were not only responsive to its immediate environment but also contributed to an intelligent and sustainable design.

This virtual representation has proven instrumental in ongoing adaptation, particularly in streamlining management of the facility.

### Learning objectives:

- Human-centric VR design application: Explore the practical application of immersive VR design as a transformative tool for architects, emphasising its role in enhancing the human experience during the design phase.
- Optimising design with parametric methodology: Showcase parametric design in shaping the Al-Moosa Rehabilitation Hospital, illustrating its role in designing complex architectural structures.
- Data-driven informed decision-making: Stress the significance of data-driven choices in the design process, ensuring alignment with the intended objectives and requirements of the hospital.
- Digital twins in post-construction persistence: Highlight the enduring relevance of digital twins post-construction, showcasing their benefits in adaptation, monitoring, and facility management.
- Seamless integration of technology: Emphasise the seamless integration of cutting-edge technology, illustrating how advancements in digital tools contribute to the quality and efficiency of architectural projects throughout their life-cycle.

## Maximising end-user design for digitally advanced hospitals

New ways of working, new models of care, staff and patient experience are the primary factors that should inform the design of a future hospital or healthcare facility. The same is true for designing digitally innovative facilities.

From a digital standpoint, a whole host of guidance and best practice is available to help support the development of digitally innovative hospitals and healthcare facilities. The New Hospital Programme's digital workstream, along with industry, is providing detailed information to help inform future improvements in healthcare delivery. However, there is a gap. If the application of digital's "art-of-the-possible" can't reach end-users – clinicians and operational staff – whom we need to design our new facilities, how can we expect the designs to reflect digital as an enabler? If these stakeholders aren't aware of how digital can change the way they work and treat patients, then we can't hold higher expectations for a digitally advanced future.

A method has been developed to help the design of digitally advanced hospitals and healthcare facilities by enabling clinical and operational stakeholders to first understand their pressures, challenges and pain points; and then to develop a cross-departmental or organisational future state that not only solves current issues but which enables step changes, or even shifts, in how healthcare is delivered and how buildings are managed. It concludes by identifying the digital interventions needed to support these new ambitions in the future.

In short, a process is necessary that isn't concerned with technology until after the full current and future states have been worked through. The process will be developed by walking stakeholders through a coaching/mentoring journey that helps them see their roles into the future, and to articulate what that will look like so that we can understand what will be needed from technology.

The method maximises workshops and graphical infographics to explain digital concepts. Not only does this get the most from stakeholders but it can be led by the stakeholders themselves. The result is a design that will change how healthcare is provided for years to come and which maximises digital opportunities.



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## Logistic robots: Workforce shortage relief?

The NHS is facing a major staffing crisis. An extensive study conducted in the US, Canada, and Germany showed that around 40 per cent of nurses' time is dedicated to 'non-value adding' and 'non-nursing activities', including delivering food trays and housekeeping services. This is a significant amount of time and effort that could be re-allocated to human-centric tasks, such as patient care. Meanwhile, labour-intensive, monotonous, and repetitive tasks that carry high risk of human errors and potential threats to health and safety could be better assigned to automation technology.

While some hospitals have been using logistic automation for some time – Cleveland Clinic Miller Heart Hospital has been using automated guided vehicles (AGVs) since it opened in 2008 – others have incorporated them only recently, such as Zealand University Hospital in Denmark with autonomous mobile robots (AMRs) in 2018. There are already notable differences between AGVs and AMRs: the former can carry heavy loads within programmed paths, but they require specific carts and even dedicated corridors; AMRs are often smaller but more flexible, with AI integration that allows them to programme new paths and navigate obstacles.

In the UK, a limited number of hospitals employ these technologies. One, however, is the Forth Valley Royal Hospital in Scotland, which has a robotic transport system with 13 robots moving food, linen and waste. If they can help alleviate existing workforce constraints, why are hospitals not using them more? The answer may lie in barriers: the lengthy return of capital period; lack of funding; difficulty integrating them into existing infrastructure and workforce management; human fear of being replaced; and lack of evidence on benefits. There may also be a perception that logistic robots are developing technologies, with potential risk of failing to bring about any promised increase in productivity.

This paper aims to analyse these factors through case studies, data, and surveys via Freedom of Information requests, in order to understand and provide evidence of the potential benefits of using logistic robots. Should they be considered part of the workforce, supporting more beneficial and efficient use of staff, easing workforce challenges, and improving patient experience?

## Home-based smart technology for improving gait in people with Parkinson's Disease in domestic space: A case study for domestic assistive smart technology

We evaluated a novel home-based smart technology for patients with Parkinson's Disease (PD) experiencing severe freezing of gait (FOG). Freeze is a brief and sudden episode of inability to walk or move forward common among 20-60 per cent of patients with advanced PD, and it's a major cause of falls.

Interventions by fixed external visual cueing (e.g., spaced lines on the floor), auditory stimuli (e.g., rhythmic metronome beats) or wearable technological units (e.g., Google glass, 'laser shoe') are considered partly effective in alleviating mobility deficits and FOG. However, they have low adherence, are cumbersome, uncomfortable, convey illness and disability, and are not adapted for normal daily life.

**Aim:** To develop a domestic smart system for delivering autonomic, individually adjusted cues for preventing FOG in people with PD (PwP), depending on their needs, capabilities and constraints, and design characteristics of domestic space.

**Methods:** A portable prototype projecting light stripes on the floor with or without metronome beats was developed and tested. Pilot experiments were performed in 15 homes of PD patients, while walking under three conditions: control; projected light stripes; and metronome. Experimental parameters included step length and step duration collected by a Kinect, and subjective parameters of satisfaction with semi-structured interviews.

**Results:** Projected light stripes significantly improved step length and step time of gait assessment of PwP. No significant changes were measured in metronome protocol. PwP reported that both cueing modalities improved their gait, confidence, and stability. Most PwP did not report any discomfort in either modality, and expressed a desire to have such technology in their homes.

**Conclusion:** This pilot demonstrated the potential validity of a personal dynamic cueing system on gait of PwP in domestic space, which may serve as a model for smart autonomous systems installed in houses for enabling a normal lifestyle, despite motor and functional limitations. This talk will present the consequences of integrating smart assistive systems on the design of domestic space in issues such as colour of tiles, glare, day and night illumination, contrast, glare, and design of corridors – all without invasion of privacy and without transmitting an image of sickness or disability.



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## How robot interventions could support people with frailty in overcoming physical barriers in their homes

Even though our homes are not designed for people with frailty or robots, digital technologies in the form of smart built environment (BE) interventions, as well as the use of robots in environments for vulnerable people or people with frailty, are constantly advancing, offering solutions to ageing and healthcare provision. Yet, so far, their implementation is mainly limited to devices such as automatic vacuum cleaners and voice assistance, or they're used to support mainly exercise and companionship.

Robotics aiming to support people with frailty are usually tested in spacious, high-tech labs, without recognising the variety of physical barriers one meets in a real home setting. Taking real BE considerations into account could further support digital innovation industry in reaching its potential, while in parallel it could benefit people with needs to live a better, independent life in their own personal space.

**Objectives:** This multidisciplinary research project brings together expertise from healthcare architecture and BE, human-computer interaction, population health, and clinical practice. The aim of this project is to support the creation of guidelines for human-robot co-habitation in residential and care BEs for people with frailty.

**Methodology:** The methodology included focus groups with health professionals, architectural auditing of frail people's residential BE and understanding their needs; simulation of robot suitability within the frail person's residential BE; and trials of selected robots for comparison with simulated data. Robots are observed in the physical space, where limited movement scenarios are recorded.

**Results:** Findings from this comparison support the design of a unified framework on people with frailty-robot co-habitation, by considering the needs of the user and the robot, as well as the residential and care BE. This will be the first step to formal guidance on designing residential BEs for people with frailty, which will take into account a whole new set of advantages for users. Putting people with frailty and robots inside real smart built environments can create difficulties and prevent technologies from reaching their full potential. This project addresses this issue, using knowledge gained to assess suitability for frail individuals in their homes.

## The robot will see you now: Reimagining AI in the healthcare landscape

The subject of AI in healthcare is a delicate one. With ethical issues to consider, there is natural trepidation over the role of AI in our healthcare landscape. But, at the same time, we need to harness its ability to enhance the systems we have.

Firstly, it's crucial to dispel the notion that AI in healthcare equates to a robot physician diagnosing and treating patients independently. Rather, effective AI works together with clinicians, bolstering the safety net of care and elevating its quality. Rather than asking, "Is AI better than traditional healthcare?", a better question would be: "Is healthcare supported by AI better than a healthcare system without?"

The key to answering this question is to look at ways in which AI can not only preserve the sanctity of patient care but also enhance it. And when it comes to the issue of alleviating the mental workload (MWL) of clinicians, the answer is a resounding 'yes'.

As any clinician will tell you, a large number of small interactions and distractions caused by administrative tasks add to their MWL. Without these administrative tasks, their attention could, instead, be directed towards clinical assessment and care, as well as learning opportunities. AI has the potential to alleviate this pressure, if its ability to access electronic patient records and summarise a patient's information, document encounters, send requests, and write letters or discharge summaries can be translated into clinical practice. This not only improves patient experience by providing more time with their clinician but it also has the potential to increase staff satisfaction. Amid a global healthcare workforce crisis, any intervention leading to greater staff resilience and retention should be championed.

Reframing analysis of AI interventions using 'time saved' as a key performance indicator will provide greater insight into how solutions can help us deliver sustainable healthcare in the future. The research aims to understand how AI is currently being used to alleviate MWL in practice, thus enhancing efficiency, sustainability, and retention of clinicians to meet the growing demands of healthcare. This review evaluates UK and international examples across the healthcare delivery landscape.



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## AI-driven cancer detection and care: Bridging the AI learning gap for rural communities towards the equity of access to healthcare

This presentation explores a novel approach to screening and risk categorisation among rural populations, by deploying innovative modular containers for northern communities in Canada.

AI algorithms, fuelled by vast datasets, demonstrate remarkable proficiency in spotting early signs of cancer among populations. With machine and deep learning capabilities, these algorithms efficiently analyse medical records and imaging data to detect subtle cancer indicators.

Patient outcomes are improved through both the rapid identification and filtering of positive cases to radiologists and specialists for timely intervention, and the opportunity to refine risk stratification approaches. AI algorithms can categorise individuals based on diverse risk factors, such as location, age, lifestyle, and environment, allowing tailored and preventive interventions, optimising resources by focusing on those at higher risk.

However, existing risk models are limited by the lack of detailed data from rural communities. This poses a significant challenge to the accuracy and constant adaptation of population risk models. What impact might the data from these communities have on current risk profiles? How does the current gap in data further affect existing disparities in health access and equity for these populations?

Furthermore, where and how are patients going to be seen, both for screening and follow-up? Who and what system is in place to provide a full continuum of prioritised care? What if we could combine data collection with diagnostics and treatment?

One solution is the use of modular containers equipped with AI-powered diagnostic equipment and software. These provide a solution for areas with limited seasonal, road or water access, as they can be outfitted in advance with flexibility, diagnostic and minor treatment capabilities before being delivered via airplane to the designated patient site.

Paired with their advanced AI-enabled diagnostic capabilities and peripheral clinic structures, they can offer timely and precise diagnoses and personalised treatment plans to underserved populations, bridging the data gap between urban centres and remote regions. This innovative approach aims not only to improve early detection and personalised care but also healthcare equity. It strives to ensure that regardless of geographical location, all individuals have access to quality, risk-based healthcare services.



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Children's Day Surgery Unit  
Evelina London Hospital, June 2023

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## The Art Room

### Monday 10 – Tuesday 11 June, Platt Room and Garden

During the Congress, get creative in the Art Room. Art in Site hosts a series of workshops and an interactive installation exploring the concept of the Sensory Hospital, along with an interactive installation.

#### Improving healthcare environments through person-centred design

**Monday 10 June | 14.00–15.30**

In 2022-23, a working group of academics, architects, arts co-ordinators, and medical practitioners developed a toolkit titled 'Improving Healthcare Environments: A Practical Guide to Person-Centred Design'. The research-led toolkit includes practical tools, methods, and examples to help people understand and improve healthcare environments. The premise underpinning the guide is one of empowerment. It focuses on understanding sensory experiences and needs, and on inclusive design practices.

#### Sensory hospitals. Are they the future?

**Tuesday 11 June | 10.45–12.00**

We explore new projects and research at the intersection of integrated art, architecture, and technology, which are helping to transform hospitals into sensorially rich places. We'll see how digital artwork can stimulate patients' vision and activate their proprioception. We'll explore texture, audio and haptics in art and wayfinding schemes. We'll see how research into multisensory environments and activities can boost recovery times and clinical outcomes. And we'll see artworks at the intersection of lighting, coding, and sculpture, which are contributing to better sleep and recovery times.

#### National Arts in Hospitals Network

**Tuesday 11 June | 14.00–15.00**

The National Arts in Hospitals Network was established in 2019 to connect arts managers working in hospitals. The network currently has 50 members and offers opportunities to network, share ideas and resources. From 2024, the network is hosted by NHS Charities Together, working closely with national arts in health organisations to establish national guidelines, and to lobby for greater recognition of the proven value of the arts in healthcare services.

### Workshop leaders



**Peter Shenai (UK)**  
Creative strategist,  
Art in Site



**Louisa Williams (UK)**  
Director,  
Art in Site



**Martin Jones (UK)**  
Director,  
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**Victoria Bates (UK)**  
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**Laura Waters (UK)**  
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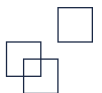
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## Lunchtime design workshop

**Monday 10 June,  
Council Chamber**

**12.45–13.50**

### Design innovation in healthcare furniture

What will be the key future drivers for innovation in the design of healthcare furniture? How will new legislation for meeting sustainability and net-zero requirements, as well as corporate social responsibility, impact on the marketplace to drive innovation in materials, aesthetics, eco-manufacturing processes, cost reduction, and new features – from wireless charging points to seat height adjustment.

At EHD 2023, we explored in this workshop how furniture in clinical environments is often dated and drab, favouring low-cost functionality at the expense of well-designed, attractive alternatives, and perpetuating an institutional feeling in our healthcare buildings. In this year's session, we'll explore in more depth the drivers and barriers for innovation that can raise the bar and set a new design standard, from procurement to greater clinical and patient engagement in the design process.

Is it time to reset the traditional "contract NHS chair" offering? How do we change the way furniture is procured to allow more innovative furniture to be tendered? How do we change a procurement culture that encourages suppliers to offer a low-cost, institutional, standard spec and discourages more innovative solutions?

Familiarity and cost are too often the driving factors when procuring furniture, so how do we embed a more patient-focused, life-cycle value proposition into the way hospitals procure? How do we also engage clinicians, users, and patients and their families in the design of healthcare furniture, and test their application? Can better feedback processes be established to support new design innovation?

We will also review the current processes for educating users about what furniture solutions are available on the market. Can we change/improve the way we conduct furniture roadshows? Is the "village hall" option the right way to go? And could VR be used to demonstrate in real time how a piece of furniture looks in (virtual) situ, allowing the end-user to review multiple brands, models, colours schemes and finishes?

### Workshop leaders



**Rose Jago (UK)**  
Procurement consultant,  
MJ Medical



**Andrew Bertram (UK)**  
Senior consultant,  
MJ Medical





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**iKure, Baruiapur, West Bengal, India**



**First Affiliated Hospital of Zhejiang University School of Medicine, Hangzhou, Zhejiang, China**



**Westmead Hospital Redevelopment**  
Westmead, New South Wales, Australia



**Rush University Medical Center Joan & Paul Rubschlager Building**  
Chicago, IL USA

## Breakfast design workshop

**Tuesday 11 June,  
Council Chamber**

**07.30–08.45**

### **Transformative military healthcare design – operating for military readiness**

Global military operations demand a resilient healthcare infrastructure. Many military hospitals across Europe and the globe are outdated, often designed during the Cold War era. Using several military medical facilities, including the Rhine Ordnance Barracks Medical Center Replacement (ROBMCR) in Landstuhl, Germany and the Brian D. Allgood Army Community Hospital at Camp Humphreys in Pyeongtaek, Korea as case studies, we'll explore how to navigate the intricate balance needed to accommodate modern military design requirements, overlapping building codes, and patient needs, with adaptability, creativity and resilience.

Focusing on the evolving healthcare infrastructure around the globe, the session examines how regulatory factors shaped the design and implementation of military medical facilities. This exploration not only sheds light on the design methodology but also unravels the tangible outcomes and broader implications of the facility, contributing valuable insights to the ongoing discourse on optimising military healthcare infrastructure worldwide.

### Workshop leaders



**Burkhard Musselmann**  
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**Simon Trumble**  
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**David Kurten** (USA)  
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**Christopher Kiss**  
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**Susana Erpestad**  
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HDR



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# Jacobs

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## Lunchtime design workshop

**Tuesday 11 June,  
Council Chamber**

**12.45–13.50**

### **Design standardisation vs innovation: Finding the right balance**

There is often a tension between standardisation and customisation / innovation of healthcare design delivery processes. Standardised design can offer templates to enable theoretically lower design costs and faster approval times. The hope is for greater reliability, improved efficiency, and better outcomes. On the other hand, excessive standardisation may restrict customisation to geography, cultural factors, clinical practices, and operational specificities. The challenge is how to achieve the right balance.

The goal of this workshop will be to integrate existing data with stakeholder viewpoints and expertise in order to enrich the themes around standardisation and innovation. A health economist, clinician, healthcare architect, and operator/policymaker will provide subject matter expertise. Four domains will be explored: 1) challenge identification, 2) evidence, 3) resources, and 4) stakeholder engagement. Several subthemes within each domain will also be discussed, for example: What is the evidence for standardisation? How do we integrate a system of peer review / quality control prior to wide-scale implementation? What are the clinical costs and operational implications of a standardised approach? How do we preserve and foster innovation in a standardised approach to health buildings? Can a design standardisation process accommodate the needs, preferences and circumstances of the individuals and local communities these buildings serve?

Parallels will be drawn with other industries – for example, in clinical medicine, which has seen a shift towards standardisation of clinical policies and care delivery. The outcomes from the workshop will integrate technically, logistically, and financially feasible options with known evidence, and consideration for value preferences in order to gain balanced stakeholder representation when considering innovation and design standardisation.

### **Workshop leaders**



**Matthew Holmes**  
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Bell** (UK)  
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**Jane McElroy** (UK)  
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NBBJ



**Dr Tom Best** (UK)  
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**Fiona Daly** (UK)  
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- The optional Powered Dynamic Positioning System (PDPS) allows caregivers to handle patients with ease

1. **References:** Alamgir, H., O. W. Li, et al. (2009). "Evaluation of ceiling lifts in health care settings: patient outcome and perceptions." *AAOHN J* 57(9): 374-380. Alamgir, H., O. W. Li, et al. (2009). "Evaluation of ceiling lifts: transfer time, patient comfort and staff perceptions." *Injury* 40(9): 987-992. Alamgir, H., S. Yu, et al. (2008). "Efficiency of overhead ceiling lifts in reducing musculoskeletal injury among carers working in long-term care institutions." *Injury* 39(5): 570-577. Chhokar, R., C. Engst, et al. (2005). "The three-year economic benefits of a ceiling lift intervention aimed to reduce healthcare worker injuries." *Appl Ergon* 36(2): 223-229. Dutta, T., P. J. Holliday, et al. (2012). "A biomechanical assessment of floor and overhead lifts using one or two caregivers for patient transfers." *Appl Ergon* 43(3): 521-531. Engst, C., R. Chhokar, et al. (2005). "Effectiveness of overhead lifting devices in reducing the risk of injury to care staff in extended care facilities." *Ergonomics* 48(2): 187-199. Marras, W. S., G. S. Knapik, et al. (2009). "Loading along the lumbar spine as influence by speed, control, load magnitude, and handle height during pushing." *Clin Biomech (Bristol, Avon)* 24(2): 155-163. S Iverwood, S. and M. Haddock (2006). "Reduction of musculoskeletal injuries in intensive care nurses using ceiling-mounted patient lifts." *Dynamics* 17(3): 19-21.

2. **Source:** 01.LG.001.GB.1.AHG <https://www.arjo.com/int/products/safe-patient-handling/ceiling-lift/maxi-sky-2/>

## Architects for Health

For over 30 years, Architects for Health has been a forum for sharing best practice, knowledge, innovation and thought leadership in the healthcare built environment.

In 2024, the need has never been greater: the NHS estate is faced with complex challenges, not least the need to deliver sustainable, operationally efficient and cost-effective health and social care, on challenging budgets and even more challenging timescales.

Our membership reflects the growing range of skills and expertise necessary to design healthcare spaces fit for the future. We now welcome NHS members for free\*: it is essential that the client – and clinicians – are in the room.

With more than 750 members we continue to grow, welcoming NHS, academic and professional organisations in both the UK and internationally.

As partners to SALUS Global Knowledge Exchange, we support an academic programme at the European Healthcare Design Congress and celebrate successful healthcare design through the European Healthcare Design Awards and Design Matters.

Our work falls under four strategic pillars:

- 1. Strategic engagement**, comprising leadership and engagement with the Future Standards Working Group (FSWG); All Party Parliamentary Group (APPG) on Healthcare Infrastructure; and research, in partnership with our academic lead, Dr Evangelia Chryssikou, associate professor at the Bartlett Real Estate Institute
- 2. Knowledge share**, focused around our three thought leadership streams of 'Mind', 'Mend' and 'Matter', featuring a combination of online and in-person events.
- 3. Best practice**, providing access to pioneering healthcare projects through case studies, building visits, exhibitions, and events.
- 4. Fostering future talent**, through our hugely popular annual Student Design Awards, the Ann Noble Research Award (ANRA) annual academic bursary, and our new Future Leaders programme, welcoming the next generation of healthcare leaders to AfH.

To discover how you can get involved, visit: [architectsforhealth.com](https://architectsforhealth.com)

*\*up to 3 named members from any individual NHS organisation can join free of charge.*



Contact:  
Jaime Bishop, Chair

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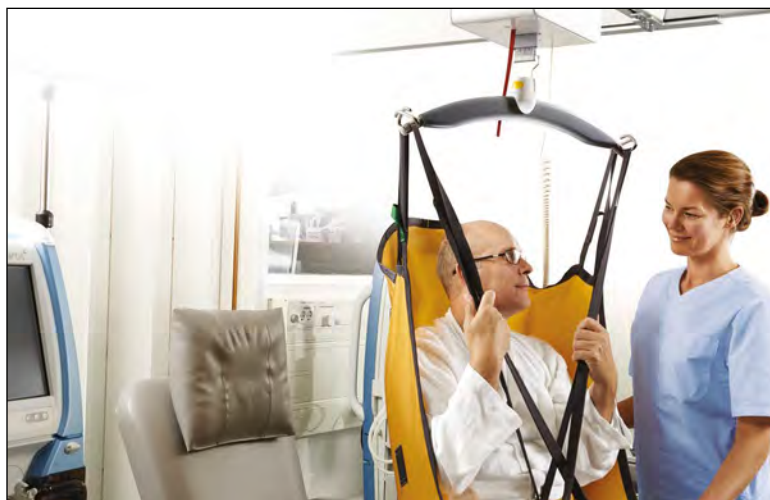


# Guldmann **Ceiling Hoist Solution**

– *much more than a transfer from A to B*

Using safe patient handling technology is a way to keep both patients and care givers safe, and at the same time promote quality of service – and create more Time To Care.

Transfer  
Treatment  
Training



The Trainer Module for GH3+ adds yet another feature to the many applications that Guldmann ceiling hoists offer – increasing the utilization value of the solution.

- ✓ Dynamic weight relief up to 100 kg
- ✓ Enabling early mobilization
- ✓ Integrated into a GH3+ ceiling hoist



| Time to care |



**Guldmann™**  
www.guldmann.com



## SALUS Global Knowledge Exchange

SALUS is an entrepreneurial global media, research, publishing, events and training organisation with a vision to improve human and planetary health through the global exchange of knowledge.

Our mission is to create, share and disseminate knowledge about the relationship between human health and the natural, built and social environments. We view the two great challenges of our age – the need to maintain and improve human health in the face of ageing populations and chronic disease, and addressing climate change through more sustainable management of our finite resources – as inextricably linked.

### Knowledge exchange – events, broadcasting, and research:

**European Healthcare Design Congress:** Launched in 2015, the Congress brings together 1000+ interdisciplinary researchers and practitioners, in person and virtually, from the fields of health system and service design, technology and infrastructure.

**International symposiums:** First launched in 2023, our international symposiums provide a deep dive into a range of specialist themes. Cancer Care Design International was held in Liverpool in February, and Sustainable Healthcare Design takes place later this year at The King's Fund, London.

**Healthy City Design International Congress:** Launched in 2017, the Congress brings together 400+ leading researchers, practitioners and policy thinkers, in person and virtually, from across the fields of urban health and sustainable development / planetary health. For the second year running, the Congress will be held in Liverpool, at the Spine, the Royal College of Physicians' northern headquarters.

**SALUS TV:** Making the virtual experience richer and more entertaining, SALUS TV enables talks and content from SALUS events and webinars to be live streamed and made available on-demand for audiences to access anywhere around the world, making knowledge on designing for human and planetary health more accessible.

**The SALUS journal and online community:** A resource providing a digital platform for publishing, mapping and archiving research, policy and practice in the field of designing for human and planetary health. In eight years, SALUS has published more than 6000 articles and abridged research papers, and 3000 hours of video talks and posters.

**Research advisory:** In collaboration with its global network of researchers, practitioners and policy thinkers, SALUS' independent research advisory supports city planning authorities and national and local health systems to develop their future thinking and strategy at the intersection of design and planning for health, wellbeing and sustainable development. In its most recent publication, SALUS produced a 'Guiding principles' document to support the development of Veraine, a planned new healthy community, in Pickering, Canada.



Contact: Marc Sansom  
Director

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# Healthy City Design

OCT  
15-16

- > RESEARCH
- > POLICY
- > INVESTMENT
- > PRACTICE

## LIVERPOOL

Royal College of Physicians



Organised by



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Partner



Knowledge  
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Silver Knowledge  
Leader



Bronze Innovation  
Leader







# Building a fairer future

## Advancing health equity through impact investment



[info@salus.global](mailto:info@salus.global)

[www.healthycitydesign.global](http://www.healthycitydesign.global)

### Event partners





Contact:  
David Powell,  
Development director

W: [www.alderhey.nhs.uk](http://www.alderhey.nhs.uk)

### Alder Hey Children's NHS Foundation Trust

Providing community and hospital care, Alder Hey is based in Liverpool and is the UK's largest children's NHS trust. The new Alder Hey in the Park hospital opened in October 2015.

Alder Hey has developed as: a centre of excellence for cancer, as well as spinal, heart and brain conditions; a Department of Health centre for head and face surgery; a centre of excellence for muscular dystrophy; and the first UK centre of excellence for childhood lupus.

One of four national centres for childhood epilepsy surgery – a joint service with the Royal Manchester Children's Hospital – Alder Hey is also a designated children's major trauma centre; a leading diagnostic centre; and a centre for research, innovation and education.



Contact:  
Kate Copeland,  
Chair

W: [www.aushdc.org.au](http://www.aushdc.org.au)

### AHDC – Australian Health Design Council

The AHDC was formed in 2011 and is a non-government organisation of professionals involved and/or interested in quality design of health facilities. It is the conduit between knowledge providers and knowledge users in Australian health design.

The aims of the AHDC are:

- to promote high-quality, efficient, effective, and safe health facility design that responds to the needs of the Australian populace, in terms of respecting the rights and requirements of patients, the health workforce, and the community in a sustainable natural/built environment;
- to promote training, education and research in health facility design to ensure the long-term sustainability of the industry; and
- to bring together health design professionals for networking, knowledge sharing, and to promote innovation in health facility design.



Contact:  
Göran Lindahl,  
Professor, Chalmers University  
of Technology; Director, CVA

W: [www.chalmers.se/en/centres/](http://www.chalmers.se/en/centres/)

### Chalmers University of Technology

The Centre for Healthcare Architecture (CVA) is a national Swedish arena for the creation, development, exchange, and dissemination of knowledge about healthcare environments.

CVA regularly produces reports, webinars and events focusing on issues related to healthcare infrastructure. As an academic centre, CVA conducts research, research training, and contributes to basic and further training in the field.

The research focus for CVA is buildings and physical environments as a support and an integrated part of the healthcare systems we all use.



**European  
Health  
Property  
Network**

Contact:  
Jonathan Erskine,  
Executive director

W: [www.euhpneu](http://www.euhpneu)

## European Health Property Network

The European Health Property Network brings together organisations and individuals across Europe with interests in how best to plan, design, construct and finance all kinds of healthcare buildings, from the largest hospitals to the smallest clinics.

We act as a knowledge-sharing hub for members, and run regular webinars, seminars and workshops on a range of topics. Recent events have focused on healthcare infrastructure sustainability, lessons for hospitals from the pandemic, the future of capital investment planning, and trends in emerging technologies. Our members comprise healthcare architects and engineers; planning authorities; finance and procurement specialists; senior clinicians; hospital directors; and health system planners. We work in collaboration with a range of other networks and organisations across Europe and beyond.



Contact:  
Crispin Walking-Lea,  
Head of healthcare planning

W: [www.gosh.nhs.uk](http://www.gosh.nhs.uk)

## Great Ormond Street Hospital for Children NHS Foundation Trust

Great Ormond Street Hospital was the first dedicated children's hospital in the UK, opening in 1852. Today, GOSH is a tertiary and quaternary hospital, specialising in complex treatments for rare conditions. Flagship services include cancer, cardiac, respiratory and neurosciences. With our research partner, the UCL Institute of Child Health, we form the UK's only academic biomedical research centre specialising in paediatrics.

Recent developments include the multi award-winning Zayed Centre for Rare Diseases in Childhood. This landmark building brings together researchers and clinicians in collaborative workspaces and laboratories to advance the treatment and management of rare diseases. In 2021, GOSH opened the first dedicated facility for the care of children with hearing and sight impairment.



Contact:  
Jennifer Whinnett,  
Senior healthcare planner

W: [www.guysandstthomas.nhs.uk](http://www.guysandstthomas.nhs.uk)

## Guy's and St Thomas' NHS Foundation Trust

Essentia designs, builds and maintains healthcare infrastructure, and is part of Guy's and St Thomas' NHS Foundation Trust. We combine public-sector values with commercial focus, innovative thinking, and modern technology to create a fantastic patient experience.

Guy's and St Thomas' NHS Foundation Trust has 22,700 staff and comprises five of the UK's best-known hospitals – Guy's, St Thomas', Evelina London Children's Hospital, Royal Brompton and Harefield – as well as community services in Lambeth, Southwark and Lewisham. The Trust is part of King's Health Partners – one of England's academic health sciences centres – bringing together world-class clinical services, teaching and research with our partners King's College Hospital NHS Foundation Trust, South London and Maudsley NHS Foundation Trust, and King's College London.



Contact:  
Danny Gibson, Robert Etchell

W: [www.healthcaredesignleadership.com](http://www.healthcaredesignleadership.com)

### Healthcare Design Leadership

Healthcare Design Leadership is a not-for-profit community interest company that provides training to empower healthcare leaders to maximise their input in the briefing, planning, design, construction and commissioning process. Our multidisciplinary faculty consists of clinicians, healthcare planners, architects, contractors, engineers and researchers, all industry leaders in their respective fields with decades of experience in planning and delivering new healthcare buildings.

By supporting NHS leaders to enhance their skills in the nexus of hospital development, healthcare buildings of the future can be truly transformational and fit for future generations. The Healthcare Design Leadership course provides an immersive introduction to the whole project life-cycle, providing opportunities for hands-on experience of the process and products developed at each stage.



Contact:  
Richard Darch,  
Tina Nolan,  
Danny Gibson

W: [www.healthcareplanningacademy.com](http://www.healthcareplanningacademy.com)

### Healthcare Planning Academy

The Healthcare Planning Academy is a membership organisation for healthcare planning professionals, which aims to maintain and continuously improve standards and knowledge by providing a professional development resource and an industry-wide framework of recognised accreditation.

Throughout the year, the Academy supports its members to stay ahead of the curve by running regular seminars and events on a range of healthcare planning topics, discussing the latest trends and advances in the planning and design process for health infrastructure.

The Academy is actively welcoming applications from new members who can demonstrate proficiency and experience in healthcare planning, with membership options inclusive of those at any stage of their professional development, including new entrants.



Contact:  
Rama Gheerawo,  
Director

W: [www.hhcd.rca.ac.uk](http://www.hhcd.rca.ac.uk)

### The Helen Hamlyn Centre for Design

The Helen Hamlyn Centre for Design is the Royal College of Art's largest and longest-running centre for design research. It's an international leader in people-centred and inclusive design – the process of designing products, services and systems for ease of use by the maximum number of people – design thinking and creative leadership.

Founded in 1991 and endowed by the Helen Hamlyn Trust, the purpose of the Centre is to conduct design research and projects with industry that will contribute to improving people's lives. The Centre takes an interdisciplinary approach, which is based around the activities of three research labs – Age & Ability, Healthcare, and Inclusive Design for Social and Business Impact. Each lab has developed its own empathic and innovative research methods, working in partnership with a wide range of business, industry, government, academic, and third-sector partners.



## Imperial College Healthcare NHS Trust

Imperial College Healthcare is the sixth largest NHS trust and London's largest teaching hospital. It provides care for 2.4m people in northwest London, and for patients beyond in need of specialist treatment. The Trust's delivery of clinical excellence and education is underpinned by its focus on research and innovation. In partnership with Imperial College London Faculty of Medicine, it's part of the UK's first new academic health science centre. The Trust is also part of the National Institute for Health Research (NIHR) and the NIHR Health Informatics Collaborative.

Contact:  
Matthew Tulley,  
Redevelopment director  
W: [www.imperial.nhs.uk](http://www.imperial.nhs.uk)



## Moorfields Eye Hospital NHS Foundation Trust

Moorfields Eye Hospital NHS Foundation Trust is the leading provider of eye health services in the UK and a world-class centre of excellence for ophthalmic research and education. At more than 25 sites in and around London, we treat and care for patients with a wide range of eye problems, from common complaints to rare conditions. The volume and variety of conditions treated by our clinicians gives them a specific range of skills and knowledge. With our partners at the UCL Institute of Ophthalmology, we lead one of the most extensive ophthalmic research programmes in the world.

Contact:  
Kieran McDavid,  
Director of capital, estates and  
major projects  
W: [www.moorfieldsnhs.uk](http://www.moorfieldsnhs.uk)



## Sykehusbygg

Founded in 2014, Sykehusbygg is owned by Norway's four regional health authorities, which derive their funding from the Norwegian Ministry of Health. The agency aims to ensure national know-how for hospital planning, design, engineering and construction remains at the highest level. Sykehusbygg seeks to facilitate and contribute to progressive hospital development projects through innovation, experience, standardisation, project management, and best practices. It also looks to ensure that experience from management and operation of hospital property is considered in new hospital projects.

Contact:  
Marte Lauvsnes,  
Project and development  
hospital planning manager  
W: [www.sykehusbygg.no](http://www.sykehusbygg.no)



## Velindre University NHS Trust

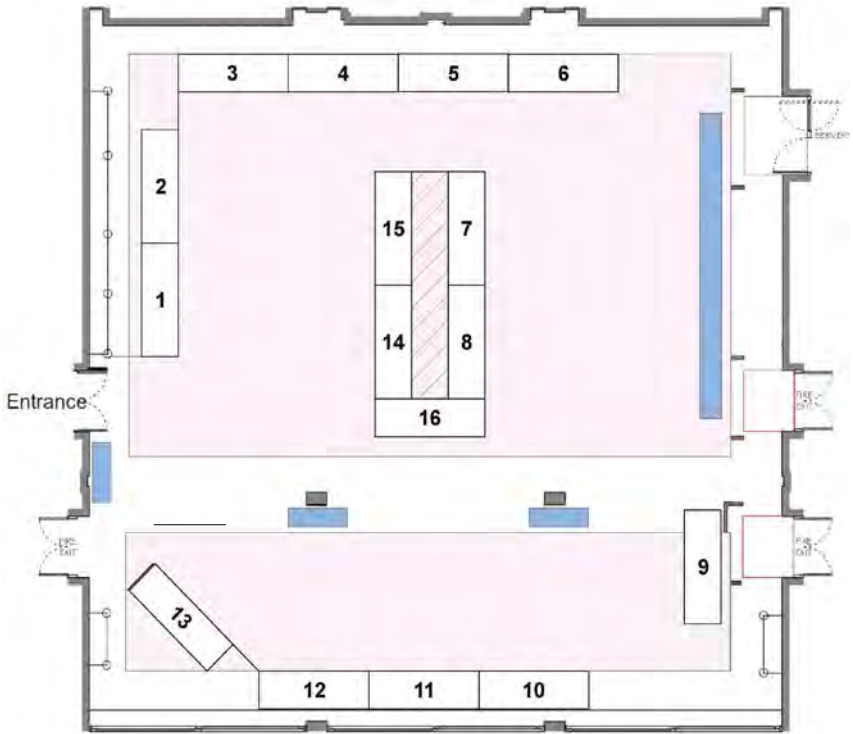
Velindre University NHS Trust provides specialist cancer and blood services across South and Mid Wales through Velindre Cancer Centre and the Welsh Blood Service. Through our Transforming Cancer Services in South East Wales Programme, we are working to build a new Velindre Cancer Centre in Whitchurch, Cardiff, with a satellite radiotherapy centre in Abergavenny. Our design focus for the new cancer centre is both patient-centred and environmentally focused – our ambition is that this will be the greenest hospital in the UK. We will combine a state-of-the-art facility for treatment and research with the healing power of nature, giving back to the environment and community.

Contact:  
David Powell,  
Project director – New Velindre  
Cancer Centre  
W: [velindre.nhs.wales](http://velindre.nhs.wales)

**OPENING TIMES:**

Monday 10 June 10.00-17.00  
 Monday 10 June 18.00-20.30  
 Tuesday 11 June 10.00-16.30

Please take time during the coffee and lunch breaks set aside for networking to visit the exhibition and explore some of the innovative and creative design solutions featured by organisations from the commercial, non-profit and media sectors that are making a significant contribution to healthcare design across Europe and the world. The exhibition will also be open during the Welcome Drinks Reception on the evening of Monday 10 June.

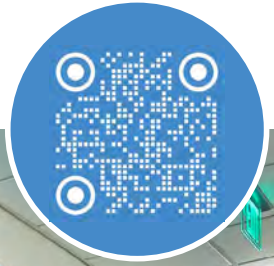


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# AECOM

Contact:

Richard Mann,  
Director, healthcare, science and  
tertiary education sector leader,  
Europe and India

W: [www.aecom.com](http://www.aecom.com)



SILVER KNOWLEDGE  
LEADER

## AECOM

We are consistently ranked as one of the world's leading healthcare and science advisors. The vision of our healthcare practice is to create environments and systems that are people-centred and focused on improving health outcomes. We work in partnership with clients and stakeholders to deliver facilities that are smart, sustainable, flexible and adaptable, using modern methods of construction.

Our teams are engaged across the entire health economy, from the scientific research that enables the delivery of modern healthcare, through to acute hospitals, specialist centres, mental health facilities, and community health and wellbeing centres. Our ability to combine technical expertise and innovation to deliver fully integrated planning, design, construction and operations management services allows us to add value, as our clients adapt to new frontiers of healthcare delivery.

# Archus

Contact:

Victoria Head,  
Director of commercial and  
performance

Jo Hall,

Head of business development,  
marketing and communications

W: [www.archusuk.com](http://www.archusuk.com)



GOLD DESIGN LEADER

## Archus

Archus is a team of experts who provide strategic and infrastructure advice for health and social care clients. Our team of health planners, clinicians, data analysts, project managers, strategic advisors and technical specialists come together to work on projects that improve health outcomes.

Established in 2017, we have a network of offices to support our work across the UK, Ireland and internationally, including Bristol, London, Birmingham, Manchester, Leeds, Swansea, Dublin, Cork and Toronto.

Archus has been certified by B-Lab UK as a B-Corporation, a growing group of companies reinventing business by pursuing purpose as well as profit.

Working at every level of the health system, we are shaping the future of healthcare.

# arjo

EMPOWERING MOVEMENT

Contact:

Malcolm Harvey,  
Project manager

Simon Saulis,  
National clinical consulting  
manager

W: [www.arjo.co.uk](http://www.arjo.co.uk)



EXHIBITION PARTNER

## Arjo UK

Arjo is a collaborative partner in many healthcare facility projects, and we know that it is vital to plan for the right equipment and space from the very beginning in order to avoid unnecessary costs due to last-minute construction variations.

Our comprehensive portfolio spans key areas of daily personal care routines with a range of high-quality products, training, services, assessment tools, design and consulting resources to create integrated solutions to enhance care, quality and efficiency.

We offer support throughout a project, from early advice on room layouts and space requirements to drawings support and equipment installations.



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**For more information,  
come and see us at Stand 9**

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## Art in Site

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### Art in Site

Art in Site makes award-winning environments that combine art, wayfinding, and interior design into unified, beautiful places.

Over 20 years, we've helped organisations like the NHS tackle big problems, such as wayfinding, patient flow times, staff wellbeing, and long term-phobias – all through our integrated art approach.

We've learned that any brief – big or small – is a chance to solve problems and transform lives. And to make the largest impact – to truly help people as much as possible – you need to stay curious, inventive, and experimental. That's why no two projects of ours will ever look the same.



Contact:  
Mark Lakey,  
UK business development and  
key accounts manager

W: [www.beaconmedaes.com/en-uk](http://www.beaconmedaes.com/en-uk)



### BeaconMedaes

BeaconMedaes stands as a global leader in providing cutting-edge medical gas pipeline systems (MGPS) turnkey solutions. Our comprehensive suite of services encompasses preventive maintenance contracts, equipment servicing, installation, site surveys, and design services adhering to HTM02-01 standards.

From major acute facilities to small extensions and refurbishments, BeaconMedaes has a track record of project delivery to specified timelines. Our commitment to sustainability is embodied in our Turnkey Sustainability Package, featuring innovations such as the Central Destruction Unit, nitrous oxide detectors, and the Halogenated Drug Recovery. This package empowers the NHS to achieve ambitious net-zero targets while revolutionising medical gas management through superior, eco-efficient technologies, prioritising staff health and safety.



Contact:  
Paul Grainger,  
Director of UK sales, east

W: [www.brandon-medical.com](http://www.brandon-medical.com)



### Brandon Medical

Brandon Medical is a UK company that delivers smart turnkey equipment for acute and primary healthcare worldwide.

For over 75 years, British engineering ethos and strong work ethic have fuelled continuous product innovation and development to provide healthcare professionals with reliable, high-quality and affordable medical equipment packages for operating theatres and critical care in more than 70 countries around the globe.

We are acknowledged experts in manufacturing medical lighting, medical power and control systems, and medical audio-video systems. Brandon Medical has decades of practical expertise in configuring acute care areas for a regulatory and recommendatory compliant solution – with high levels of engineering contingency and resilience while maintaining a commercial design philosophy.





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**Construction Specialties**

Contact:  
Mike Hearle,  
Director, European marketing

Dorota Choules,  
Marketing manager

W: [www.c-sgroup.co.uk](http://www.c-sgroup.co.uk)

 EXHIBITION PARTNER

## Construction Specialties

Transform your patient's medical care experience by ensuring the space performs as well as your physicians, and comforts as well as your home. The overall architecture and design of an environment can reduce recovery times, inspire wellbeing, and lead to healthier lives. We provide high-performance products that support patient health and enable buildings to thrive.

Our solutions include: Acrovyn wall, door and corner protection; Acrovyn doors; expansion joint covers; entrance flooring; architectural louvres; explosion venting; and solar shading.

Founded in the United States, Construction Specialties (CS) has been a global manufacturer and supplier of specialist building products for 75 years. It operates through 18 offices worldwide, with key manufacturing locations or sales offices in most European countries.

## Gerflor

### GRADUS

Contact:  
Chris Pursey,  
Key account manager –  
healthcare

W: [www.gerflor.com](http://www.gerflor.com)

 EXHIBITION PARTNER

## Gerflor Flooring UK

Gerflor is an international manufacturer of flooring, wall protection and interior finishing accessories. Our solutions are world-class, high-quality, sustainable, design-led and innovative for all the contract markets we serve. Every day in a healthcare setting, 100 million patients, are healed on a Gerflor floor, and more than 200,000m<sup>2</sup> of the company's floors are installed around the world.

We lead with a focus on safety, hygiene, comfort and durability. All this is coupled with modern in-house designs and a strong R&D commitment. We are present in more than 100 countries, with 4200 employees operating in 29 subsidiaries, and 12 production sites globally.

From product design to end of life, the circular economy is a core priority, with Gerflor committed to making five key sustainable principles central to its operational and product development activities.

# Guldmann™

Contact:  
Lee Hubery,  
New-build project manager

W: [www.guldmann.com](http://www.guldmann.com)

 EXHIBITION PARTNER

## Guldmann

Guldmann is a Danish-based company that works with the development, manufacture, and sales of welfare technology for people with reduced capabilities, and work tools for those who help and care for them.

We provide a complete solution designed to match current moving and handling needs, as well as being well-aligned with the functionality requirements of tomorrow. We are specialists in creating more 'Time to Care' in conjunction with lifting and moving requirements, including rehabilitation, across the full spectrum of healthcare environments.

Our services range from project consultancy and personnel instruction, through to service and assembly.



Contact:  
Hank Adams,  
Global director, health

W: [www.hdrinc.com](http://www.hdrinc.com)

GOLD DESIGN LEADER

## HDR

We use the power of design thinking to reimagine space, environments, programming, planning, operations and function. We blend our deep knowledge of healthcare delivery with our understanding of how environments can shape behaviours and outcomes to create solutions that champion human-centred design, solve real problems, make lives better, and advance wellness, wellbeing, healing and cures.

Through design and consideration of three important elements – patient care, context and community – we are working to reshape the way healthcare is perceived and delivered.



Contact:  
David Morris,  
Vice-president,  
business development

W: [www.hcrmoves.com](http://www.hcrmoves.com)

EXHIBITION PARTNER

## Health Care Relocations

HCR is a transition consulting and logistics company recognised internationally for its world-class service providing healthcare facilities with elite consulting and relocation assistance. A specialist in its field, it has more than three decades of experience in the planning and implementation of hundreds of healthcare facility relocations.

It is dedicated solely to assisting healthcare providers with the planning, co-ordination and execution of efficient, seamless transitions to their new facilities. Its 'patient-focused approach' during the planning process carries over to its move co-ordination team and ensures that all decisions are made with the best interests of patients at the forefront.



Contact:  
Chris Liddle, Director

Melanie Jacobsen Cox,  
Head of healthcare

W: [www.hlmarchitects.com](http://www.hlmarchitects.com)

DIAMOND THOUGHT LEADER

## HLM Architects

For over 40 years we've been designing award-winning healthcare projects and healing environments that help minimise the time people spend in them. From landscape to interiors, we design healthcare environments that aim to avoid stress, unhappiness, illness and pain, while understanding the constraints in delivering a health facility.

Our knowledge and expertise can be applied to all areas of healthcare, from primary care centres to rehabilitation environments, and we are conscious and responsive to rapidly changing technologies that make future-proofing areas, such as oncology, especially challenging.



**Architectural Products**  
Contact:  
James Ikin,  
Technical sales manager

W: [www.inprocorp.com](http://www.inprocorp.com)

EXHIBITION PARTNER

## Inpro Architectural Products

Based in the UK, Inpro Architectural Products is managed by Inpro Corp USA for the sales development of Inpro products in the UK and Ireland.

Inpro Architectural Products is bound to Inpro Europe with its head office in Italy, the site of our stock warehouse for customer care, service and assistance. Manufacturing of our products is carried out to ISO9001 standard, internally or via approved partners. Our mission is to offer safe, durable handrails, wall guards, corner guards, and wall protection sheet, made of sustainable materials to protect the buildings and the people who use them. A wide choice of colours and patterns is offered.





Contact:  
Jason Gibbings,  
IHP framework director,  
VINCI Construction, UK

Stuart McArthur,  
Director of strategy  
and work winning,  
Sir Robert McAlpine

W: [www.ihprojects.co.uk](http://www.ihprojects.co.uk)



## Integrated Health Projects (IHP)

Integrated Health Projects (IHP) has been a leading provider of outstanding healthcare solutions for 20 years.

As an established integrated alliance, IHP combines the stability, capacity, coverage and experience of Vinci Building UK and Sir Robert McAlpine. Both are major organisations working in the UK and abroad, focused on development, construction and facilities management.

IHP was formed in April 2003, specifically to act as a principal supply chain partner (PSCP) for ProCure21/21+/22. We have now secured our place on all lots in the P23 framework, while also supporting the delivery of current National Hospital Programme cohorts.

We have been appointed on more than 200 projects, valued at £3.7bn+, for more than 90 NHS clients, and we're proud that our clients have chosen to re-appoint us on 85 per cent of our projects.

## Jacobs

Contact:  
Matthew Holmes,  
Global solutions director,  
health infrastructure

W: [www.jacobs.com](http://www.jacobs.com)



## Jacobs

At Jacobs, we're challenging today to reinvent tomorrow by solving the world's most critical problems for thriving cities, resilient environments, mission-critical outcomes, operational advancement, scientific discovery, and cutting-edge manufacturing, turning abstract ideas into realities that transform the world for good.

We work with our clients to tackle challenges head-on, reimagining approaches to create and sustain well-functioning, thriving and resilient health systems, and contributing to personal, societal and economic wellbeing.

With approximately \$16 billion in annual revenue and a talent force of more than 60,000, Jacobs provides a full spectrum of professional services, including consulting, technical, scientific and project delivery for government and the private sector.



Contact:  
Charlotte Anderson,  
Head of UK sales



## KwickScreen

KwickScreen is at the forefront of infection control in healthcare. We are a team of designers and engineers who have spent the last 12 years working alongside the NHS.

Our award-winning portable, retractable hospital screens create safe spaces for patients every day.

KwickScreen was born out of a dedication to solve healthcare-associated infections (HCAIs). Now, more than a decade on, KwickScreen supplies healthcare systems globally – to every NHS trust and more than 250 hospitals in the US, as well as more than 15 different countries.



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## lexica.

Contact:  
Michèle Wheeler,  
International health and life  
sciences director

W: [www.lexica.co.uk](http://www.lexica.co.uk)



### Lexica

Lexica is a leading specialist consultancy, supporting international and UK-based health and life sciences organisations with the planning, delivery, and continuous improvement of their services and facilities.

We are a multidisciplinary team with expertise in healthcare strategy and planning; property consultancy; cost management; project management; programme management; infrastructure solutions; net zero; transformation and digital; and life sciences strategy.

## Linesight

Contact:  
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Project director

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### Linesight

Linesight is a multinational construction consultancy firm with more than 50 years' experience, providing cost and project management services, project controls, schedule, risk and procurement services for sectors including life sciences, healthcare, data centres, commercial real estate, high-tech industrial, residential, hospitality, and retail.

Linesight's specialist project teams, each with specific skills and experience, provide faster project delivery, greater cost efficiency and maximum value for money for clients.

## LLEWELYN DAVIES

Contact:  
Robert Etchell,  
Director

W: [www.ldavies.com](http://www.ldavies.com)



### Llewelyn Davies

Our name has a distinguished history in both health and masterplanning, extending over five decades and encompassing a spectrum of innovation.

The fundamental design principles of the modern hospital were essentially invented and shaped by the company's founding partners, John Weeks and Lord Richard Llewelyn-Davies. Their pioneering work, notably in understanding the need for continuous flexibility, was extraordinary and remains as relevant to hospital design today, and in the future, as ever before.

## Medical Architecture

Contact:  
Paul Yeomans,  
Director

W: [www.medicalarchitecture.com](http://www.medicalarchitecture.com)



### Medical Architecture

We are specialists in healthcare architecture. We mix strategic planning and evidence-based design to create therapeutic environments that promote wellbeing and recovery.

We work closely with our clients to develop a clear vision for their estate, sharing the pride that comes with providing the best possible healthcare. We have constantly evaluated our work and evolved our thinking to ensure we push the field of healthcare architecture forward.

Our team of healthcare designers are based in London and Newcastle upon Tyne, with current projects in the UK, Europe and North America.

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020-8090-5199



## mjmedical

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Technical director

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### MJ Medical

MJ Medical is a leading healthcare planning and design consultancy. Established over 35 years ago, we've helped plan, design and equip more than 300 healthcare facilities across 75 countries.

Our extensive and diverse global experience enables us to deliver innovative services that are sensitive to local cultural and socio-economic considerations. The knowledge base we derive from our research and development programme supports the provision of intelligent, flexible healthcare buildings able to respond to future changes in clinical best practice, medical technology, and the needs of communities.

Our team of experienced economists, academics, architects, engineers, procurement specialists, and clinicians deliver tailored, evidence-based solutions at all stages of the healthcare facility development process.



Contact:  
Ruth Strickland,  
Chief operating officer

W: [www.mtshealth.co.uk](http://www.mtshealth.co.uk)



### MTS Health

MTS Health is a leading advisor to the NHS and private sector in the planning, procurement, installation and commissioning of large and specialist health projects. In its 25th year, MTS has equipped more than 40 hospitals and is providing advice for the New Hospital Programme cohorts, working closely with the NHS executive; stakeholders, cost advisors, design teams, construction partners and health planners.

Our work is underpinned by our team of experienced clinical engineers, MCIPS procurement specialists, and clinical scientists who work with and procure medical and non-medical equipment all year round.

MTS has invested in software and data to support the efficient planning of hospitals, and we're at the forefront of medical equipment planning, providing room-by-room equipment lists, costs, specifications, and life-cycle models. MTS also delivers clinical engineering services.



Contact:  
Warren Percival,  
Healthcare director

W: [www.rskgroup.com](http://www.rskgroup.com)



### RSK Group

RSK Group is a leading, international sustainability and environmental engineering consultancy providing technical services and specialist contracting. With more than 14,000 employees working from over 300 offices across the UK and 40 countries, RSK is the largest privately owned environmental and sustainability firm in Europe.

As a multifaceted group with global reach, RSK supports clients across the value chain, working directly with NHS trust estates teams and sustainability leads, or with appointed designers, architects, project management firms and contractors. From small refurbishments and strategic property advice to site development and disposal services, our specialist business units work together to form multidisciplinary teams, helping to address your sustainability, asset management, engineering, and capital delivery challenges.

# Ryder

Contact:  
Paul Bell,  
Partner

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 SILVER KNOWLEDGE LEADER

## Ryder Architecture

We are more than an architectural practice – we’re a team of teams with diverse and extensive expertise. We lead projects in our own integrated way, delivering exceptional value and a positive impact for our clients and communities.

Founded in Newcastle upon Tyne in 1953, we now have teams collaborating across the UK and internationally, with a shared commitment to our ethos of ‘Everything architecture’ – to improve the quality of the world around us and, in doing so, improve people’s lives.

# Stantec

Contact:  
Brenda Bush-Moline,  
Global health sector leader

W: [www.stantec.com](http://www.stantec.com)

 SILVER KNOWLEDGE LEADER

## Stantec

Stantec employs more than 4000 architects, medical planners, engineers, and project managers in six countries. Teams are supported by proprietary health research, experience in lean design, and alternative project delivery models.

The firm collaborates across sectors to bring best-in-class design – delivering progressive healthcare environments that improve patient outcomes and attract and retain top talent. Its London studio has been serving the NHS and private sector in the UK since 1990, and it forms part of its global integrated practice in the UK, Canada, US, Australia, and the Middle East.



Contact:  
Sarka Oldham,  
Business development and  
partnerships director

Mark Birchmore,  
Commercial marketing manager

W: [www.vanguardhealthcare.co.uk](http://www.vanguardhealthcare.co.uk)

 EXHIBITION PARTNER

## Vanguard Healthcare Solutions

Vanguard Healthcare Solutions is a leading global provider of flexible clinical infrastructure and services, delivering high-quality, technically advanced solutions at pace.

We work with our clients to provide sustainable healthcare solutions, with bespoke mobile and modular facilities that address the needs of each healthcare system. They include operating theatres; surgical hubs; community diagnostic centres; endoscopy suites; decontamination and sterilisation facilities; wards; clinics; and minor injuries units.

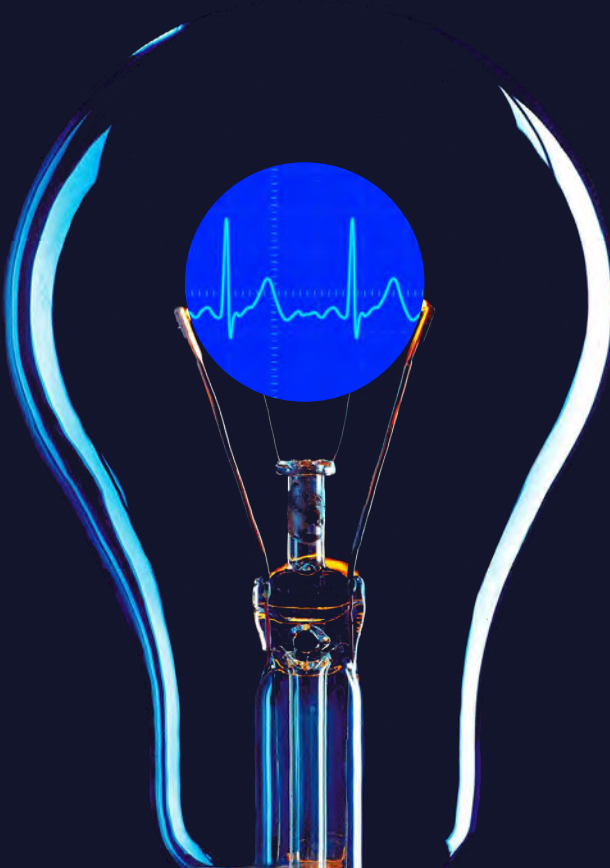
Our expertise is based on forging strong relationships with our clients and developing ways to enhance the existing infrastructure of the healthcare estate. As well as providing facilities to assist with high patient demand and long waiting lists, we can help you with operational challenges, such as refurbishments, and offer an emergency response.



# Archus

the global healthcare infrastructure specialist

Where ideas



become reality

[archus.uk.com](http://archus.uk.com)





## Lexica is a leading specialist consultancy

We support international and UK-based health and life sciences organisations with the planning, delivery, and continuous improvement of their services and facilities.

We are a multi-disciplinary team with expertise in:

- Healthcare strategy + planning
- Property consultancy
- Cost management
- Project, programme and portfolio management
- Net zero consultancy
- Lexica frameworks
- Life sciences strategy



[lexica.co.uk](https://www.lexica.co.uk)

## Delivering healthier outcomes