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PLANNING A CLIMATE-SMART HEALTHCARE SYSTEM

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Dear colleagues,

We are delighted to welcome you to the 8th European Healthcare Design 2022 Congress & Exhibition.

Providing an international forum for researchers and practitioners to explore the relationship between health service and system design, technology and infrastructure, the Congress continues to go from strength to strength and is now in its eighth year.

This year's Congress theme, 'Recovery, renewal and rediscovery: Planning a climate-smart healthcare system', is an opportunity to craft a blueprint for reconstruction along three directions of travel – responding to Covid-19, the growth of digital technology, and climate change mitigation – recognising their potential to catalyse change and innovation, and proposing ways in which they can transform our health systems and architecture.

As the world emerges from the pandemic – a global public health crisis that has deepened health and social inequalities in communities across the world – there are many harsh but valuable lessons to learn.

It's not only in reducing global climate emissions where healthcare has a vital role. There are opportunities, too, in how we plan for and invest in climate-smart healthcare systems that place health creation, disease prevention, disaster preparedness, and health and social equity to the fore.

As Covid-19 becomes endemic in our daily lives, the centrality of good health and universal healthcare to a more progressive and productive society has never been more evident. The result is a changing role for health systems as they become anchors of prosperity in communities that value health and equality, as well as places that treat disease and do the repairs when we become ill. The hospital building type will also change as its relationship with the city and the community it serves is redefined.

A climate-smart healthcare sector requires silo thinking to be displaced by system-level strategies to health planning and design, which understand the relationships and interdependence of different components of the healthcare ecosystem, from clinical service design to workforce planning to infrastructure investment.

As organisers, SALUS Global Knowledge Exchange and Architects for Health – and in collaboration with our host, the Royal College of Physicians, our partners, sponsors and exhibitors – we are delighted to welcome you to London.

Returning to our spiritual home at the Royal College of Physicians, London – after a three-year hiatus owing to the pandemic – European Healthcare Design 2022 features three days of insightful, provocative and entertaining talks, workshops, panel discussions, and study tours. Days one and two will open with keynote plenary sessions, before splitting into four streams. And the final session of day two will be devoted to a ceremony to present the EHD2022 Awards, supported by lead sponsor IHP (pp43-59). Study tours take place on day three.

This year, sessions will be streamed LIVE on SALUS TV for delegates unable to attend in person, while our dedicated event app will enrich the networking and learning experience for in-person delegates. The Congress will also host a poster and video gallery of innovative research and design projects (pp27-30), an exhibition of design and technology solutions (pp158-174), a Welcome Reception, a Garden Party (pp34-35), and four study tours (pp37-41) to landmark UK health facilities.

We're excited to meet everyone again in these salubrious surroundings. Have a fantastic Congress.

**JOHN COOPER**

Past chairman
Architects for Health

**MARC SANSOM**

Director
SALUS Global Knowledge
Exchange



Improving
Health
Worldwide
Through
the Power
of **Design**

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THE ROYAL COLLEGE OF PHYSICIANS

The 8th European Healthcare Design Congress & Exhibition, 13–15 June 2022, 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 over 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

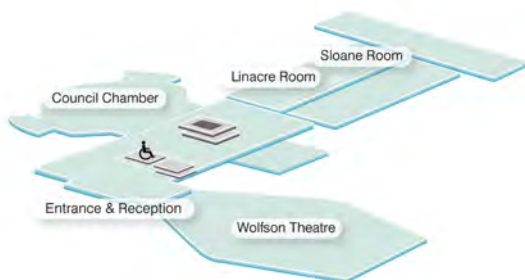
- Main conference plenary sessions, breakout sessions and the EHD2022 Awards ceremony

Council Chamber

- Breakout sessions, and breakfast and lunchtime workshops

Linacre and Sloane Room

- Breakout sessions



FIRST FLOOR

Dorchester Library

- Poster gallery and the EHD2022 Awards shortlist gallery

Long Room and Osler Room

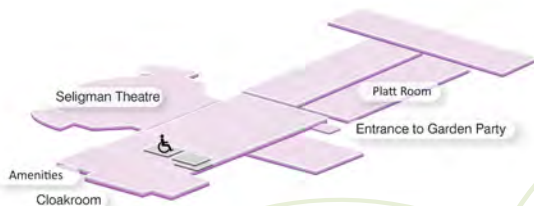
- Lunch, exhibition and the Welcome Drinks Reception



LOWER GROUND FLOOR

Seligman Theatre and Platt Room

- Breakout sessions and the Art Room



EHD LIVE ON TV

Use the EHD2022 app to enhance your event experience: prepare your agenda; connect with colleagues and friends – old and new; explore the exhibition and poster + video galleries; 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

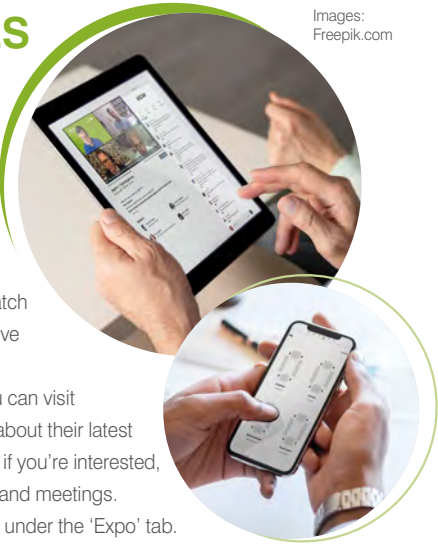
The event mobile application is available on both the Google and Apple App Stores. To download it, search for **European Healthcare Design** or scan the QR code below. Once downloaded, you'll need to sign into the app using the email address you used when registering for the Congress.



FUNCTIONS AND FEATURES

Images:
Freepik.com

- **QR code** – In-person delegates should access their QR code on the app to check-in to the in-person event. First, log in to the app, then click on your image in the top right of the screen, where your QR code will appear – click on it and check-in at the registration desk. You can also edit your profile and view your virtual briefcase and bookmarked content here.
- **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.
- **Poster+ Video Gallery** – Explore the Poster+Video Gallery also under the 'Expo' tab. Visit the Poster+Video 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 2022 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 #EHD2022 and tagging us on Twitter with the handle @EHD2022



08.00 REGISTRATION OPENS



Session 1

Opening plenary

Chair: John Cooper, Architects for Health, UK

08.45 Welcome and introduction

John Cooper, Programme chair, European Healthcare Design, and past chair, Architects for Health, UK

09.00 Keynote: Delivering a net-zero health system

Dr Nick Watts, Chief sustainability officer, NHS England, UK

09.20 Keynote: Climate and the pandemic: A perfect storm for healthcare systems

Andrew Goddard MD, PRCP, President, Royal College of Physicians, UK

09.40 Keynote: Delivering the New Hospital Programme

Natalie Forrest, Senior responsible officer, New Hospital Programme, Department of Health and Social Care, UK

10.00 Panel discussion

10.15 COFFEE, EXHIBITION AND POSTER+VIDEO GALLERY



Session 2

Human-centred design

Chair: David Allison, Clemson University, USA

10.45 Living systems – the hospital of the future

Ab Rogers, Ab Rogers Design, UK

11.05 Reframing healthcare design through a biomimetic lens: Unlocking the power of nature for environmental resilience

William P Nankivell, B+H Architects, Canada

Jamie Miller, B+H Architects, Canada

11.25 Why wood? The positive influences on our climate and our wellbeing

Birgitte Gade Ernst, Arkitema, Denmark

11.45 The Spine: A holistic approach to health and wellbeing in the built environment

Gareth Banks, AHR, UK

Ian Bullock, Royal College of Physicians, UK

12.05 Panel discussion

12.30–14.00 LUNCH, EXHIBITION AND POSTER+VIDEO GALLERY

**Session 3****Designing for cancer care**

Chair: Richard Mann, AECOM, UK

- 14.00 Cancer care at a mega scale: How MD Anderson is redefining the future of care delivery**
Mike Pukszta, CannonDesign, USA
- 14.20 Cancer centres from New York City to the Great Plains**
Louis A Meilink Jr, Ballinger, USA
- 14.40 The Grafton Way Building – delivering to the limits**
Sheila Carney and Kevin Bates, Scott Tallon Walker Architects, UK
Colin Boyd, Bouygues UK, UK
- 15.00 Panel discussion**
- 15.30 COFFEE, EXHIBITION AND POSTER+VIDEO GALLERY**

**Session 4****Sensory design**

Chair: Jaime Bishop, Architects for Health, UK

- 16.00 Considering sensory design makes sense: Exploring the positive sensory impact of Southmead Hospital main atria**
Vicky Casey, BDP, UK
- 16.20 Design for the senses**
Caroline Varnauskas, White arkitekter, Sweden
- 16.40 Panel discussion**

**Session 5****Keynote plenary**

Chair: John Cooper, Architects for Health, UK

Supported by:



- 17.00–18.00 Keynote: The Caring Collective presents ‘Fast forward: The future of health and wellbeing’**
Max Farrell, LDN Collective, UK; Bee Farrell, Foodturistic, UK; Sherry Dobbin, Futurecity, UK;
Robert Gordon Clark, London Communications Agency, UK

- 18.00–20.30 WELCOME DRINKS RECEPTION** (Exhibition, Poster+Video Gallery)
Osler and Long Room

Hosted by:



Marking 30 years of Architects for Health, the reception launches a series of events and activities celebrating its work and mission

Keynote and book signing: Turning the world upside down again

Lord Nigel Crisp, Author; Former chief executive, NHS;
Co-chair, APPG on Global Health, UK

Supported by:

**The Healthcare Planning Academy drinks reception***Dorchester Library*

Network and learn about the benefits of becoming a member of the HPA

Hosted by:



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



Session 6

Health system transformation

Chair: Sasha Karakusevic, NHS Horizons, UK

10.45 Transformation in healthcare – magical thinking or the shape of things to come?

John Kelly, Lexica (formerly ETL), UK

Emily Bunt, Lexica (formerly ETL), UK

11.05 The development of the Cavell Centres concept

Hrafnhildur Ólafsdóttir, JCA, UK

John Cooper, JCA, UK

11.25 Dorset Health Village – shopping with healthcare

Ehren Trzebiatowski, BDP, UK

Paul Johnson, BDP, UK

11.45 Developing an evidence-based approach to improving health services, infrastructure and environment within a pan-regional population basis: A South East Ireland case study

Conor Ellis, Archus, UK

Mark Kane, HSE Republic of Ireland, Ireland

12.05 Panel discussion

12.30–14.00 LUNCH, EXHIBITION AND POSTER+VIDEO GALLERY

**Session 7****Health ecosystems**

Chair: Jonathan Erskine, EuHPN, UK

14.00 Power of 8 for change**Sharon E Woodworth**, University of California at San Francisco, USA**Eva Henrich**, Heinle, Wischer und Partner, Germany**Tatiana Epimakhova**, C.F. Möller Architects, Germany**David Allison**, Clemson University, USA**14.20 Planning for resilience in healthcare infrastructure****Richard Darch**, Archus, UK**Darshana Chauhan**, Coplug, UK**14.40 A 'Well-Placed Hospital' in Barnstaple****Jos Poortmann**, MAAP Architects, Australia**Richard Henson**, Fleet Architects, UK**15.00 Panel discussion****15.30 COFFEE, EXHIBITION AND POSTER+VIDEO GALLERY****Session 8****A new profession**

Co-chairs: Tina Nolan, Healthcare Planning Academy, UK

Richard Darch, Healthcare Planning Academy, UK**16.00–17.00 Workshop: 'Archidocs' and 'Dochitects' – will clinicians or architects predominate as the healthcare planners in the future?**

Organised by:



Globally, the pace of change in healthcare is constantly accelerating, requiring healthcare planners to always stay ahead of the curve to bring knowledge of the latest trends and advances into the planning and design process for health infrastructure. And, as the world emerges from the turmoil of the last two years, it is an indisputable fact that infrastructure will increasingly mean digital rather than built environments. At the same time, sustainability – operational, environmental, social and economic – will wrap around all aspects of healthcare planning, from strategic planning down to the commissioning and operational-readiness of new facilities. Add to the mix the emergence of new concepts of design automation and standardised off-site manufacturing processes, and it is clear that the knowledge base for the profession is evolving and expanding at pace.

Panel: Marc Levinson, Murphy Philipps Architects, UK**Stephanie Williamson**, Architects for Health, UK**Eve Edelstein**, Guy's and St Thomas' NHS Foundation Trust, UK**Jennifer Whinnett**, Guy's and St Thomas' NHS Foundation Trust, UK**Iain Buchan**, Buchan Associates, UK**Ellie Richardson**, Guy's and St Thomas' NHS Foundation Trust, UK

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 (17.00–18.00).

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



Session 9

Decarbonising the healthcare estate

Chair: **Sunand Prasad**, UK Green Building Council; Perkins&Will; Penoyre & Prasad, UK

10.45 **The world's most climate-smart hospital**

Per Olsson, LINK Arkitektur, Sweden

Kristina Åkerlund, LINK Arkitektur, Sweden

Mette Dan-Weibel, LINK Arkitektur, Denmark

11.05 **A net-zero strategy for Royal United Hospitals Bath**

Adrian Regueira-Lopez, WSP, UK

11.25 **University Hospital Ghent – CO2 neutral in 2050**

Simon Ossieur, VK Architects & Engineers, Belgium

Petra Demoor, UZ Ghent, Belgium

11.45 **Decarbonisation – a tale of two sites**

Ben Barker, Hoare Lea, UK

Ned Maynard, University Hospitals Bristol NHS Foundation Trust, UK

12.05 **Panel discussion**

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

12.40–13.55 **Lunchtime design workshop:**

Blurring the boundaries of healthcare

Organised by:



See page 139 for the full abstract on the issues that will be discussed in this workshop.

Panel: Paul Bell, Ryder Architecture, UK

Miriam Duffy, National Rehabilitation Centre, UK

Beatrice Fraenkel, Mersey Care NHS Foundation Trust, UK

Donna Hall, New Local; Bolton NHS Foundation Trust; PossAbilities; University of Manchester, UK

Natalie Firminger, Whipps Cross Redevelopment, Barts Health NHS Trust; New Hospital Programme, UK



Session 10
Climate-smart hospital infrastructure
 Chair: Sam Shooter, Hoare Lea, UK

14.00 Environmental benefits of the adoption of modern methods of construction in healthcare buildings

Jaimie Johnston, Bryden Wood, UK

14.20 Designing and implementing a carbon-negative healthcare campus

Brad Hinthorne, Perkins&Will, USA
 Ruben Canas, MacDonald Miller, USA

14.40 Destination net zero: Transforming NHS estates into the hospitals of tomorrow

Bonnie Chu, Wates Construction, UK

15.00 Panel discussion

15.30 COFFEE, EXHIBITION AND POSTER+VIDEO GALLERY



Session 11
Workshop: How can healthcare institutions get to zero emissions in 2050?

Co-chairs: Antonella Riso, Health Care Without Harm, Argentina

Mireia Figueras Alsius, Health Care Without Harm, Belgium

Speaker: Maria José Mora Genís, Xàtiva-Ontinyent Health Department and Alcoy Health Department, Spain



**16.00–
17.00**

In 2020, only one national healthcare system was building a plan to get to zero emissions before 2050: the NHS. As of May 2022, 18 have committed to do the same. If the healthcare sector does not implement a clear and ambitious action plan to get to zero emissions by 2050, the emissions from the sector will triple by 2050. The climate crisis is a health crisis, and the sector has a double role to play in solving it. The healthcare sector must seize the opportunity to address its own contribution to climate change and the impact of climate change on public health. That means reducing its own emissions to net zero and adapting now so our health systems are prepared for the new pressures climate change will create.

The sector deals therefore with the consequences of climate change while having to reduce its own contribution to the problem, which is estimated at 4.4 per cent of global greenhouse gas emissions. A big proportion of these emissions come from developed countries, and 12 per cent from the European Union.

During this session, Health Care Without Harm will share its strategy and tools for healthcare decarbonisation, working with delegates in understanding the greenhouse emissions produced by the sector and the different opportunities already available to reduce them. Learning will also revolve around the challenges that require collaboration among systems and countries to create a sustainable and low-carbon supply chain for the sector around the world.

HCWH will also present a pilot project that supported hospitals across Spain, Portugal, Greece and Italy to establish internal carbon management teams and plans to transition to zero-emissions healthcare. By taking a health provider-level approach, HCWH Europe was able to provide hands-on support for participants and pilot a bottom-up methodology to carbon management, which provided vital input for the development of a toolkit for healthcare decarbonisation.

Case studies from different regions and contexts will be displayed to encourage the sector to create applicable action plans to reduce emissions, while promoting sustainability and effective models of care.

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 (17.00–18.00).

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

The smart health campus

Chair: Richard Darch, Archus, UK

-
- 10.45** **Hospital 2030: Integrating digital planning for a smart healthcare campus**
Doreen Koh Yan Fun, CPG Consultants, Singapore
-
- 11.05** **People, place and prosperity: Using big data as a diagnostic tool in health precinct design**
Michaela Sheahan, Hassell, Australia
-
- 11.25** **The distributed campus of care: Go small, reach far**
Danny Ruta, Guy's and St Thomas' NHS Foundation Trust, UK
-
- 11.45** **Hybrid model of care: Integrating physical and virtual care in an internal medicine home hospitalisation programme**
Nirit Pilosof, University of Cambridge, Israel/UK
Michael Barrett, University of Cambridge, UK
-
- 12.05** **Panel discussion**
-
- 12.30–14.00** **LUNCH, EXHIBITION AND POSTER+VIDEO GALLERY**
-

**Session 13**

Digital transformation in healthcare

Chair: Anisha Mayor, WSP UK

14.00 Digital services for climate-smart healthcare system: Challenges, gaps and opportunities

Noemi Bitterman, Technion, Israel

14.20 IoT solutions for smart hospitals

Steven Jamieson, Siemens Smart Infrastructure, UK

14.40 Ambient intelligence illuminating care at the hospital ward

Harry van Goor, Radboud university medical center, Netherlands

15.00 Panel discussion**15.30 COFFEE, EXHIBITION AND POSTER+VIDEO GALLERY****Session 14**

Digital design for intensive care

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

16.00 The Smart ED

Dr Sue Robinson, Cambridge University Hospitals NHS Foundation Trust and NHSE/I, UK

16.20 Creating, testing and evaluating immersive virtual ICU-CCU built environments

Stephen Verderber Arch.D, University of Toronto Centre for Design + Health Innovation, Canada

Christopher Parshuram MD, The Hospital for Sick Children, Toronto, Ontario, Canada; University of Toronto, Canada

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 (17.00–18.00).

08.00 REGISTRATION OPENS



Session 15

Opening plenary, day two

Chair: John Cooper, Architects for Health

08.45 **Welcome and introduction**

John Cooper, Programme chair, European Healthcare Design, and past chair, Architects for Health, UK

08.50 **Around the kitchen table with Maggie's: Valuing our workforce and carers through design**

Panel: Dame Laura Lee, Maggie's, UK

Ab Rogers, Ab Rogers Design, UK

Alex de Rijke, dRMM, UK

Charles Curwain, Maggie's, UK

Dr Ash Ranpura, Clinical neurologist and neuroscientist, UK

10.15 COFFEE, EXHIBITION AND POSTER+VIDEO GALLERY



Session 16

Hospital in the city

Chair: Paul Bell, Ryder Architecture, UK

10.45 **Encouraging interaction: Healthcare and education – two case studies**

Ernest Fasanya, Hopkins Architects, UK

11.05 **Pandemic lessons: How architecture and design supported an infectious disease hospital in China**

Beau Herr, CallisonRTKL, USA

11.25 **The new Mississauga Hospital – a new vertical hospital in the city**

David Martin, Stantec, UK

David Longley, Trillium Health Partners, Canada

Matthew Kenney, Trillium Health Partners, Canada

Suzanne Crysdale, Stantec, Canada

11.45 **Designing an XL medical campus for a translational health science future in China**

Michael Street, HDR, USA

12.05 **Panel discussion**

12.30–14.00 LUNCH, EXHIBITION AND POSTER+VIDEO GALLERY

**Session 17****Evidence-based practice****Chair: Jonathan Erskine, EuHPN, UK****14.00 Healthcare architecture's ethical imperative – reliance on evidentiary rigour****Bill Hercules**, WJH Health, USA**Ray Pentecost DrPH**, Center for Health Systems & Design, Texas A&M University, USA**14.20 A post-occupancy evaluation framework to inform future investment in healthcare design****Shari Blanch**, Jacobs, Australia**Annabel Frazer**, Jacobs, Australia**14.40 Driving innovation in healthcare design: The case of an interdisciplinary co-design process for a new rapid eye diagnostics hub for Moorfields Hospital****Dr Anne Symons**, University College London, UK**15.00 Panel discussion****15.30 COFFEE, EXHIBITION AND POSTER+VIDEO GALLERY****Session 18****Clinical innovation through design collaboration****Chair: Liz Whelan**, Greenwich University; Building Blocks for Clinicians, UK**16.00 Workshop: Opportunities for clinical innovation through interdisciplinary design collaboration within the New Hospital Programme**

While the New Hospital Programme (NHP) will proceed on the basis of central strategies, it is of paramount importance that these strategies incorporate meaningful clinical involvement to successfully deliver the programme's key objectives for the delivery of cohesive, high-quality, design solutions. Building on previous presentations and research, this session will identify good practice from panel members and the audience, and suggest how clinical innovation can be effectively included within the New Hospital Programme.

Panel: Marc Levinson, Murphy Philipps Architects, UK**Emma Stockton**, Great Ormond Street Hospital for Children; Building Blocks for Clinicians, UK**Jennifer Whinnett**, Guy's and St Thomas' NHS Foundation Trust, UK**Session 19****Awards ceremony****Chair: Chris Shaw**, Past chair, Architects for Health, UK**17.00 European Healthcare Design Awards 2022**

Supported by (Lead Partner):

**17.50 Closing address****John Cooper**, Programme chair, European Healthcare Design, and past chair, Architects for Health, UK**18.30–22.00 GARDEN PARTY**

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

Designing for children

Chair: Stephanie Williamson, Architects for Health, UK

10.45 Cambridge Children's Hospital – 'A Whole New Way': A new model of integrated healthcare and research to provide holistic mental and physical care for children and young people

Jens Axelsson, White Arkitekter, Sweden

Negar Mihanyar, Hawkins\Brown, UK

11.05 Design for dignity – measuring the impact of design: Refurbishment of the maternity ward at Punta Europa Hospital in AI, Spain

Marta Parra Casado, Virai Arquitectos, Spain

Nicolás Neleo Sánchez Cañamero, Campo de Gibraltar Oeste Health Management Area, Spain

11.25 Designing a home for palliative children

Clara Rius, Ahead PSP, Spain

11.45 GOSH Sight & Sound Centre – retrofit for unique needs

Gary Toon, Sonnemann Toon Architects, UK

Crispin Walking-Lea, Great Ormond Street Hospital for Children NHS Foundation Trust, UK

12.05 Panel discussion

12.30– LUNCH, EXHIBITION AND POSTER+VIDEO GALLERY

14.00

**Session 21****Transforming mental health design**

Chair: Brenda Bush-Moline, Stantec, USA

- 14.00 A breath of fresh air – the positive impact of integrated landscape and activity-based design in the architecture of secured mental healthcare facilities**

Coen van den Wijngaart, archipelago architects, Belgium

Laurent Grisay, archipelago architects, Belgium

- 14.20 Red Fish Healing Centre for Mental Health and Addiction: BC's newest mental health and addictions hospital shifts away from institutional healthcare**

Shane Czypyha, Parkin Architects, Canada

- 14.40 How to transform behavioural healthcare facilities**

Laia Isern, Vitaller Arquitectura, Spain

- 15.00 Panel discussion**

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

**Session 22****Neuroscience and healthcare architecture**

Chair: Paul Yeomans, Medical Architecture, UK

- 16.00 The NOVELL method**

Julie Bernhardt, The Florey Institute of Neuroscience and Mental Health, Australia

- 16.20 Neuroscience and architecture: A 12-factor matrix for healthcare design**

Davide Ruzzon, Lombardini22, Italy

- 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 (17.00–17.50).

07.30–08.45 **Breakfast planning workshop:
Reinventing planning in healthcare**

Organised by:



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

Panel: **Richard Darch**, Archus, UK
Mark Kane, HSE Republic of Ireland, Ireland
Rita Mezei, Canadian Centre for Healthcare Facilities, Canada
Nigel Edwards, Nuffield Trust, UK
Malcolm Lowe-Lauri, Grant Thornton, UK

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



Session 23

Innovation in emergency care

Chair: **Matthew Holmes**, Jacobs, Australia

10.45 **Design in the face of the climate crisis: Planning A&E for high-performance flow and lean design to deliver maximum capacity in less space**

Jon Huddy, Huddy HealthCare Solutions, USA
David White, Huddy HealthCare Solutions, USA

11.05 **The impact of merging high-fidelity mock-ups with patient-care simulated scenarios to optimise design of a new academic ED**

Dr Cemal Sozener MD, University of Michigan Medical Center, USA
Benjamin S Bassin MD, University of Michigan Medical Center, USA
Juliet Rogers PhD, MPH, Blue Cottage of CannonDesign, USA
Brian Silva, CannonDesign, USA

11.30 **Leveraging modularity to solve a mental health crisis**

Catherine Zeliotis, Stantec, UK
Chu Foxlin, Stantec, USA

11.50 **Application of computational fluid dynamics simulation to hospital room design to simultaneously predict air quality, airborne pathogen infection risk, and energy efficiency**

Pedro Obando Vega, BuildWind, Belgium

12.10 **Panel discussion**

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

12.40–13.55 **Lunchtime design workshop:
How can integrated care be more than the sum of its parts?**

Organised by:



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

Panel: **Christopher Shaw**, Medical Architecture, UK
Stephanie Williamson, Architects for Health, UK
John Kelly, Lexica (formerly ETL), UK
Martin Rooney, New Hospital Programme, NHS England, UK
Jaime Bishop, Fleet Architects; Architects for Health, UK
Lianne Knotts, Medical Architecture, UK

**Session 24****Re-imagining surgical care**

Chair: Dr Harry van Goor, Radboudumc, Netherlands

14.00 MASH Flights – Mobile Advanced Surgical Hospitals: A hybrid NGO

Christine Chadwick, CannonDesign, Canada

Kendall Joudrie, MASH Flights & Thinking Robot Studios, Canada

14.20 Evidence-based design guidelines to support safe medication practices and workflows in the anaesthesia workspace

Anjali Joseph, Center for Health Facilities Design and Testing, Clemson University, USA

Kenneth Catchpole, Medical University of South Carolina, USA

14.40 Design considerations for the modern operating theatre: Supporting the implementation of medical video, audio and communication systems

Richard McAuley, Brandon Medical, UK

15.00 Panel discussion**15.30 COFFEE, EXHIBITION AND POSTER+VIDEO GALLERY****Session 25****Unlocking the potential of healthcare workspace design**

Chair: Jeremy Myerson, WorkTech Academy, UK

16.00–17.00 Workshop: Unlock the potential of healthcare workspace design

Workspace design is focusing on understanding new ways of working and collaboration between knowledge workers who are becoming increasingly agile, mobile and remote. It is recognised as key to talent attraction, retention, satisfaction, productivity, reduced sick leave and worker sense of belonging, connection, and overall health and wellbeing. The Covid-19 pandemic has impacted on both frontstage (clinical spaces) and backstage workspaces (office spaces), leading to hybrid working models, through to the increased use of digital platforms. Most attention has been on healthcare frontstage workspaces. However, backstage workspaces should be increasingly recognised as key to communication and teamwork among all healthcare professionals and administrators. Limited evidence exists about how design can best support holistic (front and backstage) workspaces in healthcare.

Panel: Lucio Naccarella, The University of Melbourne, Australia

Lizette Engelen, Workplace strategist, practitioner and researcher, Netherlands

Monika Codourey, Architect, workplace and healthcare consultant, and researcher, Switzerland

Karrie Long, Royal Melbourne Hospital, Australia

Gareth Banks, AHR, UK

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 (17.00–17.50).

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

Regenerative infrastructure for social impact

Chair: Beau Herr, CallisonRTKL, USA

10.45 **Aligning agile healthcare environments with progressive policy initiatives**

Brian Niven, Mott MacDonald, UK

Rebecca Stubbs, Mott MacDonald, UK

11.05 **Regenerative design and health impacts**

Colin Rohlfing, HDR, USA

Anosha Zanjani, HDR, USA

11.25 **Developing a sustainable and contextual hospital model for the future: Two case studies from two different contexts in Belgium**

Coen van den Wijngaart, archipelago architects, Belgium

Laurent Grisay, archipelago architects, Belgium

11.45 **Project Maunga, Taranaki Base Hospital Renewal: Lessons from implementing New Zealand's first 5-Star Green Star hospital**

Jonathan Rae, Warren and Mahoney, New Zealand

12.05 **Panel discussion**

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

**Session 27****The sustainable hospital: Digital and modular****Chair: Tina Nolan**, Lexica (formerly ETL), UK**14.00 Digital health and the sustainable hospital****Andrew Rolf**, Arup, UK**14.20 Fast response – long-term value****Eric Trillo**, AECOM, Spain**Montserrat Vivas Loba**, Institut Català de la Salut, Spain**14.40 From organisational estate strategies to system-wide infrastructure strategies: Changing how we think about capital investment****Martin Clark**, Currie & Brown, UK**Alison Evans**, Currie & Brown, UK**Lizi Greenhill**, Currie & Brown, UK**15.00 Panel discussion****15.30 COFFEE, EXHIBITION AND POSTER+ VIDEO GALLERY****Session 28****Transforming the healthcare estate for key worker housing****Chair: Jim Chapman**, Manchester School of Architecture, UK**16.00 Solving the key worker housing crisis****Mark Rowe**, Perkins & Will, UK**Sarah Hordern**, Perspicio, UK**16.20 Housing and healthcare: Signals of change for key workers' quality of life****Arthur Kay**, Skyroom; Board of Commissioners for the Key Worker Homes Fund, 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 (17.00–17.50).

Leaders in healthcare design

We work in partnership with clients and other stakeholders to design major healthcare facilities that are smart, sustainable, flexible, and adaptable.

Oriel, London

Moorfields Eye Hospital,
UCL Institute of
Ophthalmology and
Moorfields Eye Charity

Designed in partnership
with Penoyre & Prasad
and White Arkitekter



Hosted in the Royal College's historic Dorchester Library, the 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 poster and video gallery is a great place to spend time during the coffee breaks, lunch, and in the early morning before the Congress sessions begin. Posters of the shortlisted projects for the European Healthcare Design Awards, (see pp 32-33; and pp 43-59) will also be on display.

All the posters are also available digitally via the EHD 2022 app, along with abstracts and videos, and via SALUS Global Knowledge Exchange, an innovative online, knowledge-sharing community resource, which features videos of all the talks from the previous seven European Healthcare Design Congresses, and the past five Healthy City Design International Congresses.

To view the digital posters and abstracts, visit the Poster+Video Gallery via the app or join SALUS for free as an individual member, at www.salus.global, and click on Posters in the Journal.

P01 Getting the clinical brief right

Toby Simon Banfield, Mark Reilly, Archus (UK)

events.hubilo.com/EHD2022/booth/127169

P02 An interactive dialogue: The dynamics of designing academic medical centres

Mike Apple, Michael Street, HDR (USA)

events.hubilo.com/EHD2022/booth/127171

P03 Hospitals renovating infectious disease wings following Covid-19

Beau Herr, CallisonRTKL (USA)

events.hubilo.com/EHD2022/booth/127173

P04 Lightworks: Combining art and light to combat the clinical dark age

Peter Shenai, Louisa Williams, Art in Site (UK)

events.hubilo.com/EHD2022/booth/127175

P05 Healthcare revolution: The role of robotics

Anika Rahman, Dr Evangelia Chrysikou, UCL; Dr Hina Lad, Imperial College Healthcare NHS Trust (UK)

events.hubilo.com/EHD2022/booth/127176

P06 Mental care – architectural aspect

Martha Jónsdóttir, University of Hertfordshire (UK)

events.hubilo.com/EHD2022/booth/127177

P07 The Maggie's Centre: A model of human-centred design thinking

Caterina Frisone, Oxford Brookes University (UK)

events.hubilo.com/EHD2022/booth/127179

P08 Hospital operational commissioning – 'the poor relative'

Maeve Dunne, Rachel Hall, Lexica (formerly ETL) (UK)

events.hubilo.com/EHD2022/booth/127180

P09 Designing safe and sustainable smart hospitals

Gavin Collier (UK), Colin Rohlfing, HDR (USA)

events.hubilo.com/EHD2022/booth/127181

P10 Ecourbanism – regenerative healthcare design for people and planet

Luke Engleback, Studio Engleback (UK)

events.hubilo.com/EHD2022/booth/127183

P11 Command centres: Advancing technology to prepare for future health crises

Beau Herr, CallisonRTKL (USA)

events.hubilo.com/EHD2022/booth/127182

P12 Designing the hospital of the future

Shaz Hawkins, Tarkett (UK)

events.hubilo.com/EHD2022/booth/127185

P13 Reconstructing healthcare planning

Regina Kennedy, Andrew Castle, Lexica (formerly ETL) (UK)

events.hubilo.com/EHD2022/booth/127186

P14 Standardisation, flexibility and adaptability of healthcare facility planning

Paul Sheldon, Toby Banfield, Archus (UK)

events.hubilo.com/EHD2022/booth/127187

P15 Designing for the health of coastal communities

Lianne Knotts, Medical Architecture (UK)

events.hubilo.com/EHD2022/booth/127189

P16 Creating exceptional cancer centres that provide quality and convenient care

Beau Herr, Gabryela Feldman, CallisonRTKL (USA)

events.hubilo.com/EHD2022/booth/127190

P17 Creating inclusive healthcare facilities and empowering patients by embedding person-centred design principles

Rob White, NHS Golden Jubilee (UK)

events.hubilo.com/EHD2022/booth/127193

P18 Climate-smart healthcare systems: Expanding the capabilities of BMS systems and integration with the OR

Richard McAuley, Adrian Hall, Brandon Medical (UK)

events.hubilo.com/EHD2022/booth/127194

P19 Towards sustainable health: A green patient journey

Harry van Goor, Merlijn Smits, Radboud university medical center (Netherlands)

events.hubilo.com/EHD2022/booth/127195

P20 Mind+Body: Inclusive design for complex medical / mental health co-morbidities

Shary Adams, CannonDesign; Kayvan Madani Nejad, United States Department of Veterans Affairs (USA)

events.hubilo.com/EHD2022/booth/127196

P21 Revealing hidden opportunities: Young adults co-designing an innovative mental health hub

Deanna Brown, Robyn Whitwham, Lisa Kee, Jane Wigle, Stantec (Canada)

events.hubilo.com/EHD2022/booth/127198

P22 Refurbishment or demolition? Adapting hospitals built between 1945 and 1989 in Poland to modern requirements

Natalia Przesmycka, Rafał Strojny, Anna Zyczynska, Lublin University of Technology (Poland)

events.hubilo.com/EHD2022/booth/127199

P23 Playing your way to appointments: Art and wayfinding for the Sight & Sound Centre, Great Ormond Street Hospital

Peter Shenai, Louisa Williams, Martin Jones, Art in Site (UK)

events.hubilo.com/EHD2022/booth/127200

P24 Incorporating biophilic design and materials into non-clinical spaces of a new diagnostic centre in London, UK: A case study

Jonty Craig, David Di Duca, BAT Studio; Karen Janody, Royal Brompton and Harefield Clinical Group (UK)

events.hubilo.com/EHD2022/booth/127201

P25 Symbiosis: Harnessing biology to enable a synergistic design approach for patient-centricity and sustainability
Eric Corey Freed, CannonDesign (USA)
events.hubilo.com/EHD2022/booth/127202

P26 Simulating social connection with FLUID sociability
Bruce Haden, Human Studio |
Architecture + Urban Design (Canada)
events.hubilo.com/EHD2022/booth/127204

P27 Dynamic glass supports wellbeing
Martin Zitto, Merck (Germany), Natalie Carrick, eyrise (UK), Céline Glipa, eyrise (Netherlands), Filip Roscam, eyrise (Belgium)
events.hubilo.com/EHD2022/booth/127205

P28 Virginia Woodlands
Melissa Bradner MD, Virginia Commonwealth University; Terry Wyllie, BOB Architecture; Yael Tarshish MD, Baystate Medical Center (USA)
events.hubilo.com/EHD2022/booth/127206

P29 Principles of design for ergonomic pendant solutions for minimally invasive surgery and shorter recovery times in intensive care units
Scott Pickering, Brandon Medical (UK)
events.hubilo.com/EHD2022/booth/127207

P30 Investigating healthcare professionals' interactions with technological equipment in trauma rooms
Sara Bayramzadeh, Parsa Aghaei, Kent State University (USA)
events.hubilo.com/EHD2022/booth/127208

P31 The sea at the Forensic Ward / design of the Forensic Ward at the Sha'ar Menashe Mental Health Center
Dalia Shilony, Dalia Shilony Interior Design; Lea Botzer, Sha'ar Menashe Mental Health Center (Israel)
events.hubilo.com/EHD2022/booth/127209

P32 Creating access to nature to improve wellbeing in a hospital is leading to ecosystem health: A case study
Karen Janody, Ashi Firouzi, Royal Brompton & Harefield Hospitals; Keir EJ Philip, Imperial College London, Royal Brompton & Harefield Hospitals (UK)
events.hubilo.com/EHD2022/booth/127210

P33 Modern standards for medical video systems: Infrastructure required for 4K UHD and beyond in the OR
Richard McAuley, Brandon Medical (UK)
events.hubilo.com/EHD2022/booth/127211

P34 Collaborative working in action – contracts are important, but it's about the people and the culture
Phil Wade, Peter Ball, Static Systems Group (UK)
events.hubilo.com/EHD2022/booth/127212

P35 Reinvigorating our shared ambition to design for health
Mette Lindeberg, Henning Larsen Architects (Denmark)
events.hubilo.com/EHD2022/booth/127214

P36 Impact of advancing digital innovation
Magnus Leask, Graham Cossons, Stephen Wreford, Hoare Lea; Charles Gutteridge, Bart's Health NHS Trust (UK)
events.hubilo.com/EHD2022/booth/127215

P37 Expand commissioning framework to support a healthy and enduring interior environment
Jean Hansen, Susan Suhar, Charlene Mendez, HDR (USA)
events.hubilo.com/EHD2022/booth/127218

P38 Future-proofing hospital buildings: Conceptualisation and determining practical implications
Sanaz Memari, Richard Tucker, Fiona Andrews, Deakin University (Australia)
events.hubilo.com/EHD2022/booth/127216

P39 Biophilic design and wayfinding in healthcare centres for a better experience of care

Enya Lachman-Curl, Karen Janody, Royal Brompton and Harefield Clinical Group (UK); Charlotte Roscoe, Harvard T.H. Chan School of Public Health (USA)

events.hubilo.com/EHD2022/booth/127219

P40 Identifying the role of the physical environment in causing disruptions and interruptions in trauma rooms: An observational study

Sara Bayramzadeh, Hossein Mirzajani, Hamid Estejab, Kent State University (USA)

events.hubilo.com/EHD2022/booth/127222

P41 Supporting patient wellbeing and skills development through creative co-design of the paediatric waiting area of Royal Brompton Diagnostic Centre

Sarah Grainger-Jones, Conni Rosewarne, Royal Brompton & Harefield Hospitals; Rumbidzai Savanhu, Illustrator, (UK)

events.hubilo.com/EHD2022/booth/127223

P42 An interactive dialogue: Improving community-based health and social care services through facility design and management

Michael Roughan, HDR (USA); Mike O'Mahoney, HDR (UK); Aileen Hogan, Community Health Partnerships (UK)

events.hubilo.com/EHD2022/booth/127224

P43 Teaching hospitals: Learner-centred design

Megan Phelps, University of Sydney (Australia)

events.hubilo.com/EHD2022/booth/127226

P44 Cambridge Children's Hospital – integration, innovation and improvements in the design process to deliver carbon reduction in healthcare

Ewan Graham, Hawkins\Brown; Kelly Alvarez Doran, White Arkitekter (UK)

events.hubilo.com/EHD2022/booth/127227

P45 Economic feasibility of medical construction project in Iran

Mohammad Anvar Adibhesami, Iran University of Science and Technology (Iran), Hirou Karimi, Eastern Mediterranean University (Turkey)

events.hubilo.com/EHD2022/booth/127228

P46 Can exposure to virtual tours of surgical spaces help reduce anxiety for children undergoing outpatient surgical procedures?

Anjali Joseph, Swati Goel, Matthew Browning, Clemson University; Jonathan Markowitz, Prisma Health Children's Hospital (USA)

events.hubilo.com/EHD2022/booth/127229

P47 Improving staff working conditions to stop the shortage – what staff in healthcare really want

Dr Birgit Dietz, OTH Amberg-Weiden; Eva Henrich, Heinle, Wischer und Partner; Students of the Department of Architecture, TUM Munich School of Engineering and Design (Germany)

events.hubilo.com/EHD2022/booth/127230

P48 Cambridge Children's – 'A Whole New Way': Integrating arts into the earliest stages of hospital design to create a welcoming, joyful and enchanting environment

Natalie Ellis, Cambridge University Hospitals NHS Foundation Trust; Negar Mihanyar, Hawkins\Brown (UK)

events.hubilo.com/EHD2022/booth/127231

P49 Augmented reality simulation of healthcare environments: Limitations and potentials

Sara Bayramzadeh, Hamid Estejab, Hossein Mirzajani, Kent State University (USA)

events.hubilo.com/EHD2022/booth/127232

As lead architects and clinical planners, Llewelyn Davies has successfully delivered the detailed planning permission for the new, 'Our Hospital' project in Jersey. Budgeted at £804m, this 70,000 sqm scheme is scheduled to be completed by 2026 and represents a major leap forward for the provision of modern healthcare services in the Channel Islands.

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.

'Our Hospital' Health Campus – Jersey



Healthcare Design (Over 25,000 sqm)

- A01** First Affiliated Hospital of Zhejiang University School of Medicine and Research Center, China
- A02** Hospital Nova, Finland
- A03** Maitland Hospital, Australia
-

Healthcare Design (Under 25,000 sqm)

- A04** Heatherwood Hospital, UK
- A05** The Sight and Sound Centre supported by Premier Inn, UK
-

Mental Health Design

- A06** Sikkerhetsbygget High Security Mental Hospital in Trondheim, Norway
- A07** Sligo Adult Mental Health Unit, Ireland
-

Interior Design and Arts

- A08** The Royal Brompton Diagnostic Centre, UK
- A09** The Sight and Sound Centre supported by Premier Inn, UK
- A10** Queen Silvia Children's Hospital, Sweden

Future Healthcare Design

- A11** Cambridge Children's Hospital, UK
 - A12** Joseph Bracops Hospital, Belgium
 - A13** New Hospital Malmö VB, Sweden
 - A14** Oriel, UK
-

Design for Adaptation and Transformation

- A15** Herston Biofabrication Institute, Australia
 - A16** Maternity Ward at Punta Europa Hospital, Spain
 - A17** The University of Illinois College of Medicine, Surgical and Innovation Training Lab, USA
-

Product and Technology Design Innovation

- A18** Ascent series, Green Furniture Concept, Sweden
 - A19** Guldmann Trainer Module – Trafford General Hospital, UK
 - A20** The Leeds Innovation Popup, Leeds Teaching Hospitals NHS Trust, UK
-

Design for Health and Wellness

- A21** Assisted-living apartments OCMW Halle, Belgium
- A22** Grafton Way Building, University College London Hospital, UK
- A23** Maternity Ward at Punta Europa Hospital, Spain

WELCOME DRINKS RECEPTION

Architects for Health is delighted to be hosting the Welcome Drinks Reception on 13 June at the European Healthcare Design 2022 Congress. We invite you to join us for drinks, conversation and a brief presentation from 19.00 in the Main Exhibition Hall.

This year marks 30 years of Architects for Health and these welcome drinks launch a series of events and activities celebrating our work and mission.

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 our membership is open to all who share our aims, not just architects. Our work reaches across the UK and internationally in equal measure: we are a world leader in promoting healthcare design and proudly partner with the SALUS Global Knowledge Exchange to present the European Healthcare Design Congress.

Supported by:



Venue: Osler and Long Rooms

Date: Monday 13 June

Time: 18.00–20.30



Supported by:



Venue: Osler and Long Rooms

Date: Monday 13 June

Time: 18.15



Keynote address and book signing

Lord Nigel Crisp, Author; former chief executive, NHS; Independent crossbench member of the House of Lords; Co-chair, All-Party Parliamentary Group on Global Health
(pictured): *Turning the World Upside Down Again – global health in a time of pandemics, climate change and political*

The Healthcare Planning Academy

The Healthcare Planning Academy invites its existing and prospective members attending the 8th European Healthcare Design 2022 Congress to join a complimentary drinks reception with Academy directors.

Following on from the afternoon's workshop 'Architects and Dochtitects', led by Tina Nolan and Richard Darch, the reception will offer a chance to further the discussion and debate on the future profile and skills of the modern healthcare planning practitioner and to network with fellow Academy members.

The Healthcare Planning Academy is a membership organisation for healthcare planning professionals, which aims to continuously improve standards and knowledge, and to provide entrants and practitioners within the discipline with 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.

Both existing and prospective members, at any stage of their professional development, are welcome to join the reception drinks to learn about the benefits of becoming a member.

Supported by:



Venue: Dorchester Library

Date: Monday 13 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 European Healthcare Design 2022 Congress Garden Party will immediately follow the end of the Congress and the European Healthcare Design Awards ceremony.

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

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 barbeque buffet dinner and drinks.

Venue: Medicinal Gardens

Date: Tuesday 14 June

Time: 18.30–22.00

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Participants in the European Healthcare Design 2022 Congress get the opportunity to choose one of four study tours featuring some of the UK's latest benchmark healthcare projects and architectural landmarks. Places on each tour are now fully booked.

Study tour 1: Liverpool

Departure point: Melia White House Hotel

Date: 15 June 2022

Time: 06.30–20.00



The Royal Liverpool University Hospital

Designed by NBBJ and HKS, the new Royal Liverpool University Hospital cohesively integrates an inspirational landmark building with complex clinical and technical criteria. Its key drivers are: a healthy hospital; patient- and staff-focused; a civic institution; and sustainable. The complex technical needs have been considered alongside the creation of comfortable, attractive and functional surroundings.

The Spine

An outstanding example of workplace and education design, The Spine is designed to WELL Platinum Standard and is set to be one of the world's healthiest buildings. The new northern home for the Royal College of Physicians encompasses its values throughout. Designed by AHR, The Spine houses a mix of activity-focused areas set across a flexible layout. With some of the best and most advanced medical simulation facilities in the world, there are also spaces designed to host the PACES examinations and medical assessments.



The Clatterbridge Cancer Centre

The Clatterbridge Cancer Centre will have a significant and positive impact on the health and wellbeing of the people of Liverpool and the wider Merseyside region. BDP designed the building to step back at its upper levels, creating external terraces that give access to landscaping, fresh air and spectacular panoramic views. Two atria aid intuitive wayfinding, allowing daylight to penetrate deep into the radiotherapy waiting area and main entrance. The building has been designed to be flexible for future expansion, has met or exceeded its sustainability targets, and was completed broadly on programme.



Study tour 2: London

Departure point: Melia White House Hotel

Date: 15 June 2022

Time: 08.15–18.30

Royal Brompton Hospital Diagnostic Centre

This new specialist diagnostic unit provides MRI, CT, ultrasound, echocardiogram, interventional radiology, transoesophageal echocardiogram, and bronchoscopy scanning facilities under one roof, in one of the world's leading heart and lung hospitals. It will allow the hospital to: expand clinical services; increase research and education programmes; improve access to imaging services; and house all the imaging facilities in a bigger, better space. Designed by Murphy Philipps and built by Kier Construction, the new 3417m² building expands and modernises the facilities available to patients – a development that was previously restricted by the hospital's Victorian design – improving both diagnostic services and cardiac care.



Heatherwood Hospital Ascot

Frimley Health NHS Foundation Trust is redeveloping its three main hospital sites in Slough, Ascot and Frimley. The new Heatherwood Hospital in Ascot is a key part of this strategy and provides a world-class new facility offering planned, non-emergency care to patients in Berkshire and beyond. The new £98m hospital is critical in helping the Trust double the number of patients each year to 168,000 over the next decade.

Designed by BDP and built by Kier Construction, it places a new emphasis on patient and staff mental and physical wellbeing. The 11,500 sqm new building includes six state-of-the-art operating theatres, plus outpatient and diagnostic facilities, in a highly sustainable building in an enhanced woodland setting. The new hospital supports the Trust to achieve: improved patient experience; increased patient choice; improved population health; increased access to diagnostic facilities; integrated services for seamless care; and increased productivity of elective care.



Leading Healthcare Solutions

Kier have been a leading design and construction solutions provider for Healthcare throughout the UK for more than 20 years.

We have secured positions on the ProCure Frameworks including the latest iteration, P23, Crown Commercial Framework, NHS SBS and Procure Partnerships Frameworks.

We have delivered over £1.5bn health facilities since 2005 and we are engaging with the New Hospital Programme to transform the UK's healthcare estate by 2030.

A team of dedicated professionals delivering the full range of healthcare facilities across acute, community and mental health markets.



**Heatherwood Hospital,
Berkshire**

kier.co.uk



Study tour 3: London

Departure point: Melia White House Hotel

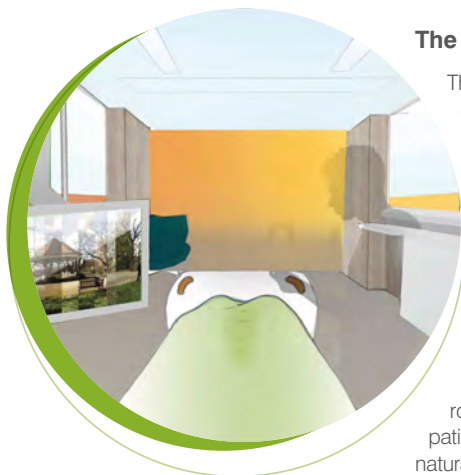
Date: 15 June 2022

Time: 09.00–17.00

Cleveland Clinic

Thirty-three Grosvenor Place has seen the conversion of a former office building into Cleveland Clinic's first European hospital. The 325,000 sq ft healthcare facility offers specialty services focusing on heart and vascular, digestive disease and surgery, neurosciences and orthopaedics. The Cleveland Clinic design team, with PLP Architecture and in collaboration with HKS Architects, have completely re-imagined this historic building, which sits on a sensitive site overlooking Buckingham Palace Gardens.

While the existing facade has been retained on three sides, the introduction of the new structure, cores and roofline have transformed this building into a state-of-the-art healthcare facility accommodating 184 inpatient beds, eight operating theatres, a full imaging suite, endoscopy and interventional labs, day case rooms for surgery, and a full neurological suite with rehabilitation.



The King's College London Critical Care Centre

The King's Critical Care Centre is one of the largest units of its kind in Europe. The first phase opened in April 2020 as part of one of the largest single-site responses to the pandemic. This challenging project is creating two new floors for critical care patients above the existing main theatre block.

The design is a ten-year collaboration between clinicians, patients, relatives, BMJ architects, garden designers, engineers and artists, and it focuses on the enhanced patient experience as a primary goal to improve outcomes. It addresses some key controversies in critical care design (such as single rooms versus open) while focusing on the principles of patient safety, wellbeing, and staff satisfaction. Maximum natural daylight, careful colouring, technical innovations, and stimulating artwork schemes enrich the surroundings.

Study tour 4: London

Departure point: Melia White House Hotel

Date: 15 June 2022

Time: 08.30–17.00



Maggie's at The Royal Marsden

Central to the vision of Maggie Keswick Jencks and her husband Charles for a new kind of cancer care was their belief in the potential of architecture to reassure people and make them feel valued. Nearly a quarter of a century later, designing a Maggie's has given Ab Rogers Design the opportunity to extend its love of creating spaces that engage people on a very human level, and make them alert to their surroundings through the firm's first complete building.

Ab Rogers designed the centre's four staggered, red fanning volumes from the inside out. A Maggie's centre must fulfil many functions. To do its job, it must straddle the hospital and the home. It must offer information, workshops, therapy, community, solitude, solace, and a cup of tea. To do its job, it must do this in a way that is comforting and life-affirming. Ab Rogers' hope is that you can feel this just by being in the building.

Springfield University Hospital

Springfield University Hospital is at the centre of a 33-hectare healthcare estate regeneration. In order to reduce stigma and normalise the care and treatment of those who suffer from mental illness, the new mental health facilities are at the centre of an emerging neighbourhood with new housing, conversion of listed asylum buildings, a district energy centre, and a new 32-acre open public park.

Designed by C.F. Møller Architects, the new mental health facilities consist of two distinct buildings, which together will accommodate inpatient wards, adult and children's outpatient services, the Recovery College, teaching/conference facilities, flexible workspace, and support services. The buildings also incorporate retail shops and several floors of car parks that will serve both the hospital and the surrounding district.





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jason.gibbings@vinciconstruction.co.uk

Stuart McArthur: 07818 076 928

stuart.mcarthur@srm.com

Celebrating the finest in global healthcare design

The European Healthcare Design Awards 2022 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.

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, including the Susan Francis Design Champion Award. They will be presented at an illustrious ceremony during the final session of the 8th European Healthcare Design 2022 Congress on Tuesday 14 June. The awards will contribute towards the development of knowledge and standards in the design of healthcare environments around the world.

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 the recordings.

All award submissions are also given the opportunity to be featured on a fully searchable map of healthcare projects on the SALUS Global Knowledge Exchange (www.salus.global).

Lead Awards Sponsor



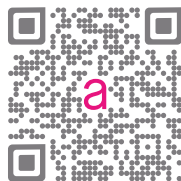
The Susan Francis Design Champion Award



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.

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Joseph Bracops
Hospital

Hospital of Wallonie
picarde - CHwapi

Leuven University Hospital
Gasthuisberg Campus

Centre-Sud
Hospital

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:
Coen van den Wijngaart,
archipelago architects, Belgium

David Powell,
Alder Hey Children's Hospital, UK

Shortlist

First Affiliated Hospital of Zhejiang University School of Medicine and Research Center

Commissioned by Zhejiang University
Designed by HDR and ZIAD (*pic: bottom*)

Hospital Nova

Commissioned by Central Finland
Health Care District
Designed by JKMM Architects (*pic: top*)

Maitland Hospital

Commissioned by Health
Infrastructure NSW
Designed by BVN

For longlist, see overleaf



Healthcare Design (Over 25,000 sqm)

Longlist

China National Respiratory Center

Commissioned by Guangzhou Administrative Center of Major Public Construction Projects
Designed by Guangzhou Urban Planning & Design Survey Research Institute

Clatterbridge Cancer Centre, Liverpool

Commissioned by Clatterbridge PropCare Services
Designed by BDP

Concord Repatriation General Hospital Redevelopment – Stage 1

Commissioned by Health Infrastructure NSW
Designed by Jacobs Group (Australia)

Cortellucci Vaughan Hospital

Commissioned by Mackenzie Health and Infrastructure Ontario
Designed by Stantec

Emory Executive Park Musculoskeletal Institute

Commissioned by Emory Healthcare
Designed by HKS

Grafton Way Building, University College London Hospital

Commissioned by University College London Hospitals NHS Foundation Trust
Designed by Scott Tallon Walker Architects in association with Edward Williams Architects

The Pavilion at the Hospital of the University of Pennsylvania

Commissioned by University of Pennsylvania Health System
Designed by PennFIRST: HDR, Foster + Partners, BR+A, LF Driscoll, Balfour Beatty, Penn Medicine

Red Fish Centre for Mental Health and Addictions

Commissioned by Provincial Health Services Authority (British Columbia)
Designed by Parkin Architects Western

TYKS Lighthouse Hospital

Commissioned by VSSHP
Designed by Architect Group Reino Koivula

Ulster Hospital, Acute Services Block

Commissioned by Strategic and Capital Development, South Eastern Health and Social Care Trust
Designed by Avanti Architects
Architectural services: Kennedy Fitzgerald Architects

Vassar Brothers Medical Center Patient Pavilion

Commissioned by Nuvance Health
Designed by CallisonRTKL

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Healthcare Design (Under 25,000 sqm)

An outstanding healthcare project in a community or primary 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:**

Liesbeth Van Heel,
Erasmus University Medical Center,
Netherlands

Panel judges:

Bill Hercules,
WJH Health, USA

Brenda Bush-Moline,
Stantec, USA

Shortlist

**The Sight and Sound Centre supported
by Premier Inn**

Commissioned by Great Ormond Street Hospital
for Children NHS Foundation Trust
Designed by Sonnemann Toon Architects
(pic: top)

Heatherwood Hospital

Commissioned by Frimley Health NHS
Foundation Trust
Designed by BDP
Main Contractor: Kier Construction
(pic: bottom)



Longlist

The Allam Diabetes Centre

Commissioned by Hull University Teaching Hospitals NHS Trust
Designed by Alessandro Caruso Architecture & Interiors

Badenoch & Strathspey Community Hospital

Commissioned by Hub North Scotland on behalf of NHS Highland
Designed by Oberlanders Architects

Cleveland Clinic MOB, 24 Portland Place

Commissioned by Cleveland Clinic
Designed by HKS

The Royal Brompton Diagnostic Centre, London

Commissioned by Guy's and St Thomas' NHS Foundation Trust
Designed by Murphy Philipps
Built by Kier Construction

Dublin National Children's Hospital Satellite Unit – Children's Health Ireland (CHI) at Tallaght

Commissioned by National Paediatric Hospital Development Board
Designed by HLM Architects and Coady Architects

ENT Theatre Block Refurbishment

Commissioned by Bradford Royal Infirmary
Design consultants: Bridger Carr Architects and SDA Services Engineers

Goodman's Fields Health Centre

Commissioned by NHS North East London Clinical Commissioning Group
Designed by AECOM

Greenock Health & Care Centre

Commissioned by NHS Greater Glasgow & Clyde / Inverclyde Health & Social Care Partnership / Hub West Scotland
Designed by Hoskins Architects

Jiahui Health (Futian)

Commissioned by Hiahui Health
Designed by Robarts Spaces

Kingaroy Hospital Redevelopment

Commissioned by Queensland Government – Darling Downs Health
Designed by Conrad Gargett

Multipurpose Building at Bellvitge University Hospital

Commissioned by Catalan Health Service (CatSalut)
Designed by Vitaller Arquitectura

Multi-Specialty Surgical Same Day Emergency Care (SSDEC) Unit

Commissioned by Bradford Royal Infirmary

Murray Bridge Soldiers' Memorial Hospital, Emergency Department Redevelopment

Commissioned by SA Government, Department of Health & Wellbeing
Designed by Wiltshire Swain Architects

Northern Centre for Cancer Care, North Cumbria

Commissioned by North Cumbria Integrated Care NHS Foundation Trust
Designed by P+HS Architects

The Royal Marsden Private Care at Cavendish Square

Commissioned by The Royal Marsden NHS Foundation Trust
Designed by Ansell and Bailey Chartered Architects

Wagga Wagga Base Hospital Redevelopment – Stage 3

Commissioned by Health Infrastructure NSW
Designed by Jacobs Group (Australia)

Ward 10, Peri-operative Care Ward, Bradford Royal Infirmary

Commissioned by Bradford Teaching Hospitals NHS Foundation Trust
Designed by Gilling Dod Architects

Future Healthcare Design

A future healthcare project that can demonstrate the potential for outstanding outcomes in masterplanning, placemaking, 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:

Cliff Harvey, Union of International Architects' Public Health Group, Canada

Panel judges:

Mohammed Ayoub, HDR, USA

Paul Bell, Ryder Architecture, UK

Shortlist

Joseph Bracops Hospital

Commissioned by Hôpitaux Iris Sud – Iris Ziekenhuizen Zuid
Designed by archipelago in collaboration with NU

Oriel

Commissioned by Moorfields Eye Hospital, UK
Designed by AECOM, Penoyre & Prasad and White Arkitekter (pic: bottom)

New Hospital Malmö VB

Commissioned by Region Skåne
Designed by White Arkitekter (pic: top)

Cambridge Children's Hospital

Commissioned by Cambridge University Hospitals
Designed by Hawkins\Brown and White Arkitekter



Longlist

Abbey Area Community Centre

Commissioned by London Borough of Camden
Designed by AHR

Centre for Children Health and Technology

Commissioned by Sheffield Children's Hospital
NHS FT / Legacy Park
Designed by HLM Architects

Centre for Proton Therapy

Commissioned by Intercommunale de Santé
Publique du pays de Charleroi
Designed by Temporary association IGRETEC / VK
Architects & Engineers

Centro Médico Prevent Senior Rio de Janeiro

Commissioned by Prevent Senior
Designed by Perkins&Will

County Council New Public Mortuary

Designed by Paul Murphy Architects

DCL Niagara Medical Arts Center

Commissioned by DCL Healthcare Properties
Designed by YT Architect Services

Mid-Cheshire Inpatient Accommodation

Commissioned by Mid-Cheshire Hospitals NHS
Foundation Trust
Designed by Ryder Architects
Healthcare planning and strategy: Archus

Residential care center Zierikzee

Commissioned by Allévo Care and Services
Designed by Gortemaker Algra Feenstra architects

Shanghai Tech University Shanghai Clinical and Research Center

Commissioned by Shanghai Tech University
Designed by Gensler

Shenzhen Third People's Hospital Extension Project

Commissioned by Bureau of Public Works of
Shenzhen Municipality
Designed by CallisonRTKL

Towards a Model of Safety and Care for Trauma Room Design

Commissioned by Kent State University
Designed by Kent State University

ZNA Cadix Hospital Antwerp

Commissioned by ZNA Antwerp
Designed by VK Architects & Engineers and
Robbrecht en Daem architecten

Human-centric healthcare: who's asking?

Posing the pertinent questions that put people first, and seeking solutions that balance demanding criteria with care-based builds, the UK New Hospital Programme's leading designer is tackling tasks at hand, head on – while keeping humans at the heart.

Build quicker. Build cheaper. Be digital. Be net zero. Huge teams come together to design healthcare facilities, whose engineering costs continue to increase with the adoption of modern methods of construction, digitisation and net zero targets. How do we meet these criteria while avoiding the 'value engineering' that strips out fundamental people-focussed design decisions that support care?

Has the *care* in healthcare been forgotten when it comes to creating the places where this is precisely the primary function? Have we lost sight of the human impact when it comes to hospital design? Are we measuring its success in the right way, or are we asking entirely the wrong questions? Who are the real champions of people-centric design?

Getting better, soon

Tasked with improving UK healthcare as part of the New Hospital Programme, we have been interrogating our every design decision against planet-conscious, human-centric guiding principles. We don't claim to have all the answers, but we know that asking the right questions is the first step to finding them. Stitching together sustainability solutions with digitally focused MMC and a can-do attitude towards repeatable design – fingers firmly on the pulse of human impact – requires a holistic approach that's paramount to promoting wellbeing.

Together we must check the sector's vital signs and remedy its issues to ensure a condition much-improved – not simply survival but peak fitness.

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:

Dr Liz Paslawsky,
Consultant advisor, SALUS Global
Knowledge Exchange, Australia

Panel judges:

Charlotte Ruben,
White Arkitekter, Sweden

Marte Lauvsnes,
Sykehusbygg, Norway

Shortlist

Grafton Way Building, University College London Hospital

Commissioned by University College London Hospitals
NHS Foundation Trust

Designed by Scott Tallon Walker Architects in association
with Edward Williams Architects (*pic: bottom*)

Assisted-living apartments OCMW Halle

Commissioned by Openbaar Centrum voor Maatschappelijke
Welzijn (OCMW)

Designed by Gortemaker Algra Feenstra Architects (*pic: top*)

Maternity Ward at Punta Europa Hospital

Commissioned by Hospital Punta de Europa. Servicio
Andaluz de Salud. Junta de Andalucía

Designed by Virai Arquitectura / Parra-Müller Arquitectura de
Maternidades



Longlist

The Allam Diabetes Centre

Commissioned by Hull University Teaching
Hospitals NHS Trust

Designed by Alessandro Caruso Architecture &
Interiors

Ascent series

Designed by Green Furniture Concept

Heatherwood Hospital

Commissioned by Frimley Health NHS Foundation
Trust

Designed by BDP

Main Contractor: Kier Construction

Surgical, Treatment and Rehabilitation Service

Commissioned by Australian Unity
Designed by Hassell

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:

Mungo Smith,
MAAP Architects,
Australia

Panel judges:

Marc Levinson,
Murphy Philipps Architects, UK

Sam Shooter,
Hoare Lea, UK

Shortlist

The University of Illinois College of Medicine, Surgical and Innovation Training Lab

Commissioned by The University of Illinois College of Medicine
Designed by CannonDesign and Bailey Edward

Herston Biofabrication Institute

Commissioned by Metro North Hospital and Health Service
Designed by Hassell

Maternity Ward at Punta Europa Hospital

Commissioned by Hospital Punta de Europa. Servicio Andaluz de Salud. Junta de Andalucía
Designed by Virai Arquitectura / Parra-Müller
Arquitectura de Maternidades (*pic: bottom*)



Longlist

Ascent series

Designed by Green Furniture Concept

Chelsea and Westminster NICU and ICU Expansion Project

Commissioned by Chelsea and Westminster Hospital NHS Foundation Trust
Designed by Ryder Architecture

Cleveland Clinic MOB, 24 Portland Place

Commissioned by Cleveland Clinic
Designed by HKS

Multipurpose Building at Bellvitge University Hospital

Commissioned by Catalan Health Service (CatSalut)
Designed by Vitaller Arquitectura

New 18-bedded ward

Commissioned by Dartford and Gravesham NHS Trust
Designed by AHR; Clinical planning by Spencer Harrison Healthcare Solutions

The Sight and Sound Centre supported by Premier Inn

Commissioned by Great Ormond Street Hospital for Children NHS Foundation Trust
Designed by Sonnemann Toon Architects

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,
artlink, Oxford University Hospitals
NHS Foundation Trust, UK

Panel judges:

Birgitte Gade Ernst,
Arkitema, Denmark

Kathryn Koran,
Cleveland Clinic Art Program, USA

Shortlist

Queen Silvia Children's Hospital

Commissioned by Västfastigheter
Designed by White Arkitekter (*pic: bottom*)

The Sight and Sound Centre supported by Premier Inn

Commissioned by Great Ormond Street Hospital
for Children NHS Foundation Trust
Designed by Sonnemann Toon Architects

The Royal Brompton Diagnostic Centre, London

Commissioned by rb&hArts
Interior design by BAT Studio
Artworks by BAT Studio, Enya Lachman-Curl,
David Lemm and Rumbidzai Savanhu
Architecture by Murphy Philipps Architects
Built by Kier Construction and BAT Studio



Longlist

Ascent series

Designed by Green Furniture Concept

Assisted-living apartments OCMW Halle

Commissioned by Openbaar Centrum voor
Maatschappelijke Welzijn (OCMW)
Designed by Gortemaker Algra Feenstra Architects

Edinburgh Haematology Centre

Commissioned by NHS Lothian
Designed by Oberlanders Architects (lead
designer)

Jiahui Health (Futian)

Commissioned by Hiahui Health
Designed by Robarts Spaces

Ronald McDonald Family Room in the Radboudumc Hospital, 'The Pebble'

Commissioned by Ronald McDonald Huis
Nijmegen (RMD)
Designed by Thoben & Minten interior design

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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:

Alice Liang,
Montgomery Sisam Architects,
Canada

Panel judges:

Beau Herr,
CallisonRTKL, USA

Christopher Shaw,
Medical Architecture, UK

Shortlist

Sligo Adult Mental Health Unit

Commissioned by The Health Service Executive

Designed by Wejchert Architects (*pic: top*)

Sikkerhetsbygget
High Security Mental Hospital in Trondheim

Commissioned by St Olavs hospital / Sykehusbygg HF

Designed by RATIO arkitekter + Karlsson Architects
(*pic: bottom*)

Longlist

Red Fish Centre for Mental Health and Addictions

Commissioned by Provincial Health Services
Authority (British Columbia)

Designed by Parkin Architects Western

Red Kite View CAMHS Unit

Commissioned by Leeds and York Partnership
NHS Foundation Trust

Designed by Gilling Dod Architects

Rowan View

Commissioned by Mersey Care NHS Foundation
Trust

Designed by IBI Group



Product and Technology Design Innovation

An innovation in medical or digital technology or product design that has had a transformational impact on the design of healthcare services and/or the patient environment, improving the quality, sustainability, accessibility and experience of care.



Lead judge:
Christine Chadwick,
CannonDesign, Canada

Panel judge:
Jim Chapman,
Manchester School of Architecture,
UK

Shortlist

Ascent series

Designed by Green Furniture Concept

Guldmann Trainer Module, Trafford General Hospital

Commissioned by Manchester University NHS
Foundation Trust
Developed and designed by Guldmann (*pic: top*)

The Leeds Innovation Popup

Developed by Leeds Teaching Hospitals NHS
Trust, UK (*pic: bottom*)



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:

Jonathan Erskine,
European Health Property Network,
UK

Panel judge:

Goran Lindahl PhD,
Chalmers University of Technology,
Sweden

Shortlist

Understanding comfort and health of outpatient workers in hospitals, a mixed-methods study

AnneMarie Eijkelenboom PhD, Architect and head r&d, EGM architects

Redesigning rehabilitation: The NOVELL (Neuroscience Optimised Virtual Environments Living Lab) way

Julie Bernhardt PhD, Florey Institute of Neuroscience and Mental Health, on behalf of the NOVELL Redesign team

Co-authors: Marcus White, Aaron Davis, Maryam Banaei, Juan Pablo Saa Arancibia, Luis Pflaumer, Ruby Lipson-Smith, Heidi Zeeman, Marie Elf, Tianyi Yang, Michelle Shannon, Leonid Churilov, and on behalf of the NOVELL Collaboration

The Maggie's Centre, a model of human-centred design thinking

Catherine Frisone, Architect and doctor, Oxford Brookes University

A post-occupancy evaluation framework to inform future investment in healthcare design

Shari Blanch M.Arch, Designer and lead health researcher in architecture, Jacobs; Annabel Frazer, Principal health planner, Jacobs



Dr Nick Watts (UK)

Chief sustainability officer,
NHS England

Keynote: Delivering a net-zero health system

The NHS was founded to provide high-quality care for all, now, and for future generations. Understanding that climate change and human health are inextricably linked, in October 2020, it became the first in the world to commit to delivering a net-zero national health system. This means improving healthcare while reducing harmful carbon emissions, and investing in efforts that remove greenhouse gases from the atmosphere.

To understand how and when the NHS can reach net zero, it established an NHS Net Zero Expert Panel, which reviewed nearly 600 pieces of evidence and conducted extensive analysis and modelling.

There are two targets:

- for the emissions the NHS controls directly (the NHS Carbon Footprint), it will reach net zero by 2040, with an ambition to reach an 80-per-cent reduction by 2028 to 2032; and
- for the emissions it can influence (the NHS Carbon Footprint Plus), it will reach net zero by 2045, with an ambition to reach an 80-per-cent reduction by 2036 to 2039.

Actions to help meet these targets include everything from energy efficiency, recycling and plastic reduction, to reducing emissions from travel, supplementing green spaces, or improving logistics.

Dr Nick Watts, the NHS's first chief sustainability officer, describes the net-zero strategy vision, the transformation process, and some of the innovative actions taking place across the system.

Nick completed his medical degree at UWA and is licensed in Australia and the UK, and a fellow of the Royal College of Physicians' Faculty of Public Health. Prior to the NHS, Nick worked internationally with a range of health organisations including the World Health Organization, and as executive director of the Lancet Countdown.

Keynote: Climate and the pandemic: A perfect storm for healthcare systems

Andrew Goddard has been president of the Royal College of Physicians (RCP) since 2018 and works clinically at the Royal Derby Hospital as a consultant physician and gastroenterologist.

His main interests in his RCP career have been workforce, medical generalism, digital medicine, wellbeing, sustainability and global health. He is a strong proponent of active transport, a greener NHS through virtual technology, and a more sustainable RCP.

He was responsible for the Royal College divesting from fossil fuels and has ensured that climate change features prominently in the RCP strategy for the next three years. His leadership of the Royal College during the pandemic continued alongside NHS duties on the front line of the Covid-19 response and will inform his keynote talk.



**Andrew Goddard MD,
PRCP (UK)**

President, Royal College of Physicians

**Natalie Forrest** (UK)

Senior responsible owner,
New Hospital Programme,
Department of Health and
Social Care

Keynote: Delivering the New Hospital Programme

The Government has committed to build 40 new hospitals by 2030, which together with eight existing schemes will mean 48 hospitals delivered by the end of the decade – the biggest hospital building programme in a generation.

The New Hospital Programme's aim is to transform the way we deliver healthcare infrastructure for the NHS. Taking a programmatic approach to building the new hospitals will enable maximum quality, deliver efficiencies, and reduce end-to-end delivery timescales. It will result in outdated infrastructure being replaced by facilities for both staff and patients that are on the cutting edge of modern technology, innovation and sustainability.

In this keynote address, Natalie Forrest, senior responsible owner of the New Hospital Programme, will talk about the aims and approach of the national programme. Before taking on leadership of the New Hospital Programme in January 2021, Natalie worked in the NHS for more than 30 years and is a registered nurse. She led the construction and operationalisation of NHS Nightingale London and was chief executive of Chase Farm Hospital in North London.

Living systems – the hospital of the future

The Wolfson Economics Prize 2021 was held last year and asked the question: How would you design and plan new hospitals to radically improve patient experiences, clinical outcomes, staff wellbeing, and integration with wider health and social care?

Announced in November 2021, the winning entry was 'Living systems – the hospital of the future'.

At the heart of the submission is the concept of the Third Carer, based on the understanding that doctors and nurses are principal carers and secondary care is delivered by a network of family and friends. The design team's manifesto demonstrates its truly holistic approach to healthcare, articulated through four guiding principles: Human-centred; Community focused; Nature driven; Flexible and Future Proof.

The team's approach is influenced by radical and exemplary institutions of the past and present, from the healthcare sector and beyond. They have taken inspiration from both national and international hospitals, learning from the empathic design of Alvar Aalto's Paimio sanatorium (completed 1932), the generosity and scale of Piero Palagi Hospital in Florence (completed 1985), and the work of João Filgueiras Lima in the 1990s for a number of rehabilitation facilities in Brazil, responding to the natural elements and introducing biophilia as part of a programme of positive patient distraction.

They have also drawn on architectural precedents presented by other progressive social and cultural institutions. Some empower users through their design, some utilise modularity to solve problems, and others radically redefine their conventional spatial uses.

The design for the hospital of the future brings together learnings from these groundbreaking institutions into one building. Absorbing and expanding their underlying principles, the team have applied them to the specific challenges of the UK's healthcare service, both today and in the future.



Ab Rogers (UK)

Designer and founder,
Ab Rogers Design



William P Nankivell
(Canada)

Chief executive, B+H Architects



Jamie Miller (Canada)

Director of biomimicry,
B+H Architects

Reframing healthcare design through a biomimetic lens: Unlocking the power of nature for environmental resilience

Today's healthcare environments possess both the opportunity and the responsibility to be resilient hubs that evolve alongside their surrounding communities while responding to global influences such as climate change, technology, and increasingly complex patient needs.

As architects and designers, addressing these sea changes requires a holistic approach whereby innovation, technology, materials, process, and data do not exist in isolation but are instead part of a greater 'healthcare innovation ecosystem' designed to embed resilience in everything we do. Central to this ecosystem are the principles of biomimetic design, which use nature as their foundation and take cues from organisms and natural systems to apply lessons in efficiency, resiliency and sustainability within the built environment.

Biomimicry consciously emulates the forms, processes and systems in nature to solve complex problems. For example, biomimicry is learning from a humpback whale fin to make a more efficient wind turbine blade. It's copying mangroves to improve desalination technologies. It's about developing new, non-toxic adhesives that are inspired by blue mussels, or gecko feet. It's copying the beak of a kingfisher to make quieter and more efficient trains. It's emulating the shape and bone structure of the boxfish to make more aerodynamic cars. It's learning from spider silk to make a recyclable material with unprecedented strength for its weight. It's self-healing pipes that copy veins, carbon-sequestering concrete inspired by coral, and sharing economies that emulate the function of a forest.

Blending biomimicry into a healthcare design context has the potential to uncover new models that are well-adapted to last by harnessing free energy, redundancies, and cyclical processes. The creation and maintenance of human-made systems, products and processes often require a great amount of energy. Drawing from the tenets of biomimetic design theory, this talk will explore new nature-based design possibilities for our health systems and will rethink the hospital as a low-energy building.

Why wood? The positive influences on our climate and our wellbeing

In Scandinavia, wood has traditionally been rejected in hospital and healthcare environments. This is now changing. Wood is now recognised as having antibacterial effects, and the positive influence of wood on the wellbeing of staff and patients is well documented. Moreover, building with timber is a sustainable solution that reduces the climate footprint compared with building in concrete.

Methodology: With examples from our Scandinavian healthcare buildings – Oksenhøja and Østre Toten Healthcare centres, Norway; The Children's Kingdom, Copenhagen, Denmark; and the Psychiatry at New Akker Hospital, Oslo, Norway – we will share our experiences using wood and timber in construction, as cladding and in furniture.

Results: Wood has several sustainable advantages:

- CO₂ captured during the tree's lifetime is embedded in the wood – using wood frees up space in the forest for new trees that will then capture CO₂, and the cycle continues;
- wood is lighter than concrete and easier to transport; and
- wood is easy for assembly, disassembly and reuse, thus enabling minimal waste.

Our studies show that on changing concrete to mass timber beams, columns and facades, we save about 50 per cent CO₂.

Wood has also been shown to have a positive impact on human wellbeing, including:

- a) Stress: Viewing a setting with natural elements elicits positive feelings.
- b) Concentration: Studies show that people working in a setting with a large amount of visible wood are more satisfied with work life, feel less stressed, and find it easier to concentrate.
- c) Comfort: Uncoated wood is comfortable to touch and offers a pleasant temperature sensation.
- d) Hygiene: Wood contains lignin and extractives, which have antibacterial effects.
- e) Indoor climate: Research shows how we can improve indoor humidity conditions with hygroscopic building materials, such as wood.

The responsible use of wood as the world's only renewable resource also ensures an economically sustainable investment for the future. We hope to inspire others to look at a future of more wood in buildings, leading to healthier work and living spaces, innovative construction, and a planet we can still call home.



Birgitte Gade Ernst
(Denmark)

Partner, architect, head of healthcare, Arkitema



Gareth Banks (UK)

Regional director, AHR



Ian Bullock (UK)

Chief executive, Royal College of Physicians

Co-author:

Robert Hopkins (UK)

Regional director, AHR

The Spine: A holistic approach to health and wellbeing in the built environment

In 2016, the Royal College of Physicians (RCP) reported that 40,000 deaths per year were attributable to air pollution exposure. As airborne contamination and pathogens continue to rise, the future of building design will need to support occupant health.

Purpose: A practical approach to creating humane spaces that positively impact the health of occupants.

Methods: The paper will demonstrate the methodology in creating The Spine, a workplace targeting the WELL Platinum Standard, which can be applied across all sectors. The RCP needed a workplace that would manifest its ethos. An investigation of how the College functioned was undertaken, via observation within their existing facilities, spatial audit, and a questionnaire. A remote College team established in Liverpool was also consulted. The results defined which facilities were needed and how the interplay of biophilic principles and the WELL standard might have a positive impact on the health outcomes of occupants.

Some interventions applied included:

- highly specified air supply and filtration systems and routine air-quality monitoring;
- every workstation located within a maximum of 7.5m from a window;
- use of the Voronoi pattern on the facade to create a forest canopy of internal shading, helping occupants to synchronise with their circadian rhythms; and
- salutogenic planting – species selected for their air-purifying properties.

The idea that 'If you can touch it, it's real' was also incorporated, through: extensive use of oak; carpets made from recycled fishing nets, which capture air particulate matter; use of biophilic patterns; and air-purifying paint and furniture with low volatile organic compound (VOC) properties.

Results: Two post-occupancy evaluations (PoE) will be undertaken, including one in the WELL accreditation process. The College has a team of occupational scientists focusing on the impact on staff. Data will then be used to inform future design.

Conclusion: While there have been significant biophilic interventions in the design of the building, these have been contained to an uplift of less than 2 per cent to the capital cost. What might be a small percentage increase in the design and construction costs, if implemented correctly, they can provide an excellent return on investment.

Cancer care at a mega scale: How MD Anderson is redefining the future of care delivery

This session will discuss how MD Anderson is transforming cancer care and delivery. It will focus on how a ten-year master campus framework will capitalise on more than 20 million sq ft of facilities in a new, resourceful way.

As cancer care is constantly evolving and innovating, a “master framework” rather than a “masterplan” was crafted. This allows MD Anderson to guide short-term investments with confidence that these facilities will create a flexible and dynamic platform for the changing nature of cancer research and care.

The session will discuss how the framework meets the organisation's three main goals:

- Reach: Expanding MD Anderson's footprint not only within the Texas Medical Campus but throughout Houston and beyond.
- Breakthroughs: Invest and become leaders in first-class basic, translational and clinical research.
- Value: Create more streamlined operations and become a destination for early-stage cancer patients, retaining them from diagnosis to survivorship.

MD Anderson's main location is at the Texas Medical Center (TMC). The challenge was to redefine care and also double the size of the clinical, research and education footprints on the campus. This session will highlight how the master framework allows MD Anderson to become an all-encompassing research and care network within the TMC campus, as well as discuss strategies of shifting patient volume to a robust community network. We will discuss how the network provides convenience for patients and cutting-edge treatments in a non-hospital setting. The session will demonstrate how the main campus will be zoned to accommodate: discovery, research and education; academia, medicine, science and commerce; a new model of vertical patient care; and quaternary horizontal patient care.

We will also show how MD Anderson is reframing ambulatory care by creating an outpatient destination on its main campus, and explore how this complex will create “one-stop care” tailored to the needs of its patients, with vastly different services and amenities than the main hospital.

Additionally, we will explore how the master framework moves the institution away from siloed research and towards team science. Consolidating the research enterprise on the TMC will fuel better collaboration and transform it into a hub of innovation.



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Cancer centres from New York City to the Great Plains

As cancer treatment has expanded in recent years, the expectations of patients and care facilities are evolving from immediate disease maintenance to long-term chronic care. This shift introduces a need for amenities for long-term visitors who require repeat access to care and new services.

This paper analyses three cancer care facilities, ranging from the metropolitan landscape of New York City and the suburban garden campus outside Philadelphia, to the pastoral setting of Lincoln, Nebraska, highlighting how they meet the needs and demands of the communities they serve. Our goal is to highlight the next stage of cancer care and emphasise the value of post-occupancy evaluations (PoEs) when planning and building facilities to support the patients, caregivers, staff and community. We'll review how these individual projects are situated with the ecosystem of the system operations, and how their operational model drives change in programmatic needs.

Case exemplar: NewYork-Presbyterian Hospital: The 500,000 gross sq ft state-of-the-art ambulatory facility was designed for operational efficiency, future flexibility, and sustainability. Situated in the heart of Manhattan, the facility is one piece of New York-Presbyterian's expanded cancer system, providing local treatment and specialty care.

Case exemplar: Penn Medicine Radnor: Penn Medicine Radnor transformed a suburban office park into a community-focused, sustainable, mixed-use development rooted in nature. The multi-specialty ambulatory care centre was built to ensure ease and accessibility for all visitors.

Case exemplar: Bryan Medical Center: Located in Lincoln, Nebraska, Bryan Medical Center is under construction and will provide an in-depth look at the design influence on new freestanding cancer centres. Bryan will be the primary medical centre for the 280,000 residents of Lincoln and will provide diagnosis and treatment for a variety of specialties to respond to the needs of the surrounding population.

A matrix comparison between the programme inclusion and key rooms of these urban, suburban and rural projects will identify the shifting programme needs of each facility and outline the optimisation of their environment across a system. We will compare the inclusion of PT/OT, acupuncture, and the implications of reduced infusion treatment with oral medication options to flexible environments for holistic patient care.

The Grafton Way Building – delivering to the limits

The University College London Hospital Grafton Way Building marks the completion of the overall masterplan for redevelopment of UCLH's Bloomsbury Campus. The brief was to create a world-class, modern, safe and responsive healthcare environment, facilitating better outcomes, an improved environment for patients, visitors and staff, and a clinical service delivery that reflects UCLH as a world-class centre of excellence.

This landmark building houses innovative proton beam therapy (PBT) treatment, eight theatres, a day surgery suite, imaging, a critical care unit, and inpatient wards for patients with blood disorders, making it one of Europe's largest dedicated haem-oncology hospitals. The revolutionary PBT centre is one of only two providing this new treatment for the NHS across the UK.

To meet the clinical brief, the 11-storey building comprises seven storeys above ground and four below ground. The building is characterised by its generosity of space, light, transparency and sensory encounters to offer respite from city life and the busy surrounding area. To respect surrounding heritage, and light and sight lines, the building is stepped back across its section and split into two blocks: the L-shaped main block and a smaller courtyard block, connected by a spacious, light-filled atrium. This atrium brings natural daylight down through the building, through a deep plan and six floor levels, to filter into all inpatient rooms. This is particularly important for the wellbeing of long-term cancer patients who are immuno-compromised and confined to their room for long periods. The innovative facade design and external 'veil' provide solar shading and layers of privacy for patient rooms from outside, while allowing openness, connectivity and visibility to the outside world for the patient, countering any sense of isolation that can accompany extended hospital stays.

The overall structure is designed to provide maximum flexibility for repurposing, and the design has been developed through a highly collaborative process to incorporate ambitious sustainability and BREEAM design criteria.

This paper will present an overview of the scheme, detailing the key challenges faced in the delivery of this challenging project, which will form a cornerstone of UCLH's service offering.



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Considering sensory design makes sense: Exploring the positive sensory impact of Southmead Hospital main atria

'Sensing spaces of healthcare: Rethinking the NHS hospital' is a forthcoming research study providing best practice exemplars of good hospital design where the whole sensory experience has been considered. The main entrance and atrium at Southmead Hospital form a case study within the research, which will be examined in this talk. Focus will be on the senses and how good design should go beyond visual quality. The atrium design considered carefully the sensory experience of arrival at a hospital.

Key sensory qualities:

Sound: Southmead has a lot of acoustic absorption. It's a vast space, as tall as Westminster Abbey with a glazed roof and tiled floor. One of the reasons the reverb time is low is to ensure that voice announcements via the audible alarm system are legible. In a fire scenario, bespoke concealed shutters seal and protect the hospital street. The openings allow the filtering of sound to reach all patients and staff above, so they can hear the sounds from the public space below, giving a sense of connection to everyday life.

Sight: Southmead is visually appealing with natural daylight through the glazed roof. The atrium is vast and tall, giving a sense of arrival. The height allows people to see each level of the building via super-sized graphics, letting people see clearly where they need to go. This legibility of space reduces stress and frees up staff time. The space also has trees growing inside.

Smell: The atrium is naturally ventilated. The air change rate supporting the space is high and there is a pleasant sense of freshness.

How are these sensory qualities/encounters shaped?

- At night, the lighting of the commissioned artwork provides visual interest. An art piece doubles as a binary clock to help people comprehend the passing of time.
- Emotions generated in this space are calming and engaging for those feeling stressed.
- Materials aren't visually overly stimulating – non-patterned flooring, for example, prevents confusion for those with sensory impairments.

The trust was very involved and committed to procuring a high-quality design. This was the key enabler for the architectural and interior team to deliver the space.

Design for the senses

The interior design strategy for Oriel, the new eye care facility for Moorfields in central London, provides an opportunity to apply evidence-based design knowledge to create a holistic and humanistic environment where “design for the senses” and healing spaces converge. In this paper, we intend to: present the theoretical grounding regarding the benefits of the “design for the senses” approach and evidence-based design; identify the specific methods and how we applied them to the Oriel project; and set the framework for evaluation once the project is built.

Methodology and outcomes: In an eye care facility, other senses in addition to sight must be taken into consideration, including:

Sound: Floor surfaces: the sound of steps and canes are important for navigation.

Touch: Braille and tactile maps are used along with digital information boards.

Scent: The sense of smell can assist with navigating spaces. The cafe, for example, advertises its presence with the smell of coffee.

Sight: Inclusive design ensures that the building is easy to navigate for users with sight difficulties.

Outcomes: Six methods or key design fields have formed the focus:

1. *Form:* Soft shapes that resemble nature lower stress for patients.
2. *Natural materials:* A gradient between hard and soft natural finishes crosses the public spaces of the building: from extending the stone pavement inwards to the atrium, to the softness of timber-clad walls in some waiting areas.
3. *Colour:* Well-chosen colours create a pleasant environment and make patients feel more relaxed and comfortable, as well as creating an aesthetic impact.
4. *Lighting:* Carefully placed lighting aids orientation, provides intuitive wayfinding, and creates welcoming and relaxing atmospheres. Through a consistent lighting scheme grounded on vertical illumination and accent lighting, easy orientation and wayfinding throughout the building are ensured.
5. *Landscape:* Elements of nature have been incorporated and the roof terrace is an outdoor environment, rich in experiences to maximise health benefits.
6. *Art:* Art installations use scents or touch surfaces to encourage patients and their visitors to feel cared for and welcome.

Post-occupancy, a full evaluation of the “design for the senses” approach is planned.



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Keynote: The Caring Collective presents 'Fast forward: The Future of Health and Wellbeing'

The Caring Collective, a collaboration between 34 built environment experts and creatives, is excited to present the first-ever stage reading of its short play 'Fast forward: The Future of Health and Wellbeing'. The play was highly commended in last year's Wolfson Economics Prize competition, which sought new ideas for planning and designing the hospital of the future.

Presenting a positive vision of the future, the play weaves together experiences, expertise and creativity based on interviews, workshops and research. It depicts healthy ecosystems, from the home to the high street, and humanistic hospitals liberated by technology – all working seamlessly together.

**Bee Farrell (UK)**

Founder, Foodturistic

**Sherry Dobbin (UK)**

Managing and cultural director,
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Transformation in healthcare – magical thinking or the shape of things to come?

These days the word on everyone's lips in healthcare is transformation. In England, a major Government capital investment programme is expected not only to replace crumbling NHS buildings but also to transform service delivery, workforce productivity and patient experience. Business cases are also expected to demonstrate how the investment will contribute wider social value, measured in additional Well Being Years (WELLBYs).

To help the NHS, the Government is setting up a Transformation Factory. AI, of course, is seen as a key enabler of transformation in healthcare so it may be worth remembering Terry Pratchett's observation: "Real stupidity beats artificial intelligence every time", and let's hope he's wrong. But he's not the only sceptic. Mathematician Hannah Fry uses more colourful language to caution against over-belief in the transformative power of AI and digital disruption more generally.

There are also differing views about what it should look like and whether we will know it when we see it. To answer these questions, it may be useful to learn from the experience of other sectors. For the Catholic church, an important transformation is that which was believed to occur during the communion ritual. The orthodox view, transubstantiation, is that this is when the communion wafers and wine are transformed into the body and blood of Christ. An alternative view, consubstantiation, is that the two states wafer/wine and body/blood, co-exist simultaneously.

In this talk, we will argue that there are strong parallels to the trans/con-substantiation debate in healthcare today. We've developed a taxonomy that locates these in scale, impact, durability, transferability and cost-effectiveness. Preliminary analysis suggests that the majority of initiatives reviewed should be classified as consubstantive – ie, their impact has remained relatively small scale, localised, and co-existing with largely unchanged traditional models.

We will also report on examples that have been transubstantive – where the very essence of how care is delivered has been changed – and what this suggests for transformation in the future. Finally, we will consider how to identify early in which of the two categories a programme is likely to end up, so that investment can be targeted for maximum transformational impact.



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The development of the Cavell Centres concept

The primary health estate in England is fragmented with many GP practices owned by partners and funded through rent reimbursement. Low investment and fragmented ownership have resulted in an estate that is often poor in quality and poorly adapted.

The Cavell programme aims to remedy this by providing the right infrastructure in the right place, restructuring the tenure of these centres to facilitate change and adaptability.

Purpose: This paper will present a new report for NHS Innovation and NHS England, titled: 'Cavell Centres – model planning and design for primary and community health infrastructure'. It features prototype designs for a new generation of integrated care centres planned to provide modern, high-quality, flexible infrastructure to support the transformation of primary and community care services in England.

The primary features of this transformation are: the emergence of collaborative primary care networks linking general practice and primary care teams over a defined geographic area; modernisation of community health services; co-location with social services to provide a continuum of care that supports local health and wellbeing and enables care closer to home; new capacity for a "left shift" of low-risk clinical activity from the acute hospital closer to the patients' home; and integral accommodation for third-sector organisations that provide valuable continuing patient support and who may act as enablers for social prescribing activities.

Methodology: This paper will address the second stage of this programme, where six pioneer Cavell Centre projects have been used to test and develop the outline brief, focusing on:

- flexibility and adaptability by assuming a wide spectrum of current or future activities or tenancy;
- becoming a catalyst for positive, healthy urban transformation;
- ensuring that landscape / green urban spaces are an essential component;
- maximising standardisation, modular planning and MMC opportunities;
- responding to the pandemic;
- community focus and outreach – spaces with social and practical utility; and
- sustainability and net-zero carbon.

Results and implications: This paper will describe the process, challenges, successes and failures of the six pioneers' design programme. Expected results will be captured in the next stage report in Spring 2022.

Dorset Health Village – shopping with healthcare

Dorset Health Village is a new model of care seeking to strengthen health system resilience and address post-Covid challenges with the backlog in elective care. It also recognises how the geography of the NHS estate is diversifying healthcare investment to stimulate the reuse of retail facilities for health, improving access and stimulating town centre life.

This paper tells the story of fast-track construction, methods and readily available equipment from the Nightingale projects in delivering the diagnostic centre in 22 weeks, focusing on: opportunity; circular economy; elective care; and stimulating the high streets.

Opportunity: The opportunity arose after the owners of Beales department store gave permission to use the 1750m² gross internal area of the second floor. Lessons learnt from the Nightingale projects enabled the project to be delivered quickly, by adopting the same design principles of constructing modular units and standardising components.

Circular economy: Contributing to the NHS net-zero ambitions, the design focused on a circular economy approach by reusing building materials and equipment provided by the decommissioned Nightingale projects. Plasterboard, doors, ironmongery and much more were salvaged and stored, reducing the project's cost and delivery time.

Elective care: Taking advantage of its open-plan space, the design manifested into providing three clinical streams: breast screening, ophthalmology, and general. The general services provide dermatology and orthopaedics with additional capacity for future flexibility. Concept designs tested the opportunities to maximise efficiency in staff workstreams and patient support. Single flows with separate entrances and exits were encouraged to maximise clinical appointments and social distancing, much like the vaccination centres.

Stimulation of the high street and economy: The circular economy approach to the design of the diagnostic centre helped pioneer the delivery of a temporary clinic before the winter surge. With growing concerns for England's high streets and the retail industry, owing to the uncertainty caused by the pandemic, the NHS is now able to quickly utilise these spaces for much-needed health services in the community. Easily accessible by public transport, Dorset Health Village will revitalise the local economy by incentivising visitors to undergo health checks while also boosting activity in the shopping centre.



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Developing an evidence-based approach to improving health services, infrastructure and environment within a pan-regional population basis: A South East Ireland case study

Historically, hospital bodies and health clinics work within specialty-based assessments of needs and then add future demands as capital or revenue allocations permit. This often leads to piecemeal thinking.

Instead of shared care and pathway specific usage that supports high usage and good return on investment, hospitals and clinics that have outgrown their use are subject to several small-scale and single-use extensions. These not only fail to provide long-term value but are inflexible to wider care needs – a widespread problem across Europe.

Methodology – case example

Waterford has a small local population but serves a tertiary population of 500,000-plus across a conurbation that is more than 40 miles of rural and smaller urban areas, while Cork provides not only local city health services but also tertiary and national services for a population in excess of 1 million.

In a joint project with the HSE, we have taken a return-to-the-baseline position to come up with an evidence-based approach that:

- works on implementing known global evidenced long-term transformation aspects and national and local policy needs;
- builds the transformed model of care from current activity to longer-term 2033+ projections;
- standardises the room requirements and optimises flexibility;
- embraces digital technologies to underpin the future care model in line with Slaintecare and the HSE digital roadmap;
- uses the best of existing buildings and refurbishment where possible, alongside highly utilised, future used facilities;
- brings workforce and digital solutions together;
- builds highly repeatable and reusable rooms, open to multiple professions;
- speeds up the time taken to develop projects and reduces capital cost with programme and risk-reducing benefits; and
- provides sustainable healthcare that aspires to carbon neutrality.

The result is a standard way of working that builds on work carried out for the New Hospital Programme in England and other global projects to maximise the interaction between all care providers, and streamlines care pathways into a ten-year-plus DCP of prioritised projects. This work proves that strategic and capital work can go together and provide the feasibility as an evidenced-based approach.

Power of 8 for change

Driven by multiple crises from climate change to current and future pandemics, the role for health systems and the very nature of the hospital as a building type are in urgent need of change. As stated in the European Healthcare Design 2022 Call for Papers, the change needed must address “system-level strategies to health planning and design, which understand the relationships and interdependence of different components of the healthcare ecosystem, from clinical service design to workforce planning, and infrastructure investment to how healthcare relates to the city and the communities it supports”. The Power of 8 is an all-encompassing framework for this crucial change.

This framework for change designates eight principles guiding how hospitals can become a place within an interconnected constellation of settings and services focused on prevention – moving health systems from primarily managing illness towards promoting wellness and the health of individuals, communities, and the environment at large. As a tool, the Power of 8 principles encompass guidelines written as action steps for transforming systems from illness-based to wellness-focused; each guideline is defined in terms of what it means, when or where it applies, why it is important to consider, and how to achieve it conceptually. The intent is to not be prescriptive but clear with respect to the general directive. The benefit of this tool is the opportunity to see in one place, all ideas laid out clearly, well explained, and affordable.

The Power of 8 knowledge focus is theoretical, based on the philosophical idea that what needs to change is well-documented, but the process for achieving this change has never been addressed. This presentation will be interactive soliciting extended dialogue with the audience via a mobile phone-based app generating rapid opinions and feedback.



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Planning for resilience in healthcare infrastructure

This paper discusses how access to a wide range of population, community and healthcare data is critical to inform decisions on the requirements for infrastructure to support healthcare delivery.

The premise is to move away from 'single project' thinking in new infrastructure to long-term planning that models a range of options for delivering new buildings, adapting existing buildings, and providing technologies in homes.

In England, various data sets can be accessed to inform planning. These range from open-source data sets on planning and housing, transport, pollution and flood risk, to proprietary data on existing health and public infrastructure and current uses, and healthcare statistics that can be manipulated to establish future demand for services and the capacity required to meet that demand.

The presentation will outline how these data sets have been used to overlay, through mapping technologies, a vision of what infrastructure could be put in place to build resilience into healthcare delivery. By illustrating a particular geography and community, current infrastructure will be shown, together with options and scenarios for the development of future infrastructure. This distributed health campus model is considered to be more resilient and sustainable than thinking about investment in infrastructure as a series of single and often independent projects.

From a funding perspective, the thinking is that specific and targeted capital funding will be limited to those buildings that have no alternative use. These are buildings housing high-acuity activity. However, for all other elements of the campus, buildings will be designed for alternative use or even be a fit-out of existing buildings.

Through this approach, capital investment requirements will be kept to a minimum and alternative revenue funding models can be developed to lease or rent buildings. Not only will this keep the model affordable but it delivers a sustainable approach through elements of the campus having an alternative use in housing, retail or office space. The authors will demonstrate that by taking this approach, healthcare systems can develop a robust strategy to long-term planning that uses available data to inform future investment decisions and model alternative scenarios for delivering resilient community healthcare infrastructure.

A 'Well-Placed Hospital' in Barnstaple

The 'Well-Placed Hospital' advocates a radical rethink for locating, sizing, and designing a health neighbourhood as a response to the acute challenges faced by health and social care in delivering effective and affordable services in the future. At the same time, it offers mitigation measures for the ongoing economic crisis faced by many town centres across the UK.

The paper describes how by bringing back the hospital into the city or town as an anchor institution in a health neighbourhood, a virtual circle of partnership, economic stimulus, and regeneration is enabled. The benefits arising from a sustainable anchor institution inserted into the town centre, and attracting investment and local employment, include: improved access; reconfiguration and partial disaggregation of existing premises to deliver services; a smaller acute hospital supported by complementary services in more suitable and less expensive settings; and visibility, urban integration, and civic identity.

Our methodology and lines of inquiry included:

- analysis of population data and to place proposed health facilities for best access;
- land-use analysis to benchmark potential town centre redevelopment sites;
- methods to reduce the extent of capital investment and recurrent costs;
- analysis of six potential town centre sites for new health facilities;
- a case study in a real location – Barnstaple, North Devon, with a masterplan for a replacement hospital and social care services;
- hospital space reconfigured with the question asked: what would the health neighbourhood look like?;
- economic analysis that underpinned the proposal – buildings costed to 2026;
- a proposal to integrate health and social – an alternative to the recent Government Bill; and
- ideas to deal with the workforce crisis in the NHS and aged-care sectors.

The case study explored a new brief for a medium-sized hospital, and the lessons learned may inform the HIP 2 shortlisted projects. As well as including the masterplan for a health neighbourhood, it also compares the funding and development of a conventional hospital replacement and an alternative, which represents a well-placed hospital. This work was nine months in the making and may inform an ongoing discussion about innovative options for healthcare infrastructure and delivery.



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Workshop: ‘Archidocs’ and ‘Dochitects’ – will clinicians or architects predominate as the healthcare planners in the future?

Globally, the pace of change in healthcare is constantly accelerating, requiring healthcare planners to always stay ahead of the curve to bring knowledge of the latest trends and advances into the planning and design process for health infrastructure. And, as the world emerges from the turmoil of the last two years, it is an indisputable fact that infrastructure will increasingly mean digital rather than built environments.

At the same time, sustainability – operational, environmental, social and economic – will wrap around all aspects of healthcare planning, from strategic planning down to the commissioning and operational-readiness of new facilities. Add to the mix the emergence of new concepts of design automation and standardised off-site manufacturing processes and it is clear that the knowledge base for the profession is evolving and expanding at pace.



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Panellists:

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Architect and director, Murphy
Philipps Architects

Stephanie Williamson (UK)

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The world's most climate-smart hospital

In hospital design and construction, there is a lot of talk of sustainability, but few projects are executed to a satisfactory level of environmental impact – with excuses about prioritising clinical and operational requirements. But the climate challenge does not leave space for excuses. According to Health Care Without Harm, if the health sector were a country, it would be the fifth-largest emitter on the planet. Therefore, the sector must respond to the climate emergency not only by treating those made ill, injured, and dying from the climate crisis and its causes, but also by practising primary prevention by radically reducing its own emissions.

Objectives and outcomes: With this talk, we want to mobilise the necessary skills in healthcare design, to join forces in paving the way towards the world's most climate-smart hospital. We know what technical solutions work, and when the target is to significantly lower the carbon footprint of buildings. To make it happen, the climate question must be part of the equation from an early stage of a project.

We have collected and tested solutions that work from cost, production and patient security perspectives, and put together a 50,000 sqm virtual project that will reach net-zero carbon emissions over the life cycle of the building. In this talk, we will present both risks and benefits in climate-smart solutions in relation to: foundations; load-bearing structures; facades; interior walls and surfaces; space and geometric optimisations, e.g., heat-loss form factor (HLFF); and ventilation, energy systems and optimised solar energy production.

We will demonstrate solutions and how they work in a hospital environment to lower carbon dioxide emissions, cost, and risk perspectives regarding patients' health and wellbeing. There are competing definitions for net-zero buildings, but to achieve net-zero emissions by 2050, we must focus on both 'upfront carbon' embodied in construction materials as well as significantly lowering the carbon footprint of buildings through their life cycle. Finally, we will discuss our concept for 'Impact Architecture', ensuring a continuous project delivery on both sustainability and financial bottom lines – to ensure value for both society and clients.



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A net-zero strategy for Royal United Hospitals Bath

The Royal United Hospitals (RUH) Bath NHS Foundation Trust provides a comprehensive range of acute services for more than 750 patients and employs more than 4500 staff on a 52-acre site. It has set a target of net-zero carbon emissions by 2030 as part of the NHS's nationwide strategy to achieve net-zero emissions by 2040.

A comprehensive low-carbon energy strategy was developed with input from several stakeholders, including estate and facility management, and sustainability expertise. The energy strategy modelled baseline and business-as-usual scenarios to determine opportunities for reducing the emissions that RUH controls directly. Three priority areas were identified to reach net zero while minimising the need for carbon offsets:

1. reducing energy demand of building services and infrastructure (through optimisation, refurbishments and upgrades);
2. increasing on-site renewable power generation (using solar photovoltaics); and
3. eliminating fossil fuels (by converting building systems to low-carbon electricity).

The energy strategy will ultimately require major upgrades to the existing electric infrastructure, district steam system, and gas-fired combined heat and power (CHP) plant. The potential for electric vehicle (EV) charging stations was also assessed.

While eliminating the use of fossil fuels is a challenge for any site, it's especially challenging for a site that contains a mix of old and new buildings providing vital healthcare services 24 hours a day, seven days a week. In this paper, participants will learn about:

- the plans and details of RUH's energy strategy for achieving net-zero emissions by 2030;
- the technical considerations, financial mechanisms and strategic partnerships necessary to achieve net-zero emissions;
- how healthcare services can remain resilient and continuous while the site undergoes major infrastructure upgrades; and
- how the common challenges faced by healthcare facilities seeking decarbonisation on the path to net zero can be overcome.

University Hospital Ghent – CO2 neutral in 2050

Ghent University Hospital is reorganising its 40-hectare campus over the next two decades and is aiming for a carbon-neutral campus by 2050. The campus masterplan considers embodied carbon emissions, rainwater management, and the architectural needs to create a healing environment. Sustainable mobility with a reduction of car usage by personnel from 65 per cent to 47 per cent is also integral.

The main challenge to achieve net-zero operational carbon emissions by 2050 is decarbonising the heating supply. Therefore, the masterplan contains a route map, considering different heating supply options for 2050 and the transition phases. The chosen path will depend on factors such as evolutions in energy prices and technology maturity. Thanks to its low-temperature regime, the heating systems can easily adapt to any renewable heating supply. Cooling production will be centralised in a cooling plant, maximising the potential for energy exchange between heating and cooling. Instantaneous energy exchange will be performed by heat pumps connecting heating and cooling. Based on building energy simulation, approximately 30 per cent of heating demand and 40 per cent of cooling demand will be covered by this exchange. Different thermal energy storage systems are considered for enabling more energy exchange. Rainwater and fire suppression reservoirs play a key role as an energy storage reservoir.

Photovoltaics can play a role for on-site electricity generation but carbon-neutral energy contracts are key towards net-zero carbon electricity consumption. Considering embodied carbon emissions, a life-cycle assessment was carried out to verify which load-bearing structure has a lower environmental impact. After analysis, it was concluded that a concrete structure is a better choice compared with a steel structure. Another challenge is the long lifespan of hospitals and therefore the need for a high degree of flexibility in the building. This is solved by implementing simple yet important design solutions: implementing generic design, flat concrete slab structure on a regular square column grid, combined technical shafts and vertical circulation, and grouping of technical rooms.

Besides all the technical challenges, the aim must also be to create a healing environment for patients, visitors and staff.



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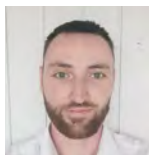
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Decarbonisation – a tale of two sites

In response to the climate crisis, the NHS has set a target to decarbonise its estate by 2040. A key part of the decarbonisation will be achieved through the transition away from fossil fuels to all-electric heating solutions utilising electric heat pumps for existing estate. Decarbonisation of the national grid over time will continue to reduce carbon emissions associated with electricity. Coupled with this, the systematic improvement in the efficiency of fabric and engineering systems will reduce core energy demand. However, this is a complex and lengthy process with differing solutions for different buildings and sites.

Purpose: This paper aims to discuss through a case study of two contrasting sites for University Hospitals Bristol and Weston NHS Foundation Trust the practicalities and pitfalls of decarbonising the existing NHS estate. It aims to share the learnings from this feasibility journey for the benefit of other NHS trusts and wider public estates needing to be decarbonised.

Methods: This case study looks at how existing buildings on the Trust's estate can be decarbonised, moving away from fossil fuels, such as natural gas and oil boilers, to electric heat pumps. The study focuses on two very different sites in the UHBW estate: a city centre site in Bristol and a campus site in Weston-super-Mare. The city site features a large variety of buildings on its estate, which has been developed over several decades with different heating systems and a new local heat network. The standalone site in Weston-super-Mare is fuelled by high-efficiency boilers and combined heat and power, and features several remote buildings. Key considerations include:

- analysis of existing estate;
- feasibility of efficiency improvements for fabric and engineering systems;
- application of different heat pump technologies;
- key considerations retrofitting heat pumps to existing buildings and heating systems; and
- high-level costs analysis.

Results: This presentation will provide a summary of the different approaches and technologies that can help decarbonise the use of fossil fuels in existing NHS estate.

Conclusion: We hope this case study demonstrates practical considerations for decarbonisation of the NHS estate, giving delegates clear information to take away and consider in their own hospital and healthcare schemes.

Environmental benefits of the adoption of modern methods of construction in healthcare buildings

The NHS estate is responsible for around 5 per cent of the total carbon emissions of the UK. In line with the UK Government's commitment to reduce carbon emissions and become net zero by 2050, the NHS, in collaboration with specialists in the field, is exploring ways to cut emissions from construction and operations and, at the same time, improve the staff and patient experience and wellbeing.

As part of the development of the New Hospital Programme, the authors analysed the layouts and characteristics of five hospitals currently being designed in the UK. The aim was to identify commonalities in clinical clusters design, dimensional approach (grids and room height), and MEP (mechanical, electrical and plumbing) strategies, and standardise the design to facilitate the extensive use of modern methods of construction (MMC). The proposed MMC solution is based on the adoption of a 'kit of parts' (KoP), which can be applied to structure, facade, fit-out and MEP elements. This approach has multiple benefits, including the reduction of capital costs, programme, labour and, crucially, a substantial reduction in embodied carbon due to the optimisation and the use of a lean design.

A detailed whole-life cycle carbon analysis of the proposed solutions has been carried out, combined with daylight and thermal simulations to evaluate the performance of the proposed solutions from a carbon, visual and thermal experience viewpoint. The outcomes of the analysis show a substantial reduction in embodied carbon compared with standard steel and concrete structures, and industry benchmarks for superstructures and facades. The proposed layout and facade solutions also show substantial increase in daylight availability, views out, and thermal comfort, compared with commonly adopted ward arrangements.

The design of the New Hospital Programme and adoption of MMC are expected to influence the development of healthcare buildings at a national scale. The lessons learnt from this study will help reduce both operative and embodied carbon, make healthcare buildings more efficient and operative, and establish high sustainability and wellbeing standards, which will in turn benefit patients' health and experience.



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Designing and implementing a carbon-negative healthcare campus

Swedish Health Services is a five-hospital system in Washington state, affiliated with Providence Health & Services, which owns and operates 51 hospitals across seven states. Swedish First Hill is a flagship hospital and one of the largest not-for-profit health providers in the Seattle metropolitan area. To meet strategic, operational and clinical goals, the transformation of Swedish First Hill will modernise every building and system, and implement a district energy strategy that will create the first carbon-negative healthcare campus in the US by 2030.

Application: The project comprises 1,000,000 sq ft of new construction, 250,000 sq ft of renovation, and upgrades to existing systems and infrastructure. The North Tower includes: a new emergency department; diagnostic imaging; 24 new operating rooms; nine cath / EP rooms; and 216 ICU beds. Block 95, a new outpatient tower, provides: 600 new parking stalls; a loading and logistics centre; a conference centre; and more than 300,000 sq ft of clinical space to accommodate the Swedish Cancer Institute. In addition, the project involves an alley vacation, two new skybridges, and a tunnel. The project is under construction and will be operational by early 2026.

Implementation: This talk will outline the key steps to implementation:

Step 1 – First Hill Sustainability and Resiliency Initiative

- Implement building analytics software;
- Identify and monitor measurable energy and carbon reductions;
- Leverage sustaining initiatives to obtain utility funding grants; and
- Reduce fossil dependencies without compromising resiliency.

Step 2 – Systems and infrastructure modernisation

- Satisfy state sustainability and environmental mandates;
- Install smart buildings advanced fault detection and diagnostics;
- Realise \$2.1m in energy savings and utility incentives; and
- Install heat recovery infrastructure.

Step 3 – Carbon-negative campus by 2030

- Implement campus-wide heat recovery piping expansion;
- Finalise design and documents for carbon-neutral campus;
- Minimise greenhouse gas emissions;
- Maximise waste-heat recovery; and
- Construct micro-heat recovery plants.

Implications: It's incumbent on us engaged in healthcare design to be exemplary stewards of precious and limited resources. This project will manifest the owner's commitment to its mantra, 'Health for Good'.

Destination net zero: Transforming NHS estates into the hospitals of tomorrow

Without immediate and bold action, climate change will define the health of current and future generations and will challenge already overwhelmed health systems.

The NHS is committed to being part of the solution as it recognises that it's a significant part of the carbon emissions problem. In 2020, the NHS became the world's first health system to commit to delivering a net-zero service and set out the following targets:

- for emissions controlled directly by the NHS (the NHS Carbon Footprint) to reach net zero by 2040, with an ambition to reach an 80-per-cent reduction by 2028-32; and
- for an extended set of emissions, including those that it can influence in the supply chain (the NHS Carbon Footprint Plus), to be net zero by 2045, with an ambition to reach an 80-per-cent reduction by 2036-39.

Objectives: This paper will describe a process developed for NHS trusts that delivers progressive decarbonisation through improvements in the built environment. When a holistic approach between fabric and services is adopted to ensure an optimum solution, it addresses the following concerns: improved patient experience; clinical outcomes that are future-proof; enhanced staff wellbeing and productivity; and better integration with wider health and social care infrastructure. The process embraces a range of smart decarbonisation solutions.

Methodology: A four-step process to develop viable and bespoke decarbonisation solutions for each trust over a three-to-four month period has been developed as follows:

1. Brief: a) establish which estate/building to prioritise; b) NHS trust to provide all available data; c) identifying missing data and required surveys; and d) NHS trust to commission surveys where required.
2. Optioneering: a) review of data/estate and building; build energy model for optioneering; c) establishing opportune areas for decarbonisation; d) testing model with potential solutions.
3. Validate: test preferred solutions with whole-life carbon and costing to provide a holistic view.
4. Solution: Output solutions could be quickly implemented, mid- and long-term plans.

Results: We're currently working with several NHS trusts to put into practice our proposal. We intend to have initial outcomes, implications and next steps by Q1/Q2 of 2022.



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Workshop: How can healthcare institutions get to zero emissions in 2050?

In 2020, only one national healthcare system was building a plan to get to zero emissions before 2050: the NHS. As of May 2022, 18 have committed to do the same. If the healthcare sector does not implement a clear and ambitious action plan to get to zero emissions by 2050, the emissions from the sector will triple by 2050. The climate crisis is a health crisis, and the sector has a double role to play in solving it. The healthcare sector must seize the opportunity to address its own contribution to climate change and the impact of climate change on public health. That means reducing its own emissions to net zero and adapting now so our health systems are prepared for the new pressures climate change will create.

The sector deals therefore with the consequences of climate change while having to reduce its own contribution to the problem, which is estimated at 4.4 per cent of global greenhouse gas emissions. A big proportion of these emissions come from developed countries, and 12 per cent from the European Union.

During this session, Health Care Without Harm will share its strategy and tools for healthcare decarbonisation, working with delegates in understanding the greenhouse emissions produced by the sector and the different opportunities already available to reduce them. Learning will also revolve around the challenges that require collaboration among systems and countries to create a sustainable and low-carbon supply chain for the sector around the world.

HCWH will also present a pilot project that supported hospitals across Spain, Portugal, Greece and Italy to establish internal carbon management teams and plans to transition to zero-emissions healthcare. By taking a health provider-level approach, HCWH Europe was able to provide hands-on support for participants and pilot a bottom-up methodology to carbon management, which provided vital input for the development of a toolkit for healthcare decarbonisation.

Case studies from different regions and contexts will be displayed to encourage the sector to create applicable action plans to reduce emissions, while promoting sustainability and effective models of care.

Hospital 2030: Integrating digital planning for a smart healthcare campus

Hospital 2030 is an imaginary healthcare facility that encompasses evidenced-based innovations in its design and planning. It's a theoretical proposal that explores incorporating digital healthcare and digital planning into the traditional medical and architectural planning framework to create a comprehensive healthcare facility. Hospital 2030 proposes that digital planning is addressed at the early design stage to reap improvements to the hospital's operations and maintenance phase for end-users.

The study defines the processes in the traditional spatial and medical planning of healthcare facilities as the baseline for comparison. From there, Hospital 2030 will introduce a new planning framework and IT requirements to establish a digital roadmap that co-ordinates with the functional requirements of the hospital. Next, the paper will explore three digital planning factors that disrupt the traditional design and construction process: 1) identifying digital enablers in the design stage; 2) establishing areas of 'phygital' interfacing during the planning and construction stage; and 3) reviewing contract and fund planning from the operational management phase at the early design stage. Finally, the paper will compare Hospital 2030 with the phasing and planning of traditional hospital design to demonstrate that the integration of digital planning creates a comprehensive healthcare facility that responds to current and future public health needs.

Outcomes and significance: Hospital 2030 proposes that by integrating digital planning into traditional spatial and medical planning, there is a potential for better design co-ordination and freeing up space for other activities. Furthermore, the project can achieve better planning of funds and project overview for the clients; there are significant benefits for a more seamless handover between the design and construction to operational management phase with early-stage digital planning. Lastly, Hospital 2030 suggests that a better sustainable design for hospitals can be achieved with digital planning, providing intelligent solutions for manpower allocation, remote monitoring, potential cost savings, and promoting the hospital's outreach at a larger scale.



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People, place and prosperity: Using big data as a diagnostic tool in health precinct design

The Gold Coast University Hospital opened in Southport, Australia, in 2013. Fiona Stanley Hospital opened in Perth, Australia the following year. Each is a new public tertiary hospital adjacent to an existing university campus and co-located with a private hospital and new residential and commercial facilities. Aligned aspirations included the attraction of a skilled workforce, evidence-based design principles of the healing benefits of nature, and mixed-use development to catalyse employment and population growth. This paper demonstrates the potential for digital innovation in health precinct planning to a level of detail that has not been accessible previously.

The project similarities presented an opportunity for a multi-faceted post-occupancy evaluation: to compare activity in two emerging health precincts, to diagnose under-utilised design elements within them, and to use the findings to inform ongoing development. We explored three themes:

1. People – do the precincts have high-quality amenities for individuals who live, work or learn in them?
2. Place – do the precincts offer comfortable, safe and distinctive experiences for all users?
3. Prosperity – do the precincts support positive environmental, economic and social outcomes?

Method: Using longitudinal data sets from anonymised mobile phone signal data, we analysed: activity heat maps and dwell times of site users; cross-site visits and connections between buildings, landscape and precinct features; worker and visitor origins by suburb; emergency department catchments; and travel mode to site.

Results: The precincts have expected patterns of cross-site visitation between research and clinical areas, and similar peak times for retail, green space and transport infrastructure. The data show areas of potential improvement for food, transport and seasonal site activation. Landscaped areas show high visitation across both sites. Benchmarking analysis shows some significant development differences, which are due to demographic, economic, infrastructure and locational forces.

Implications: Big data analytics can reinforce design decisions and assist in ongoing design and operational adjustments to major infrastructure. The data are represented in high-impact, easy-to-read spatial and statistical infographics to enable stakeholders to understand potential improvements to the functionality of their precincts. The data can also be operationalised through a live data dashboard tailored to a client's specific requirements.

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The distributed campus of care: Go small, reach far

As we enter the third decade of the 21st century, hospitals have attained iconic status, exemplified by the Covid-19 pandemic; yet, as we look to the future, does this status hold true? Do they serve the need of the community for better health? Will building newer but similar hospitals meet future requirements?

Our post-pandemic economy cannot sustain a capital programme on the scale seen in the last half century, nor would this be wise. In short, the hospital as the towering cathedral of care will cease to be the main focus of care by the mid-21st century. This is the decade to begin dismantling the cathedral and replacing it with a different kind of icon.

Our multidisciplinary working group believe we can 'go small, reach far', providing value-added care that truly addresses the needs of the local population. We call this the 'distributed campus of care'.

With emphasis on care rather than healthcare, we acknowledge the importance of environment, socio-economic factors and education in generating a healthy population. We believe in co-production of services that create local investment in the health of the community. Our key principles are:

- Developing a distributed campus of care model that minimises the footprint of the keystone hospital building – in particular, the science of treatment – yet maximises the art of care (go small).
- An inter-connected system that gives greater visibility and ability to intervene on a wider geographical region and, where appropriate, extend healthcare delivery from large hospital buildings into individual homes. Fewer hospitals, greater coverage (reach far).
- The hospital is iconic for the British public as the physical embodiment of the NHS and everything it stands for. Our distributed campus of care will have smaller iconic spaces, rooted in the culture and lived experiences of local communities.

We're embarking on a 10- to 20-year journey in a mutual and reciprocal relationship with our staff, patients, local communities, and other public agencies, so that in 30 years' time, Guy's and St Thomas' hospitals will be transformed into a distributed campus of care, which is not hospital-centric, or even health-centric.

Hybrid model of care: Integrating physical and virtual care in an internal medicine home hospitalisation programme

Transformations in digital health during the Covid-19 pandemic led to the development of new hybrid models integrating physical and virtual care. The growing ability to provide remote care by telemedicine technologies, and the need to control hospitals' occupancy and prevent contamination, accelerated programmes for home hospitalisation.

Sheba Medical Center, through 'Sheba Beyond', the first virtual hospital in Israel, developed a programme for an internal medicine unit with physical and virtual beds managing inpatient hospital care with remote home care based on the patients' medical condition. The programme is a collaboration between physicians from the hospital and nurses from the health maintenance organisation (HMO), Maccabi Healthcare Services.

The study examines the process of setting up the hybrid model of care for the Internal Medicine Home Hospitalisation programme. We investigate the use of telemedicine technologies for service innovation and integration of care between hospital and home. A particular focus is on how digital technologies can enable the smooth transition of care between hospital and home-care delivery contexts. The research is based on qualitative semi-structured interviews with Sheba Beyond management, medical staff from the hospital and the HMO, IT, telemedicine, and medtech organisations.

The results show how the new hybrid model evolved to integrate four care pathways multiplied by the mode of delivery and the location of care: physical care at the hospital; physical care at the patient home; virtual care at the hospital; and virtual care at the patient home.

The study illustrates dynamic patients journeys across the four care pathways and the growing complexity of the new hybrid models. The study explores aspects of scalability and the potential impact on the future design of internal medicine units, managing multiple physical and virtual beds simultaneously.

It indicates the potential to accelerate flexibility and efficiency of the healthcare system, provide personalised service, and enhance the involvement of the patient and family. Yet it also highlights the challenges of measuring the quality of the care and managing the dynamic complex hybrid model across the healthcare ecosystem.



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Digital services for climate-smart healthcare system: Challenges, gaps and opportunities

Covid-19 gave us a 'promo' for the interrelationship between disaster situations and healthcare services. One of the greatest achievements of the current epidemic has been the increase in the use of digital healthcare services. Digital services are sustainable as they reduce clinic and hospital travel, saving fuel and lowering emissions.

Purpose: To characterise the changes that occurred during Covid-19 in the use of medical and non-medical digital services; and to map out the gaps in the use of digital services and offer solutions to improve remote services for a smart environment in an era of climate change and crises.

Methods: Three rounds of anonymous questionnaires were distributed before and during Covid-19. Questionnaires included more than 50 closed and open-ended questions, and they were analysed by quantitative and qualitative statistical methods identifying use of digital medical and non-medical services, correlations with demographic data, general mobile and computer usages, health and wellness status, and more.

Results:

- Digital medical services: a significant increase in using digital healthcare services during Covid-19 from 89.86 per cent to 94.08 per cent and 93.38 per cent, respectively. A significant increase in use of 'appointment for family physician'; 'renewal of medical prescription'; 'Q&A with physician'; and 'information about vaccination' during Covid.
- Non-medical digital services: the most used services that were ranked high stayed high during Covid: 'phone calls'; 'SMS and WhatsApp'. A significant increase in use of: 'email'; 'Facebook and social nets'; 'video communication'; 'internet surfing'; 'games'; 'apps'; 'music'; 'video calls'; 'view video content'; 'online purchases'; and 'marketing messages' during Covid.

Conclusions: The survey demonstrates an evolutionary increase in the use of medical and non-medical digital services that has taken place, somewhat out of lack of choice, in response to a situation created by the Covid-19. There are still gaps in the ability to follow up health status (digital medical record, EMR) and reminders (preventive and proactive medicine). We must take advantage of this evolutionary process to improve digital and e-health systems for providing continuous care, encouraging patient empowerment, and establishing a smart patient-centred care system for crisis situations such as Covid, or other disasters expected from climate change.

IoT solutions for smart hospitals

New IoT use cases help hospitals become smarter and improve the operational performance and quality of care.

Purpose: The business case for IoT solutions is built around three dimensions: energy efficiency, space efficiency and efficient workflows in the building. Hospitals can achieve a return on investment of under one year by implementing IoT solutions. The use cases address a wide variety of stakeholders in a hospital.

Method: Digitalisation touches every aspect of the hospital and is about optimising work processes and improving staff and patient experience. IoT solutions for smart hospitals consist of three main components that are built around an IoT platform (smart hospital platform). The platform combines multiple streams of data into one unified and structured data model, and gathers data from the building and its occupants from various systems, such as IT, OT, and IoT systems. This requires open connectivity and a scalable platform architecture to leverage the existing systems in a hospital.

Use cases such as asset tracking, wayfinding, and patient journey require additional data to be generated and ingested into the platform to create the business logic. Hospitals often consist of multiple buildings combined into one organisational campus. This requires a scalable and flexible smart hospital platform and a variety of IoT systems to fit all building conditions, whether it is new construction or an existing building. Scalability of the platform is important.

Results: IoT solutions can have a short return on investment of up to one year, depending on the hospital situation. In case of a new hospital building, the CAPEX (additional IoT sensors) can be minimised by capitalising on synergies with the building management infrastructure. This leads to very low additional costs and a much higher value for hospital operations. The major saving potential comes from asset tracking.

Conclusion: IoT solutions contribute to digitalisation, energy efficiency, and operational efficiency at the same time. Implemented in the right way, they offer a rapid return on investment of under one year. IoT solutions help create a digital patient and staff experience, and improve resource and process efficiency. In addition, they positively affect patient safety and quality of care, and are therefore an important strategic element of any smart hospital.



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Ambient intelligence illuminating care at the hospital ward

Quality and speed of recovery after surgery depend on a complex interplay between patient, clinician, and healing environment factors. Clinicians spend much effort supporting recovery but they also suffer from a lack of individualised real-time information and are hampered by inadequate workflows. Continuous 'ambient intelligence' monitoring can 'illuminate' the complex interplay of factors and provide means to individualised approaches.

Practical application: Ambient intelligence refers to the use of contactless sensors in an environment for analysing this environment using artificial intelligence (AI), named by us A2I2. It works by processing encrypted images from a sensor located in the environment in real time. Images are compared with a large dataset of sample scenes and translated into practical insights. A2I2 is increasingly applied in healthcare to support decision making and improve workflow. In the patient room, it may monitor various aspects of recovery, e.g., mobility, sleep, falls, abnormal behaviour, stress, pain, and fluid and food intake. Connected to smart building technology, patient care can be more automated – e.g., detecting when someone leaves bed during the night, switches on the light in the room, and signals the nearest nurse to prevent a fall.

Outcomes: We've started A2I2 at eight private patient rooms in the surgical ward. All data are displayed on a dashboard co-designed with clinicians. Bias-free AI algorithms are aggregated with electronic health record and wearable device information for real-time monitoring and decision support. Care is triaged via personnel in a 'remote monitoring room', owing to the magnitude of data and to prevent cognitive overload of an individual clinician.

Implications: A2I2 can improve safety, quality and efficiency of care in hospitalised patients. It drives initiatives reconsidering modes of care delivery and corresponding nurse ward design. A2I2 holds promise for application in long-care facilities and at home. Ambient intelligence monitoring of the (patient's) home environment can provide insights into wellbeing and functioning from a distance. This may not only be relevant for early@home and hospital@home but also wellbeing, lifestyle and other health and wellbeing maintaining initiatives. Such digital migration of health and healthcare to home benefits inclusivity, access, affordability and sustainability of health(care) resources.

The Smart ED

The majority of major emergency departments (ED) were never designed with patient experience or staff wellbeing in mind. Instead, they were focused on basic measures of patient outcome and the challenge of initial triage, treatment and disposition for all acute medical emergencies, physical injuries, and mental health crises. Almost a quarter of the population will attend an ED each year but, sadly, the patient experience is often poor at a time when they are most anxious and distressed.

Purpose: The Smart ED focuses on the entry point to an acute hospital and is based on contemporary data and extensive experience from an NHS ED. Designed by a multidisciplinary team, it considers the individual components of a conventional ED design and re-imagines them to optimise efficiency, safety and comfort. Operational processes have also been redesigned to improve patient and staff experience and clinical outcomes. This talk will outline the key differences to those designs in common use in the UK and demonstrate how the Smart ED design can result in improvements in all domains of quality and patient experience.

Outcomes: At the heart of the Smart ED is a linear design that comprises a central staff work core surrounded by patient spaces. Every room can be used to treat every patient, and the whole ED is able to expand and contract throughout the day to meet demand. Technology is used to improve wayfinding and release staff time to deliver care, while also enhancing safety. We estimate that the cost of building the Smart ED is similar to that of a conventional design. The Smart ED will yield a positive net benefit to society within three or four years. Reduced utility bills due to green energy installations will pay for the entire ED build in just over 30 years.

Conclusions and implications: The proposal is a commitment to design and plan new hospitals focused on the needs of the patient group that have been historically the most disruptive to the effective and efficient running of the hospital.



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Creating, testing and evaluating immersive virtual ICU-CCU built environments

The recent ICU-CCU evidence-based built environment literature expresses a typology of nine primary concerns. These are:

1. Nature engagement and outdoor views – studies examining the influence of exposure to nature, as well as representations of nature, with focus on measures of stress reduction outcomes;
2. Family accommodations in the ICU-CCU environment – studies on the role of family involvement and the influence of family input in unit design and amenities provided;
3. Spatial configuration and amenity – physical layout and associated amenities, staff affordances, and proxemic relationships – i.e., staff travel distances and patient sight lines, and single versus semi-private rooms;
4. Noise considerations – deleterious effects of excessive noise and involuntary distractions on patient and staff wellbeing, patient delirium, and the influence of noise mitigation measures on occupant outcomes;
5. Artificial and natural lighting – adverse effects of excessive light on occupant wellbeing, the benefits of informative views, utility of ventilation systems, and optimal ambient light levels on patient outcomes;
6. Patient safety and infection control – studies addressing the types and prevalence of adverse medical events in ICU-CCUs, mitigation, and improving patient outcomes;
7. Portable field hospitals and disaster mitigation including Covid-19 – the functionality of hospital adaptations and redeployable field hospitals in natural disasters and the current Covid-19 pandemic;
8. ICU-CCU ecological sustainability – recent advancements in energy efficiency, materiality, facility design, and daily operations;
9. Recent and prognosticated design trends, including therapeutic design affordances and unit performance optimisation.

In the context of this knowledge base, Immersive Virtual Environment (IVE) simulation is a potentially useful means to test and assess the appropriateness of unbuilt and built hospital-based ICU-CCUs. However, this technology is yet to be used as a facility planning and design tool in either pre-design or post-occupancy contexts. The aims of this paper are to: review IVE research in healthcare environments in the context of the broader ICU-CCU literature, comparing/contrasting studies from the end user's perspective; and assess interdisciplinary IVE strategies as a design visualisation tool in ICU-CCU settings.

Around the kitchen table with Maggie's: Valuing our workforce and carers through design

Maggie's centres are designed to a considered and demanding architectural brief. Every architect and designer embraces this brief – a blueprint first created 25 years ago by its founder, Maggie Keswick Jencks. Through the design process, the charity ensures its environments cater to the needs of all its users, including people living with cancer, carers, NHS colleagues, visitors, and professional staff.

The architecture, unlike traditional hospital settings, is non-prescriptive and designed to feel welcoming for all visitors. There are opportunities for gathering around a shared space at the kitchen table, secluded rooms for private conversations, large spaces for group activities, and settings for contemplation that often give a view of the garden or outside world. All of these elements ensure Maggie's staff can provide the professional support and care visitors need.

For friends and family, the centres often start as a place to simply wait with a hot drink while the person with cancer visits the hospital. However, once inside, the setting opens them up to conversations with staff or other visitors which, in turn, can help them find the support they often didn't know they needed themselves.

Maggie's centres also assist staff to create conversations, often accelerating the discussion of psychological issues. The informal setting means that staff can wait for a person to become at ease in the environment before approaching them and assessing their needs.

Hospitals are larger and much more complex settings. But what lessons can hospitals learn from Maggie's? What is the role of the environment and architecture in supporting and valuing healthcare staff? And what are the universal design principles applied in Maggie's centres that can help humanise our hospitals through design?



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Encouraging interaction: Healthcare and education – two case studies

In this talk, we present two buildings that demonstrate how architecture can supercharge the interaction not only between clinicians and researchers but also between researchers themselves. We explore how the buildings have been briefed, designed and constructed, the outcomes created, and the implications and directions for the future.

Both buildings arise from a joint venture between an NHS trust/charity and one or more universities to create a new type of healthcare/research/education hybrid.

Institute in the Park, Alder Hey Children's Hospital: Working with the adjacent Alder Hey Hospital and the University of Liverpool, together with UCLAN, Liverpool John Moores University, and Edge Hill University, we designed a flagship project that brought together academic researchers, healthcare professionals, technology companies, commercial research teams, students and educators. A corridor-free mix of laboratories, teaching spaces, lecture theatres, and open-plan and cellular office accommodation focus around an atrium that incorporates write-up space, a library and cafeteria.

Pears Building, Royal Free Hospital: UCL's Institute of Immunity and Transplantation in the existing hospital has been quintupled in size in an adjoining new building to create a globally significant clinical research centre, utilising the proximity of the patient cohort in the hospital for rapid turnaround translational research. Two hundred researchers interact with clinicians, who can call on the resource of the clinical trials patients also housed in the building. Write-up space is deliberately segregated from labs and grouped together around a whole building atrium to encourage the "collision co-efficient" necessary for new ideas.

Outcomes: Both buildings are relatively new, so outcomes will continue to emerge. Certainly, interaction is occurring, and it will be interesting to see whether there are focal points for this. The Institute in the Park has been successful in attracting more academic partners. The Pears Building has already become a magnet for hospital staff to visit and use the buildings.

Implications: In the paper, we will set out the implications of this model, in how to balance the need for privacy and interaction, together with how the model might be expanded to co-locate other kinds of complementary space and use within this type of building.

Pandemic lessons: How architecture and design supported an infectious disease hospital in China

While healthcare design is often seen as static, synergies between architectural design and clinical planning within healthcare facilities can enhance patient outcomes. Design considerations can increase both throughput and general efficiency of healthcare spaces while minimising operational costs, allowing practitioners to maximise their time while keeping patients top of mind.

In this paper, attendees will understand the importance of strategic planning while building positive environments that play a role in healing patients. Attendees will also gain insight into the various ways to elevate the design of healthcare facilities, critical access hospitals, and ambulatory care centres, while ensuring spaces are organised, operational and safe.

The talk will highlight the Shenzhen Third People's Hospital, an infectious disease hospital, as a case study. Located in Shenzhen Municipality in China, the hospital opened just before the pandemic. It required specific inpatient accommodations for treating and dealing with patients with infectious diseases.

This paper will explore the lessons learned from the hospital during the pandemic, while discussing design elements and spatial allocation choices to improve patient outcomes. By assessing decisions made at the beginning of the project, it is now possible to reflect on aspects that worked well and others that needed improvement. By utilising the project in China as a lens for analysis, we can further examine how design and architectural considerations can improve the health and wellbeing of patients and staff within healthcare facilities.



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The new Mississauga Hospital – a new vertical hospital in the city

The new Mississauga Hospital is a critical part of Trillium Health Partners' (THP) plan to build a new kind of healthcare that serves its growing and diverse community for the decades ahead. The project will be the largest hospital project in Canadian history and a significant part of THP's long-term health infrastructure renewal plan.

Located in Mississauga, Ontario, the project will be delivered through Infrastructure Ontario's Public-Private Partnership (P3) model. The new model enhances collaboration and development of an exemplar design prior to confirming a development partner, and features a new way of making that selection.

Purpose: This session will focus on reviewing the clinical and design opportunities being addressed by the project, while integrating knowledge gained through a new 'Progressive Development' model. The perspectives of both design team and client will be shared in exploring whether the new model is supporting the design and delivery objectives.

The project: The new hospital will be a full replacement of the existing hospital and will redefine a new urban centre focused on health. The 280,000 sq m acute hospital will nearly triple the size of the current site capacity in the form of a 23-storey tower, orchestrating an overall masterplan that enhances community cohesion, embraces future transportation systems, and integrates open green spaces with the public realm. This will be a vertical 'hospital in the city' and design has been enriched by collaboration between THP, the City of Mississauga, and other third-party stakeholders.

Procurement model: The design process employs a new model in Infrastructure Ontario's PPP programme: the Progressive Development model, which strikes a new collaborative approach to ensure increased levels of flexibility, digital enablement, health and wellness, and inclusiveness are achieved as part of a 'whole hospital' design that emphasises the patient experience.

This session will explore the intersection of the design opportunity with the novel Progressive Development model in revealing new approaches of collaboration between hospital, design team, third-party stakeholders, and contractor – a new evolution of PPP procurement that is responsive to the myriad market issues posing challenges to large-scale hospital development.

Designing an XL medical campus for a translational health science future in China

Zhejiang University, one of the top universities in China, is planning a new 1500-bed School of Medicine First Affiliated Hospital Yuhang and Research Center.

The design concept brings the research, hospital, administration, housing, a VIP hospital, hotel and conference centre together on one campus, focused on integrated spaces for translational collaboration and multidisciplinary care, a clinical specialty cluster for an enhanced patient experience and outcomes, and efficient and flexible shared infrastructure to easily adapt to future needs. Part of the campus mission is to create opportunities for an integrated network of green infrastructure to reduce dependency on traditional forms of energy consumption and promote active considerations for sustainable means and methods.

The initial challenge was to create a simple circulation infrastructure to separate functions at the campus scale and within each component. This required separating circulation paths for patients from paths for healthcare providers within the hospital. Access to the outpatient clinics required individual entrances to each specialty. Staff also share resources between specialties to maximise operational efficiencies.

The design expresses a modern, technology-infused approach to research-informed healthcare, combining best practices of international and Chinese medicine. White patient towers sit atop a brick diagnostics and treatment podium on one edge, and outpatient facilities along the other. An internal spine connects the diagnostics and treatment block with the specialty clinics.

At the lobby, patients are guided to the correct area on campus using their phone. Kiosks use facial recognition for check-in purposes, an automated pharmacy makes use of a telelift to ensure accurate and rapid delivery of medication, and drones deliver blood and organs for transplant.

As a pedestrian-friendly campus, a contiguous walk is provided around the entire building, connecting all major entrance plazas. The entire west building facade engages the Central Green, the heart of the campus. This 'park-like' environment has spaces for learning, collaboration, relaxing and healing.

The result is an elegant, cohesive complex with intuitive organisational clarity. It's both a symbolic expression and physical embodiment of interconnectivity, collaboration and wellness – the fundamental idea behind translational health sciences and the future of healthcare.



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Healthcare architecture's ethical imperative – reliance on evidentiary rigour

Growing bodies of evidence demonstrate the profound effects the built environment has on health – evidence that should rapidly reshape architectural practice and demands ethical and professional obligations to act intentionally, maximise benefits, and eliminate harms and inequities. However, the architectural profession remains stubbornly attached to late-century norms: few qualified firms can satisfy healthcare providers seeking new environments that improve health; broad health inequities persist; evidence about unhealthy building materials and processes is largely ignored; and students fear that their architectural education is increasingly irrelevant to contemporary challenges.

Traditional architecture curricula and career paths do not equip architects to effectively conduct, evaluate and use rigorous research and data in their practices. Architecture is not the first profession to face this shift, so examining the ways other professions have transformed to a research-driven knowledge base and practice model to discover relevant, practical lessons can support architecture to evolve. This ongoing research explores the root causes and pathways towards future practice in three phases: 1) study the evolution of other professions towards reliance on research; 2) conduct a workshop to explore findings with educators, practitioners, industry leaders, and regulators to identify barriers and solutions; and 3) posit a roadmap for architecture's evidence-based turn, including the Union of International Architects' 2022 declaration 'Year of Design for Health'.

The results of this research will create a practical framework to steer architects towards a research-based design process. Lessons from medicine and other professions with similar professional evolutions hold value for architecture.

Architecture must make a deliberate and conscious turn towards evidence-based practice. The profession must effectively manage and communicate a body of knowledge, a set of research skills, and a range of design implications, and utilise this knowledge to shape projects for a radically different future. By embracing this journey, architects will be ideally positioned to assert a new level of professional authority that may extend beyond healthcare, and which pushes the envelope of how the built environment can improve the human condition.

A post-occupancy evaluation framework to inform future investment in healthcare design

Australia and New Zealand, like many countries, are spending more on health than ever before. As such, it's imperative that health delivery services, infrastructure and facility performance contribute to an adequate feedback loop, which identifies and improves building performance and health outcomes.

Australian states and territories and New Zealand districts are responsible for delivering healthcare in their jurisdictions, and each has differing methodologies and requirements for undertaking post-occupancy evaluations (PoEs) or building performance evaluations (BPEs). Mandates to undertake these evaluations are rare, and when undertaken, they're perceived as not rigorous or detailed enough to be valuable. There is a significant need to identify the return on investment for these facilities in a measurable and meaningful way.

The purpose of this research is to develop a rigorous and standardised framework for future PoEs for healthcare facilities in Australia and New Zealand. The development of this framework will pave the way to undertake PoEs, which will help to: make amendments to existing facilities as a result of recommendations; assist with ongoing asset management strategies for healthcare facilities; influence design and innovation for future healthcare facilities to improve the return on investment for infrastructure investments in order to improve health outcomes.

The framework tool is developed in two phases. First, a comprehensive literature review of empirical data summarises current national and international trends in PoE development. A review of relevant government documents reviews existing policies around PoEs for healthcare facilities. In the second phase, semi-structured interviews are conducted with healthcare and infrastructure department representatives to identify aspirations and barriers towards PoEs. This framework will produce a scalable, integrated and holistic evaluation process. There will then be a pilot stage to implement the tool in several healthcare facilities.

Literature review results demonstrate broad existing practices and vary by geographic location. The interview phase will narrow the relevant themes to apply within the proposed PoE tool.

This framework aims to enhance the existing system in Australia and New Zealand to improve the feedback loop for healthcare delivery and infrastructure, and subsequently aims to contribute to better health facilities and better health outcomes.



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Driving innovation in healthcare design: The case of an interdisciplinary co-design process for a new rapid eye diagnostics hub for Moorfields Hospital

The evidence to reconfigure healthcare in response to the pandemic is insufficient. Healthcare systems, organisations and clinical teams have tried hard to work with built environment specialists to reconcile their priorities. However, few have made investments in research, innovation and interdisciplinary evidence. This paper describes a case study that prioritises the reconfiguration of eye care to respond to patient backlog and develop a diagnostics hub.

Ophthalmology, the busiest NHS outpatient specialty, is suited to providing a testbed for rapid, research-driven innovation and to show how research in the built environment can better inform clinical and technological advancement. Current design guidance does not cater for the clinical advances that have taken place over the last 20 years, including the introduction of more sophisticated medical testing equipment.

Purpose: Provision of a diagnostic clinic for glaucoma and medical retina conditions, which can be located away from the main hospital outpatient department and in 'pop-up' locations, from which ophthalmologists can assess patients remotely from the virtual clinic. It also gives easier access for patients being able to attend clinics within their communities.

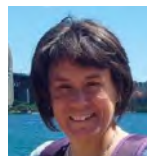
Methods: A rapid evidence review and clinically led case study are described, which outline the approach taken to bring together the design, engineering and modelling expertise of multiple built environment experts. The interdisciplinary co-design process is explained to describe how it encouraged an innovative approach to equipment configuration, layout design, and scientific evidence base. The case study involves three iterations of layout and two different forms of enclosure to be able to assess the most effective clinical pathway, including how to cope with pandemic situations.

Results and discussion: The outcomes of the study aim to address: the most effective clinical pathway for remote diagnostic hubs, design guidance, and environmental conditions that can cope with clinical adaptability to cater for pandemic situations. There is a significant need to address the methodological, interdisciplinary and theoretical implications of the existing evidence for healthcare reconfiguration. We offer a conceptualisation of an evidence-based co-production process that will optimise safety, working conditions, efficiency of movement of patients and staff, and advance digitally enabled technology and virtual clinical practices.

Workshop: Opportunities for clinical innovation through interdisciplinary design collaboration within the New Hospital Programme

While the New Hospital Programme (NHP) will proceed on the basis of central strategies, it is of paramount importance that these strategies incorporate meaningful clinical involvement to successfully deliver the programme's key objectives for the delivery of cohesive, high-quality, design solutions.

Building on previous presentations and research, this session will identify good practice from panel members and the audience, and suggest how clinical innovation can be effectively included within the New Hospital Programme.



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Cambridge Children's Hospital – 'A whole new way': A new model of integrated healthcare and research to provide holistic mental and physical care for children and young people

The new Cambridge Children's Hospital will provide a world-class model of integrated healthcare and research, combining holistic care for children and young people in the East of England. The project champions 'A whole new way' – an approach that treats the child as a whole, without distinguishing between mental and physical health.

Redefining the boundaries between mental and physical health is already being discussed in the UK and Scandinavia but this project turns the page in the history of hospital planning. In a combined effort by Cambridge University Hospitals NHS Foundation Trust and Cambridgeshire and Peterborough NHS Foundation Trust, the project will act as a global exemplar of holistic healthcare. Translational research will be at the heart of the project, and a dedicated specialist research institute for the University of Cambridge will support this innovative new model of care by pushing the boundaries of paediatric medicine and research.

In creating a completely new typology of hospital, the design team has worked closely with the staff, parents and patients. Children and young people have been an integral part of the design process from the outset – from being on the interview panel to selecting the design team, to being actively engaged in an arts-led consultation programme.

The design of the whole building will be psychologically informed, founded in the knowledge that architecture contributes to healing and patient wellbeing. This will be a place to learn, play, heal and recover – indoors and out. The building will enable medical staff, researchers and other professionals to meet, collaborate, exchange and develop new knowledge, to provide the best healthcare quality for generations to come.

A hospital that is kind to its inhabitants must also be kind to the environment to leave a legacy that is sustainable and resilient for future change. CCH will be net-zero carbon and one of the most sustainable new hospitals delivered in the UK, designed sensitively to encompass WELL standards.

To conclude with some words from one of our young people: "Children need psychological and physical care. Not one or the other. Not one before the other."

Design for dignity – measuring the impact of design: Refurbishment of the maternity ward at Punta Europa Hospital in AI, Spain

During the first years of our practice as specialists on maternity wards, we focused on perfecting the space for giving birth, designing especially for birthing women. The main concern was to design for an active, self-determined birth. Providing privacy, acoustic comfort, and space for free movement, as well as integrating the family were crucial. Now we turn our focus to the carers. This refurbishment project demonstrates the results, highlighting design issues and their outcomes.

When we first visited the maternity ward at Punta Europa Hospital, we were unimpressed by the very poor working environment. The area made it difficult to communicate, lacking space, daylight, ventilation and acoustic comfort. Midwives had no visual control of the area, no place to replenish their energy during their long work shifts, and storage space was spread all over the area.

Purpose: It was also not possible to separate the pregnant mothers from the babies' health. And something similar happens with midwives and other medical staff – if they're not being taken care of, they're not able to take care of birthing women. This project brings a focus on dignity and care for the carers through design. This refurbishment has only been possible with the initiative and lead of those midwives.

Methods: The intervention area covers about 600m² (consultancy space, birth rooms, surgical area, and staff zone). After a deep analysis, and meetings and interviews with users, we worked with the before-after concept and metrics such as staff journeys, relating to the main design issues and resolving all aspects to offer a healthy workplace. As a refurbishment project, the relation with the hospital engineers was crucial. When it comes to "surprises" during the building site process, the result depends on good communication with technical staff at the hospital.

Results: The area re-opened in autumn last year. Providing separated spaces for all staff needs, offering an environment that facilitates communication, visual control, and enough room for storage makes the difference. Retaining talent is also about designing for a healthy work environment.



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Designing a home for palliative children

Born as a house for children with palliative care, Casa Sofia includes rooms for a temporary stay and rooms for the end of life. How do we plan this project? What should be the space that welcomes these children and their families? The basis must come from scientific evidence, supporting a design that will create the best comfort and healing space, and one that will not lead to adverse effects of anxiety and pathologies for its users.

The space is created as a large house that welcomes children. An extension of their home so that they can have a quiet, refreshing stay, full of peace and with all the necessary attention for their daily care. For this, the space is not that of a hospital, but that of a house. Rooms are designed like the rooms they might have in their own home. Common areas for families and games are adapted to their needs. A large outdoor space extends the common areas into a spacious environment, with views of nature, nearby surroundings, and the sky.

The building is in quiet surroundings and has large windows that provide the entrance with natural light and good ventilation. The connection with the outside is the basis of a healing space. At the same time, the interior spaces create routes with views of the exterior for a better spatial and temporal orientation. Use of natural and warm materials, together with everyday objects from children and their families' life, is included as part of a person-centred design with a holistic approach.

The project is completed with the integration of interior design and environmental graphic solutions, based on the same visual language developed for the SJD Barcelona Children's Hospital. This language consists of a specific palette of colours, patterns of repetition, and the storyline, 'Animals playing hide and seek', which uses real-scale animal representations hidden within the spaces. The patient rooms were designed to emphasise a warm, homely feeling, using bespoke posters, bed linen and other elements, such as furniture, desks and shelves.

GOSH Sight & Sound Centre – retrofit for unique needs

The Sight and Sound Centre was conceived to transform the experience and care of children and young people treated by Great Ormond Street Hospital for Children (GOSH).

Forty per cent of patients are under four years of age and 50 per cent are never inpatients. Many return over years, some throughout their childhood. The Centre co-locates audiology, cochlear implants and ophthalmology, as well as ear, nose and throat, and speech and language therapy services. Those with sight and hearing impairment represent the largest group. Sensory loss results in specific needs. Elements making spaces more comfortable include sufficient light, but without glare, reduction of noise, seating arrangements that aid the reading of faces and lips, reduction of clutter, and the use of art for stimulation and wayfinding rather than reliance on signage, avoiding a more acute hospital setting.

The study that led to the Centre being accommodated in a listed building, adjacent but off campus, didn't start with this use predetermined. Rather, the benefits were clarified and opportunities categorised on a sliding scale, starting with clinical attributes. With a rising complexity of clinical activity, it's common for the dependence of the patient to increase and thereby the engineering and fire safety demands that are placed on the building. Illustrating the relationship between the clinical purpose and the scope of building works helps to identify what use best fits. For our project, avoiding a mismatch between purpose and building at the outset allowed the focus to be on how to make best use of what we had.

The highest standards appropriate to healthcare environments are met while being a less overtly medicalised setting than an acute hospital. Refurbishing retains materials, forms and attributes that would not be repeated in new healthcare buildings, and those quirks contribute an experience demonstrably richer and more eclectic and is, in the context of this use and location, arguably better than would be achieved through building new. Combined with specially commissioned artworks and art installations makes for an engaging place focused on people.



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A breath of fresh air – the positive impact of integrated landscape and activity-based design in the architecture of secured mental healthcare facilities

This paper will illustrate a design approach for secured psychiatric hospital projects, where activity-based programming, access to nature, and relations to the (distant) landscape are key design parameters in the layout of the building and its architecture. Considering the perspective of the patients, the goal is to create a climate-smart built environment that can support the healing process and lead to rehabilitation.

Methodology: In two recent high-security psychiatric hospital projects in Belgium, we've applied an integrated design method using activity-based design with users' wellbeing and climate resilience as key drivers.

In 'Les Marronniers' hospital, on the edge of Tournai close to the countryside, the new facility acts as a buffer between active, urban life and the calming landscape. This duality is exploited to allow patients to live in a quiet environment while also maintaining a connection with the city centre and its social network. A new public square highlights the link to the city, while landscape design capitalises on the proximity of nature to offer diversity in outdoor spaces organised for specific activities and security needs, from enclosed patios and terraces to open gardens and walking paths.

In Jean Titeca Centre, located in a densely populated area of Brussels, the site's access routes and flows were restructured, and the infrastructure was partially rebuilt to strengthen the links to outdoor and indoor common areas. New secured care units include generous, open common areas, located at the heart of the units to encourage socialising, while also offering each patient access to large terraces overlooking the garden.

Results: Applications of the integrated landscape and activity-based design approach to promote rehabilitation in secured psychiatric facilities include: flexible space layouts and walkways that encourage social interactions and allow a certain degree of autonomy; use of topography to blur the perception of enclosure and offer views to the distant landscape; and diversity of secured outdoor spaces, organised according to specific activities and security requirements.

Conclusions: Climate-smart, secure mental health facilities should adopt a holistic design approach, integrating landscape and activity-based programming to support the therapeutic process with the aim of rehabilitating patients into society.

Red Fish Healing Centre for Mental Health and Addiction: BC's newest mental health and addictions hospital shifts away from institutional healthcare

The Red Fish Healing Centre is a standalone centre in North America dedicated to treating the concurrent disorders of mental health and addictions at the same time. Its design has created a culturally safe interiors space intended to promote rehabilitating patients back into their communities.

Inside the recently opened centre in Coquitlam, new approaches are being taken to try to help the most desperate British Columbians, those with both a crippling substance-use dependency and a serious mental illness. Despite the opening of this new 105-bed facility, though, more progress is needed to save lives: 1534 British Columbians were fatally poisoned by toxic drugs in the first nine months of 2021. Red Fish is leading change in its care philosophy by treating the whole person and providing care for mental health and substance-use issues simultaneously, while drawing on current research evidence and person-centred care models.

Residents stay up to nine months, longer than other treatment facilities, which gives time to understand the roots of their addictions, through conventional counselling as well as different therapies that can involve music, art and physical activities.

The facility's name was proposed by the Kwikwetlem First Nation, whose name in their traditional language means "red fish up the river", a reference to the sockeye salmon that once thrived in the Coquitlam River. The local Kwikwetlem First Nation also made contributions to the facility's design, including Indigenous murals and art in the interior spaces, the incorporation of a room for spiritual healing activities, and the erection of a "House Post" – the first to be raised in their traditional lands in over a century and carved from a 600-year-old tree.

The centre is divided into seven co-ed units, where residents are placed based on their stages of recovery, with a TV lounge, an eating area, and a room for family visits. Each unit has 15 private bedrooms, where none of the hooks or bars in the bathrooms can hold a ligature and none of the furniture can be used to break a window. Special patient windows can be opened without patients being able to harm themselves.



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How to transform behavioural healthcare facilities

In October 2021, the World Health Organization presented the new Atlas of Mental Health. This review of Atlas, which is updated every three years, shows little improvement in the provision of mental health services at a time when the Covid-19 pandemic is highlighting the growing need for mental health support.

At the same time, the Spanish Government presented the Mental Health and Covid-19 Action Plan for 2021 to 2024. The plan promotes specialised health training, raises awareness, fights against stigma, and targets prevention of addictive behaviours and promotion of emotional wellbeing.

Evidence-based design can follow a nine-point strategy to create a safe and therapeutic environment for behavioural healthcare:

- a non-institutionalised home environment that supports patient autonomy;
- provide a neatly ordered environment, allowing peace and tranquility;
- special care for acoustic comfort, with noise mitigation achieved by implementing sound-reducing surfaces;
- support for privacy without losing sight of safety, and enabling autonomy to carry out daily living activities, creating intimate spaces that can be used individually or collectively;
- natural light access and nature views benefit people's wellbeing;
- accessible outdoor space, designed as a protected space;
- creating a physically and emotionally safe environment;
- a place that stimulates social interaction, and favours encounters and communication between people; and
- use of positive distractions that have a direct effect on improving wellbeing and, therefore, speed of recovery.

This paper will present how these criteria have been applied in the new mental healthcare facility Hospital de Martorell of Hermanas Hospitalarias Foundation, a new building that was due to be finished in January 2022, as well as other examples of behavioural health projects, such as the refurbishment of Hospital de la Esperanza of Hermanas Hospitalarias Foundation and the refurbishment of the mental healthcare unit in Sant Pau Hospital of Barcelona.

Conclusions: Behavioural health architecture must include in the design process the purpose of facilitating productive exchange between patient and caregiver, community, or family. Mental healthcare design not only supports the therapeutic functions of care settings but also fights stigma and removes barriers to treatment.

The NOVELL Method

Healthcare facilities are some of the most complex and expensive buildings in the world. Over past decades, the Living Lab has emerged as a framework for bringing together complex groups of stakeholders to develop solutions to difficult challenges. But how we bring together these groups and stimulate deep engagement, while also delivering innovation and supporting evidence-based decision making, has been less clear.

Practical application: The Neuroscience Optimised Virtual Environments Living Lab (NOVELL) has developed a method that brings together processes from co-design, architecture, design science, and neuroscience to deliver evidence-based, end-user engaged innovation in healthcare design. The NOVELL Method is currently being deployed in the re-imagination and redesign of stroke rehabilitation environments, a particularly complex area of healthcare design. The project has successfully used distributed synchronous and asynchronous co-design processes, alongside traditional academic research processes, to bring together stroke survivors with lived experience of rehabilitation environments, researchers, architects and designers, and clinicians.

The NOVELL Method has facilitated the collaborative development and prioritisation of a series of design briefs that extend thinking beyond the status quo to establish a new best-practice standard for rehabilitation design. The briefs are then translated into virtual and/or physical prototypes that are tested and validated using rigorous experimental processes, delivering an evidence base upon which we can make better decisions about hospital design.

Outcomes: The NOVELL Method has shown that a Living Lab framework can bring together socially engaged co-design processes and evidence-based design practices to imagine, prototype, and test solutions to some of our most complex challenges. The multiple points of entry into the process, and the treatment of our collaborators as co-researchers, creates an equitable and accessible process that goes beyond standard engagement. The rigorous design science processes then help translate the ambitions from blue-sky thinking processes into insights that can be tested and actioned.

Implications: The NOVELL Method provides a strong theoretical and practical framework to solve the many complex challenges faced in healthcare design. By adopting this process, we can revolutionise the next generation of healthcare facilities.



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Neuroscience and architecture: A 12-factor matrix for healthcare design

This paper presents the concept for hospital design in which technology, architecture, neuroscience and art are brought together to create a place that takes care of patients and staff with a holistic approach. This method is based on research in various fields, starting from studies in neuroscience and environmental psychology, which provide architects with guidelines to design the architectural components with several aims: manage physiological regulations; prevent delirium; facilitate recovery for patients; reduce stress and errors; and enhance staff attention and performance.

Other studies provide the bases to regulate spatial perception, emotional regulation, and navigation in space. Application of this knowledge is useful to prevent neurological diseases and delay brain ageing.

The last theme is the arts as a therapy tool. Applying studies about neuro-aesthetics and the evidence that this method gave in the treatment of Alzheimer's, dementia, depression, and other neurological and behavioural disorders, can be a useful alternative to the overuse of drugs.

Practical application: These themes were categorised into a 12-factor matrix as design pillars, which were implemented in the architectural project. These are:

- 1. acoustics, stress and error reduction, performance enhancement; 2. light, neurotransmitters regulation, performance and delirium; 3. air, quality of the atmosphere and attention; 4. materials and health; 5. colours and physiological regulation;
- 6. spatial perception, emotional regulation and stress; 7. body movement and brain-derived neurotrophic factors; 8. spatial navigation, health of the hippocampus and degenerative diseases; 9. nature, stress reduction and chromosomes' telomere protection; 10. services for the staff, relax and performance; 11. orientation and pro-social dimension; and
- 12. art therapy: visual arts, music and cinema.

The design pillars were the bases for the competition design of a 192,600 sqm hospital in the city of Padova, Italy, which would host 960 beds.

Outcomes: This hospital project ceased at the design phase.

Implications: The next steps are the application to architectural projects and their scientific validity through experiments in virtual reality, psychological and neurophysiological tests, before and after the intervention, to measure their effects quantitatively.

Design in the face of the climate crisis: Planning A&E for high-performance flow and lean design to deliver maximum capacity in less space

Overbuilding and creating excessive space in A&E to deliver more capacity is the wrong path to take in the face of the climate crisis and the target of carbon-neutral design.

Creating new patient pathways that expedite flow, reduce length of stay, and create capacity through multiplying exam room capacity is the first step to a successful, lean design solution. Data mining, performance analytics, and simulation modelling can measure the impact of new emergency department workflow and quantify the multiplied room-turnover capacity of creative patient flow and staffing. Innovative architectural design concepts can be stress-tested through predictive modelling for future increases in patient volumes, ageing patients, and rising acuties.

This paper will document the methods, analytics tools, and architectural design concepts that have delivered more capacity in less space from around the globe, including lessons learned from the pandemic and how emergency departments are being planned to deliver care in "the new normal" that every hospital is facing.



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The impact of merging high-fidelity mock-ups with patient care simulated scenarios to optimise design of a new academic emergency department

One of the hallmarks of true lean-inspired healthcare design is the utilisation of mock-ups of clinical space prior to construction to optimise architectural design.

This is an iterative process and can incorporate high- or low-fidelity materials to demonstrate the design in three-dimensional space. It allows the end-users and architectural team to make adjustments to the planned space during the design process, as opposed to after final construction. While utilisation of mock-ups is an upfront financial investment, it can lead to substantial savings to the ultimate budget for the project by avoiding costly change orders.

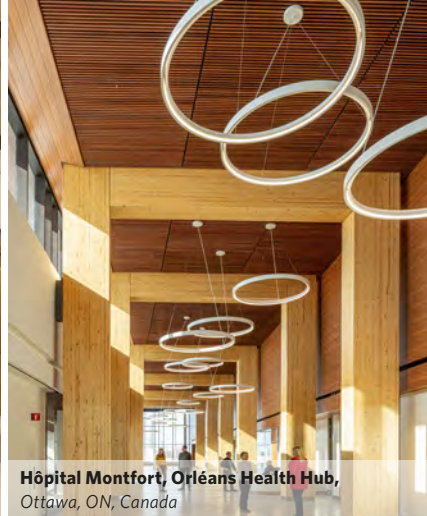
In this talk, we explore how a multidisciplinary team with expertise across all three pillars of architecture/design, process/operations optimisation and clinical medicine worked with a large US academic medical centre on a large-scale ED renovation. At the point of testing the design using full-scale, high-fidelity mock-ups, we chose to utilise a novel format of merging this validated tenet of evidence-based design with simulated clinical medicine. This allowed end-users to test real-life medical scenarios in the proposed space. A high-fidelity electronic human patient simulator was utilised to execute clinical scenarios in the mocked-up space with teams of end-user clinicians composed of physicians, nurses, paramedics, respiratory therapists, radiology technicians and trauma teams.

Outcomes presented in the discussion will include the magnified benefits of the novel concept of utilising traditional mock-ups while running common clinical scenarios that will ultimately be managed within the built space. This novel exercise led to substantial improvements to the design in the pre-construction phase, as well as creating consensus around multiple design elements and excitement for the project as a whole among the clinical end-users.

This endeavour was so beneficial in the eyes of the architects, clinical end-users, and hospital leadership that it has been proposed to become the preferred pathway to test novel clinical space designs into the future for other similar large-scale projects.



The Pavilion at the Hospital of the University of Pennsylvania,
Philadelphia, PA, USA



Hôpital Montfort, Orléans Health Hub,
Ottawa, ON, Canada



iKure, Baruaipur, West Bengal, India



**First Affiliated Hospital of Zhejiang University
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Westmead Hospital Redevelopment
Westmead, New South Wales, Australia



Waldkliniken Eisenburg, Eisenburg, Thüringen, Germany

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Leveraging modularity to solve a mental health crisis

US statistics estimate a quarter of the population will confront a mental health challenge every year. Of those, it's estimated that half will go undiagnosed and untreated. In the US alone, this equates to 49 million people. Further compounding the problem is social isolation, brought on by the pandemic.

Emergency departments (EDs) remain the overwhelmed gatekeepers – the first point of entry into the healthcare system for people in crisis. Data emerging from EDs in the US show skyrocketing rates of admission for those experiencing a mental health crisis. The average ED wait time for a referral is about ten hours but some patients could wait for days, even weeks, for transfers to the appropriate level of care.

We believe that the rapid deployment of standalone modular, prefabricated, crisis units can tip the scales and address this access and capacity issue for health systems around the globe. For every patient who can be transferred out of the ED into a dedicated modular crisis unit, up to three other patients could be seen and treated in the ED. Moreover, rapid regional deployment in a hub-and-spoke model can address rural healthcare disparities.

These units can be sourced turnkey in a third of the time it would otherwise take using conventional construction methods. Designed for incremental, organic growth, as the needs of the organisation evolve, the units retain and recover as much value as possible from resources by reusing, repairing, refurbishing, re-manufacturing, repurposing, or recycling products and materials. For many hospitals, this solution also presents an additional revenue opportunity via increased ED throughput. These benefits compound at community scale if we consider that for every patient in crisis, either the police or the paramedics spend an average of ten hours waiting with the patient in the ED. That time could be spent on saving lives in communities.

The biggest positive impact will be on patient experience. These modular units are designed to be a supportive and calm environment with access to sunlight and nature – attributes that can make all the difference for someone experiencing a mental health crisis.

Application of computational fluid dynamics simulation to hospital room design to simultaneously predict air quality, airborne pathogen infection risk, and energy efficiency

Air quality is crucial to the health, wellbeing and productivity of hospital building occupants, both patients and staff. The Covid-19 pandemic has exposed weaknesses of existing hospital buildings that have unfortunately often proven to be incapable to keep patients and workers safe.

In this paper, we demonstrate how state-of-the-art computer simulation techniques can be applied to architectural and HVAC system design for hospital buildings. Computational fluid dynamics (CFD) can accurately predict the air flow, heat transfer, and respiratory droplet dynamics in a three-dimensional space. Besides providing typical parameters for indoor air quality assessment, such as air changes per hour and mean age of air, data from simulations can be used to assess the risk of infection from a specific airborne pathogen. At the same time, simulations allow for evaluating and optimising the energy consumption associated with air ventilation, providing a powerful and flexible tool to design new hospital buildings or improve existing ones.

Several configurations and operating conditions for the mechanical ventilation system have been tested in a fully digital environment, allowing for an accurate and detailed comparison among different room design options and HVAC configurations.

The method has been applied to two test cases: an existing intensive care unit room from a Belgian hospital, for which an improvement of the ventilation system has been proposed; and a newly designed isolation room equipped with an advanced ventilation system according to the ASHRAE standard. The risk of infection has been evaluated based on the best available data for the SARS-CoV-2 virus with a method that can be easily extended to any airborne pathogen.

This study illustrates how the use of digital models based on three-dimensional engineering simulation can be integrated into the architectural design process to create safer, more comfortable and more sustainable hospital buildings.



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MASH Flights – Mobile Advanced Surgical Hospitals: A hybrid NGO

Global clinical and medical challenges are growing more specific, dire and time-critical. The pandemic has only exacerbated these issues, and potential solutions need a more focused and collaborative effort that brings help in a rapid and concentrated way. A consortium of organisations created the Mobile Advanced Surgical Hospital (MASH) flight, which would help provide medical care both on the ground as well as through air-based emergency response.

The aviation-based healthcare system would be optimised to provide patient care where it's needed the most – in remote and underserved areas around the globe. It would provide advanced, mobile surgical and ICU capabilities, as well as lab/diagnostic services, imaging, and patient-specific care services for the population it is serving. The model, which uses large commercial aircraft, has six surgical suites and more than 60 contained ICU beds, providing world-class critical care and surgical services for parts of the world with no access to such care.

The MASH Flights would have 100-per-cent supply-chain resilience, with all supplies needed produced within MASH facilities. This allows for at-cost or no-cost services, depending on to which country the aircrafts are deployed.

Implementing these flights could have a significant economic impact on any country in need. It would accelerate healthcare research and development; create jobs in myriad fields; bring in university and academic expertise; and foster corporate responsibility initiatives. MASH Flights will be a catalyst for growth: a research collaborator with academic and healthcare institutions; an employer to local communities; a synergistic partner with existing innovators; and a magnet for aligned companies.

Most critically, the MASH Flights would alleviate the strain and supply chain issues of providing healthcare for these remote and urban areas experiencing a public health or societal crisis, natural disasters, or other emergencies, and augmenting struggling critical support systems with advanced flexible infrastructure.



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Studios

Evidence-based design guidelines to support safe medication practices and workflows in the anaesthesia workspace

Anaesthesia providers (AN) experience numerous difficulties while performing critical medication tasks, due to poor ergonomics workspace, cluttered and crowded layouts, and limited space. It's important to improve the design of the anaesthesia workspace in the operating room to support safer medication practices.

Objectives: This study aimed to develop evidence-based guidelines to support the design of anaesthesia work environments that enable AN to conduct medication tasks safely.

Methods: This study involved an extensive literature review, and observation and coding of more than 30 pre-recorded videos of outpatient surgical procedures to identify key challenges experienced by anaesthesia providers while performing medication tasks. These guidelines, developed based on literature review and surgery observations, were vetted and refined.

Results: Anaesthesia providers are required to work in an ergonomically flawed workspace, conducting a range of medication-related tasks, including patient monitoring, documentation, medication preparation, and administration. Current standard anaesthesia workspaces force ANs to work with multiple bulky pieces of equipment with numerous connections from every direction, which require them to constantly rotate to cover different angles, causing disruptions and safety issues along with fatigue and musculoskeletal issues. ANs have insufficient available work surfaces for medication preparation tasks, increasing the chance of clutter, contamination and errors. Moreover, ANs are also challenged with other team members' movements into and through their workspace, causing distraction and contamination.

The observations and literature findings are channelled into seven evidence-based design guidelines, including: locate critical tasks within a dominant field of view; eliminate travel into and through the anaesthesia zone (for other staff); identify and demarcate a distinct anaesthesia zone with adequate space for the anaesthesia provider; optimise the ability to reposition/reconfigure the anaesthesia workspace; minimise institutional clutter; provide adequate and appropriately positioned surfaces for medication preparation and administration; and optimise task and surface lighting.



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Design considerations for the modern operating theatre: Supporting the implementation of medical video, audio and communication systems

This talk will explore how to design or upgrade an existing operating theatre to accommodate the latest transmission standards for medical devices, such as endoscopes, fluoroscopes, X-ray and CT scanners, including designing copper and fibre infrastructure to support the latest developments in medical video systems, remote connectivity, and audio-video streaming systems.

Objectives: The time lag between the developed design and delivery of systems as part of a completed project presents a particular problem with regard to medical video system integration. The rate of development for video standards and imaging systems can often outpace the construction or refurbishment works. This is especially the case where medical equipment forms part of the Group 4 package and is procured as the project is nearing completion. In this presentation, we will discuss the generally accepted standards for connectivity, future proposed standards, and the transmission infrastructure required to support the deployment of such diverse systems. We will discuss the use of fibre-optic cables, category cables and copper cables, including their respective benefits and limitations. The presentation will cover the dual delta wiring concept between the key medical components of lamp structure, medical services pendant, medical displays, and theatre control panel.

Methods: We will explore four key considerations:

- operating theatre video and audio connectivity design;
- design resilience and future proofing;
- practical considerations for interconnectivity; and
- infrastructure for streaming and remote learning.

A case exemplar will then be presented of the integrated endoscopy suite at St James's Hospital, Leeds, which allows observation of procedures from any of the three endoscopy theatres, two-way audio, recording and broadcast, from any location globally that has connectivity to the trust network.

Conclusions and findings: The provision of external connectivity from the operating theatre for education and observation purposes, what transmission methods are appropriate, and how they can be accommodated within both the base build and final system specification are discussed.

Workshop: Unlocking the potential of healthcare workspace design

Workspace design is focusing on understanding new ways of working and collaboration between knowledge workers, who are becoming increasingly agile, mobile and remote. It's recognised as key to talent attraction, retention, satisfaction, productivity, reduced sick leave, and workers' sense of belonging, connection, and health and wellbeing.

The Covid-19 pandemic has impacted on both frontstage (clinical spaces) and backstage workspaces (office spaces), leading to hybrid working models through to the increased use of digital platforms. Most attention has been on healthcare frontstage workspaces. However, backstage workspaces should be increasingly recognised as key to communication and teamwork among all healthcare professionals and administrators. Limited evidence exists about how design can best support holistic (front and backstage) workspaces in healthcare.

Purpose: With ongoing uncertainty and increasing demands, it's more important than ever to rethink, envision and unlock the potential of holistic healthcare team office workspace design. This workshop is targeted at: healthcare professionals; healthcare facility executives, managers, and professionals; healthcare building architects and workspace design consultants and design industry experts; and academics from architecture, design, psychology, and public health.

Methods: The workshop comprises interactive polls, presentations, and world cafe-style discussions focused on: Why do backstage workspaces matter? To what extent do backstage workspaces support clinical, managerial and administrative work? What holistic workspace designs can optimise workforce outcomes? How will digital spaces impact on hybrid workspaces in the future? What and whose needs should a holistic workspace design be meeting? And what does a successful holistic workspace design look like?

Results: All participants will receive a report that synthesises workshop discussions, in particular: 1) identifying holistic workspaces contextual factors, strategies and outcomes; 2) identifying key collaborators to research and unlock the potential of holistic workspace design; 3) informing a Delphi study to validate and refine workshop findings; 4) informing an incubator event on how to further unlock the potential of holistic healthcare workspace design; and informing a 'Why holistic (back and frontstage) workspaces matters?' webinar and e-bulletin.

Conclusions: Workshop discussions will have research implications (e.g., priority research questions and appropriate methods) and practice implications (e.g., building design evaluation and certification systems) for optimising environments and holistic workspace to support clinical and administrative service planning strategies.



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Aligning agile healthcare environments with progressive policy initiatives

Governments and care providers across leading health economies are wrestling with how to address the combined challenges of achieving zero carbon, digital healthcare transformation, and social outcomes in the planning of new healthcare environments, against the need for agile acute capacity and the demand for rapid diagnostics. This challenge on the development of climate-smart healthcare drives at the heart of future clinical models and design. A perfect storm of ambitious policy, new standards, and changing demand will alter the way we build healthcare assets forever.

Purpose: We'll share insight gained across global healthcare schemes on how solutions are impacting on healthcare developments and what this means in practice for all aspects of their development, from end users and patients through to capital cost and lifecycle impact. Focus areas will include:

- Pragmatic strategies to the zero-carbon journey that aligns with clinical design practice and future options. We explore detailed technology choices and fabric solutions, how they contribute to meeting new and evolving design standards, as well as meeting NHS net-zero targets considering both whole-life and embodied carbon.
- A wider perspective on how the evolution of new healthcare assets with embedded social outcome deliverables can drive community value through the circular economy and improve health outcomes at the same time, with measurable returns. And how we must evolve from social value to social outcomes and the requirements with regard to building healthcare assets and the types of potential solutions.
- Why agile healthcare environments have emerged from the pandemic as a key to future delivery solutions in changing healthcare, changing the way we view asset demand and influencing design from first principles. Here we bring together learnings on what agility really means for clinical leaders from a built environment perspective, to challenge existing thinking and traditional asset envelopes against a backdrop of value engineering.

Outcome: Shared learning and best practice from current schemes in these rapidly developing areas will assist programme and project leaders in approaching these challenges with a fresh perspective and an informed knowledge base.

Regenerative design and health impacts

A 2020 Fast Company Innovative Idea winner, the Regenerative Design Framework and associated design approach breaks existing design paradigms to reconnect humans and nature through continuously evolving social and ecological systems.

This reconnection requires an immediate reversal of the negative impacts associated with carbon emissions, environmental degradation, and social inequality. For decades, the design and construction field has implemented increasingly stringent “high performance” design practices to minimise those impacts. However, as climate change nears a tipping point with irreversible consequences, high-performance buildings are not enough.

A regenerative building must act as a “carbon bank”, a healing space, and a community resource to achieve net-positive impacts over its lifecycle.

A regenerative building achieves “climate positive” impacts – meaning buildings that go beyond achieving net-zero carbon emissions to actually create an environmental benefit by removing additional carbon dioxide from the atmosphere and various carbon cycles.

Regenerative design is not only about ecological impacts. It is keenly focused on net-positive impacts for both human health and social equity, especially as it relates to disadvantaged communities. Mental health therefore is a key component of the framework.

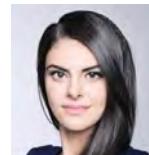
A regenerative building embraces the need to think about our developments not in the context of doing less harm but actually doing good. We recognise that our projects need to actively regenerate or contribute positive impacts to the people who use them and the local ecology that surrounds them.

This session will provide insight about putting the Regenerative Design Framework into practice with case studies and concrete metrics from multiple health projects around the world, including the United States, Germany and Canada.



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Developing a sustainable and contextual hospital model for the future: Two case studies from two different contexts in Belgium

Through two case studies, we'll demonstrate how future hospital models will offer customised care through a highly contextual approach to infrastructure design.

Method and objectives:

Case study 1: The new Joseph Bracops Hospital in the city centre of Brussels – a circular construction that produces a healthier environment through an adaptable structure, net zero-energy use, low-impact materials, and integrating public space on the ground floor.

Case Study 2: Restructuring of the Vivalia hospital network in rural Luxembourg – a new 'cornerstone' in this development, the new CHR Centre-Sud, centralises the operation of the hospital on a site that allows a scaling of volumes for each specific programme, while reducing energy use and promoting biodiversity.

For both case studies, we applied a holistic contextual approach by integrating an activity-based and a performance-based method in the design process. The Bracops hospital is redeveloped along a central axis that organises a clear distribution of activities, connected to both the open ground floor and vertical circulation for each separate unit. The hospital follows circular design principles, applying a closed-loop economic system with a regenerative approach aiming to eliminate waste, pollution, carbon emissions, and ensure continual use of resources.

The CHR Centre-Sud for the Vivalia hospital is located on a vast and open site, bordered by a river and a motorway. The connection to this motorway is essential for the regional hospital network, while the open site allows the future scaling of activities. Units on the site are each designed to house specific care activities. The performance of the building relies on natural, renewable energy sources that are integrated in the design of the building.

Conclusion: With activity-based and performance-based design methods, a drive for wellbeing and sustainability is achieved by a careful approach to the distribution of activities and energy from the masterplan phase onwards. The hospital of tomorrow is therefore a resilient infrastructure that allows for different programmes to evolve, adapting to the future needs of patients, staff, the neighbouring community, and a wider region.

New hospital models must accommodate these changes without harming the high quality in standards for the care services provided.

Project Maunga, Taranaki Base Hospital Renewal: Lessons from implementing New Zealand's first 5-Star Green Star hospital

Taranaki Base Hospital provides secondary services for the region, from a sprawling site on a ridge overlooking the coastal town of New Plymouth. The buildings are a mix of ages but the key clinical buildings were constructed between the 1960s and 1970s. They are at or beyond their useful working life – below structural strength, in poor physical condition, or in a configuration that doesn't suit the services delivered. This status repeats in most base hospitals in New Zealand, and Taranaki has the first business case approval to renew the site and provide lessons for subsequent renewal programmes.

The first stage of Project Maunga was completed in 2013, replacing the theatres and inpatient units, prior to the understanding of resilience from the Christchurch earthquakes or the commitment to carbon reduction by central government. The first stage also left several service issues unresolved. This paper will examine the planning for the renewal of the hospital and how this supported an improvement in service provision, resilience and sustainability for the buildings, and what might be taken forward in the regional hospital development programme. Key issues will include:

- renewing the masterplan for adjacency, compatibility with service plan, and staging for feasible project scale in a regional service centre;
- re-providing the clinical services in at-risk buildings and introducing new services to the site with facilities in line with guidelines;
- addressing cultural issues in the existing site for Tupapaku with improved provision for whanau and reflection of regional iwi and Tangata Whenua within the design;
- addressing the government target for structural strengthening and improving site and service resilience post-disaster in the wake of the Christchurch and Kaikoura earthquakes;
- leading the ministry in the feasibility of designing a higher-performance hospital aiming for 5-Star Green Star, pre-dating government commitment to reducing carbon; and
- utilising the new buildings to support upgrading of sustainable and resilience features of the existing stage-one building.

As the first project underway in New Zealand's regional hospital renewal programme, there are lessons to be drawn in each of these areas in developing a robust business case and designing sustainable improvements to our health infrastructure.



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Digital health and the sustainable hospital

This paper will consider the digital interventions in healthcare design and operation that will help transition to a more sustainable healthcare estate.

There is an established framework for reaching low-carbon embodied and operational energy: build nothing, build less and build clever; and build lean, build clean and build green. Digital interventions throughout the design and operations of the healthcare estate support these goals and targets to reach net zero.

Building nothing is the best way of not investing in increasing embodied or operational carbon. Using digital interventions to improve efficiency to eliminate or reduce the quantum of building can play a significant role. A great example is the use of improved theatre scheduling to increase capacity and reduce the requirement for additional physical theatre space, which has a significant impact on carbon.

Building less is achieved by optimisation of internal spaces, ensuring sufficient flexibility for adaptation while limiting initial capital carbon use. Using digital interventions, such as mass motion, optimised energy modelling, etc, to make spaces more efficient and resilient will help us construct smarter healthcare buildings.

Building clever includes taking a more digital approach to material selection, considering not only the materials themselves but also the transport to sites, time and carbon used to construct them. Minimising waste during construction stems from the use of modern methods of construction (MMC). Linking the building design to optimisation studies, programme and cost analysis using integrated BIM systems, etc, can all help reduce the uncertainty of construction. It's important to provide healthcare buildings that are actively monitored, regulated and corrected without significant human intervention. Digital interventions to improve patient experience can have the added benefit of using less energy.

Being lean is about avoiding using energy at all. Using advanced solar, thermal and energy modelling, we should not be optimising the massing, form and orientation of buildings to reduce reliance on building services equipment to achieve thermal comfort.

Building clean and green relates to how we monitor, evaluate and react to smarter healthcare buildings in future, using data to make decisions about operation.

Fast response – long-term value

Sant Joan Primary Care Centre (CAP Sant Joan) is in the centre of Barcelona's Example city quarter. The area is targeted for regeneration, with plans for a new primary care centre (CAP) to be built a couple of streets away.

When Covid-19 struck, the Catalan national health system, CATSALUT, devised a rapid-response plan to strengthen its primary care network and extend its services for its 7.7m residents, with new temporary facilities ranging from 300m² to 4800m².

As part of that plan, CAP Sant Joan is a small 360m² extension to an existing CAP on the opposite side of the street, located on public ground in the centre of a building block. The approach to delivering this facility has had an impact wider than its original intention.

The brief presented significant design and build challenges: the need for rapid delivery, no access for construction equipment, and a location on public ground. By law, public ground occupation cannot last more than five years. Modular design and build was the only solution to meet the brief, site constraints, and deliver a high-quality sustainable primary care centre, designed in alignment with evidence-based design principles and high sustainability / circular economy credentials. The facility was designed and fabricated in 11 fully equipped units, built in a warehouse 20km away, assembled/connected on site within 36 hours, and fully operational in under four weeks from module delivery on site.

Success was founded on close partnering with contractor COMSA Service and the decision to design and fabricate fully equipped units to ensure fast-track completion. In light of the cost-effective, sustainable and rapid delivery of such temporary environments, combined with positive feedback from clinicians, staff and patients, CATSALUT has amended its development strategy, favouring extensions delivered by modern methods of construction over traditional new-build projects.

Delegates will hear how a fast-response small intervention supported an emergency clinical-service planning strategy, how it's serving the needs of one community and potentially another in the future, and how it helped shape the strategy for the rollout of the regional health authority's 'Plan for Strengthening and Transforming Primary and Community Care'.



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From organisational estate strategies to system-wide infrastructure strategies: Changing how we think about capital investment

Delivering high-quality patient care requires an integrated approach to infrastructure, incorporating buildings, equipment, plant and digital technology into a single, environmentally sustainable strategy.

New ways of working create the need to go beyond thinking about facilities to thinking about buildings, equipment and digital technology as a combined asset. A move towards systemic health and care models means that all forms of healthcare infrastructure need to be planned (and funded) on a system basis. The concept of the 'smart hospital' must be extended to all healthcare facilities in the system.

Environmental sustainability targets and net-zero carbon (NZC) commitments need a system-wide approach if they are to be achieved. NZC targets necessitate an infrastructure-based approach. There are some signs of change in England:

- the DHSC Health Infrastructure Plan (2019) recognised that "health infrastructure is more than just 'bricks and mortar'";
- the pandemic has emphasised the need to consider resilience in all aspects of infrastructure; and
- new legislation will give NHS England the power to set capital limits for individual organisations to ensure they work together to invest in local healthcare infrastructure.

However, some key challenges remain:

- central guidance on healthcare estate planning is outdated;
- the Government's focus in the last two years has been the development of new hospitals, with little emphasis on investment in other parts of the system, such as primary care;
- healthcare providers have faced pressure to reduce investment in digital technology and measures to achieve NZC; and
- although some integrated care systems have integrated strategies for buildings, technology and sustainability into a single integrated strategy, this is currently the exception.

Investment is currently looked at the wrong way round. Although business cases are required to demonstrate that estate proposals align with clinical, workforce, digital, equipment and sustainability strategies, in reality, the process often leads to these being considered in isolation or as an afterthought. System-wide service models logically lead to the need for system-wide assets and system-wide capital investment, creating the imperative to move away from organisational healthcare estate strategies towards system-wide healthcare infrastructure strategies.

Solving the key worker housing crisis

The challenge: Providing key workers with a standard of living that fairly reflects their contribution while managing public-sector cost.

The solution: Using surplus NHS land to create long-term sustainable key worker communities at affordable prices, which enhance the health and wellbeing of those who live there while supporting the hospital at their core.

What is needed to succeed?

- Vision to align operational strategy with the development of surplus land asset.
- Expertise and a toolkit to support organisations in defining the vision, selecting, and negotiating with a development partner.
- Development finance underpinned by reduced risk and construction at pace and scale.
- Long-term investment vehicle for annuity capital with supporting lease arrangements.
- Removal of roadblocks: public-sector budgeting rules focused on annual fire sale; public-sector procurement focused on monetary 'best consideration'; and enabling works solutions.

Historic landed estates have preserved and actively managed their land for generations, creating and curating attractive communities, both urban and rural. They recycle and reuse land and buildings to support their long-term strategic goals, investing in infrastructure, open spaces, and the things that make life better. There is an opportunity to do the same for the NHS by creating long-term sustainable integrated communities that house key workers and complement the organisations that employ them.

Creating attractive communities that can support staff retention, reducing costs and improving performance, requires not only houses but homes, and opportunities for social interaction, exercise, play, and local shopping are all part of diverse intergenerational communities.

A long-lease approach provides a means of developing using private capital while retaining long-term control for future generations. The soft and hard infrastructure that can support community – including car clubs, local walking routes, social hubs providing co-working/coffee/click and collect/pub, gardening clubs, toddler groups, and more – can be designed to integrate new and existing communities, as well as hospital staff, patients, volunteers and visitors. An integrated approach provides an opportunity to fully utilise infrastructure assets, with lecture theatres and meeting rooms used by the community in the evenings; and coffee shops, play areas, and local shops by visitors, patients and staff during the day.



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Managing principal,
Perkins & Will



Sarah Hordern (UK)

Director, Perspicio



Arthur Kay (UK)

Founder and chief executive,
Skyroom; Board of
Commissioners for the Key
Worker Homes Fund

Housing and healthcare: Signals of change for key workers' quality of life

Skyroom's Key Worker Homes Fund is a programme that aims to address the housing shortage in the English capital by delivering sustainable, affordable homes in the city's airspace, thereby enabling key staff such as healthcare workers to live near their place of work.

The £100 million Fund offers local authorities and housing associations technical expertise and capital to deliver airspace developments above buildings in their portfolio. It was launched in March last year to help landowners achieve ambitious housing delivery targets, using sites they already own.

More than 40 sites were submitted to the Fund's Board of Commissioners for consideration. The commissioners – which include Professor Sadie Morgan, founder of dRMM architects, Sir Steve Bullock, chair of the Housing and Finance Institute, and racial justice campaigner Baroness Doreen Lawrence – selected the most impactful developments, based on criteria such as the number of new homes that can be delivered, their affordability, and the benefits to existing residents and local communities. The successful schemes comprise a five-storey residential building in Lambeth, and several low-rise residential buildings in an estate in Waltham Forest.

Early-stage designs indicate that more than 111 new homes could be delivered across the two sites: 23 in Lambeth and 88 in Waltham Forest. Responding to a shortage of family-sized homes, both proposals include a mix of one-, two- and three-bed flats. At least half of new homes would be affordable and allocated to key workers as a priority group. Twenty-three per cent of working residents in Lambeth and 32 per cent in Waltham Forest fall into this category.

The proposed airspace developments fast-track essential maintenance work, allowing the building owners to re-invest the savings back into housing delivery. A retrofit programme to better insulate the existing buildings improves their energy efficiency and the living environment for existing residents. Interventions on a larger scale considered in early-stage designs include new lifts to make upper storeys accessible for buggy or wheelchair users, solar panels and heat pumps to reduce dependence on the gas grid, and shared gardens both at ground level and on the rooftops.

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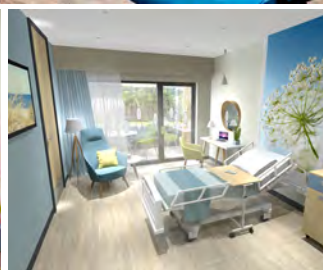
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Workshop leaders



Louisa Williams (UK)
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Martin Jones (UK)
Director and artist,
Art in Site



Peter Shenai (UK)
Creative strategist,
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Lottie McCarthy (UK)
Designer, Art in Site

Michelle Charles (UK)
Artist, Art in Site

Celia Knox (UK)
Designer, Art in Site

Scott Leslie (UK)
Project manager, Art in Site

All-day art and design studio

**Monday 13 June – Tuesday 14 June,
Platt Room and garden**

10.15–17.00

(Lunch/refreshments provided during networking breaks)

The Art Room: Using arts engagement to unlock design imaginations

Time for a mental break from the conference? Come join the Art in Site team during the Congress and get physical and creative in the Art Room.

Art in Site leads a series of workshops, mini-discussions, and an interactive installation – focusing on the role of arts engagement activities in healthcare. Together, Art in Site and EHD delegates will explore how community art workshops and co-design can bring fresh energy, enthusiasm, and new ideas to teams driving healthcare design and art of the future.

Drop in, chat, make, and re-imagine with the team. No former experience or “art expertise” required – just bring an open mind. And if the weather allows, the group may spill out into the garden, making the most of the Royal College’s beautiful outdoor surroundings.

The Art Room will showcase new techniques, workshop formats, and innovations in accessibility – helping to share and pool knowledge in best practice in arts engagement and design around the world. There will be a look at creative approaches to engagement that help transform barriers into creative opportunities: from non-verbal workshops with dementia patients, to dealing with the “politics” of colour choices, through to digital methods of interacting with a distributed community. No matter which area of healthcare you work in, there will be something relevant for everyone.

Arts engagement is a vital tool for design: it can solve wider problems, re-energise groups, strengthen new partnerships, enable creative input, and awaken bigger ambitions and imagination. Recommendations will be given on the when, how, who, what and why of arts engagement, drawing on Art in Site’s recent experience and insights from working with NHS trusts, including Great Ormond Street, Guy’s & St Thomas’, Leeds Teaching Hospitals, and beyond.



Monday 13 June

All day: Re-experience: with artist Michelle Charles, a series of workshops, talks, and drop-in sessions exploring how we renew the way we see, including:

Drop-in all day: Social drawing

08.30-08.35: Walking meditation

10.20-10.45: Walking meditation and presentation on perception

13.00-14.00: Re-imagine: An informal workshop to re-imagine a hospital in an hour, using a cocktail of drawing, auto-writing, collage, and sculpture

15.45-16.00: Walking meditation and drawing exercises



Tuesday 14 June

13.00: Re-engage: Looking beyond the hospital, what can we learn about engagement from the worlds of social action, participatory arts, non-hierarchical pedagogy, and liberating structures?

Throughout

All day: Re-construction: We are constructing an immersive space inspired by your workshop ideas, taking them from 2D to 3D. Join to chat, make, or explore.

All day: Social drawing: Connect and network over some informal drawing exercises.



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Lunchtime design workshop

**Monday 13 June, Council Chamber
12.40–13.55**

Blurring the boundaries of healthcare

There is a greater acknowledgement that we need to blur the boundaries across our social infrastructure if we are to create environments that are socially and economically sustainable, create environments that address health and social inequality, and create environments in which everyone can start well, live well and age well.

Unequal access to basic resources necessary for health – such as good housing, education, connectivity, healthy food, and employment opportunities – can lead to social isolation and exclusion, both of which have been found to influence health. A perception of being treated unfairly can undermine trust in others and in institutions, and the capacity to form the social connections important for good mental health.

This workshop will look at opportunities to blur the boundaries between healthcare, education, housing and economic regeneration. It will consider community, connectivity, local economies, housing choice, and how a more holistic approach to wellness can shape our approach to the design and delivery of healthcare.

Workshop leaders



Paul Bell (UK)
Partner,
Ryder Architecture



Beatrice Fraenkel (UK)
Chair, Mersey Care NHS
Foundation Trust



Donna Hall (UK)
Professor, Chair, New
Local; Chair, Bolton NHS
Foundation Trust; and
PossAbilities; Honorary
professor of politics,
University of Manchester

Miriam Duffy (UK)
Programme director,
National Rehabilitation
Centre

Natalie Firminger (UK)
Hospital design
and development
director, Whipps Cross
Redevelopment, Barts
Health NHS Trust; Special
advisor, New Hospital
Programme

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Breakfast planning workshop

Tuesday 14 June, Council Chamber

07.30–08.45

Reinventing planning in healthcare

This workshop will address the benefits of strategic planning for major capital investment in health infrastructure. Tackling Covid has led to significant government intervention in the planning, investment and operation of health systems around the world, even where there is a predominantly market approach to healthcare delivery. It is now recognised that major investment decisions in healthcare require high-quality data to inform investment decisions and that such decisions could be better made through a 'planned' approach to healthcare rather than a market or 'quasi-market' approach.

The workshop will debate whether this is the case and that this accelerated trend will mean the end of commissioning and purchasing or insurance-led approaches to funding healthcare with a move to more strategic planning. It will explore what this means for major capital and health infrastructure investment and what data and information are necessary in order to make informed and rational planning decisions.

The debate will also focus on what an effective planning framework should look like and what the implications are for investment cases, business cases and funding models, such as PPP. Finally, the workshop will bring an international dimension and address whether existing health infrastructure plans in the UK, Canada, Australia and Ireland would look very different if such a planning approach were taken.

Workshop leaders



Richard Darch (UK)
Chief executive, Archus



Mark Kane (Ireland)
Assistant head of estates,
HSE, HSE Republic of
Ireland



Rita Mezei (Canada)
Executive director,
Canadian Centre for
Healthcare Facilities



Nigel Edwards (UK)
Chief executive officer,
Nuffield Trust



Malcolm Lowe-Lauri (UK)
Head of public
healthcare,
Grant Thornton

Creating therapeutic environments
that promote wellbeing & recovery



Medical
Architecture

www.medicalarchitecture.com

Lunchtime design workshop

Tuesday 14 June, Council Chamber

12.40–13.55

How can integrated care be more than the sum of its parts?

The UK health system is focused on episodic treatment and care – its infrastructure, hospitals and clinics reflect that purpose. However, in the UK and around the world, health systems are creaking and even collapsing under the weight of the demand as populations age. Many of the challenges faced by older people of frailty and complex morbidities are, however, driven by factors in the community that are not regulated and managed through the health system. These include: environmental health; poor and overcrowded housing; social deprivation and isolation; and unhealthy consumption patterns and lifestyles.

Can new models of care, where health services are distributed in and across the community, be better suited to these inherent needs, make much better use of limited financial and workforce resources, and be sustainable and adaptable over the long run? If so, what kind of services and buildings do we need to plan to support these changes?

This workshop looks at the tensions within health service delivery, public health, and city and community planning, exploring where opportunities might lie. Could multi-sector and community-based facilities play a greater role in integrated care systems? Our panel will look at scenarios and debate how these tensions might generate progressive ideas and possible alternatives to the norms.

Workshop leaders



Christopher Shaw (UK)
Consultant,
Medical Architecture



Stephanie Williamson (UK)
Co-chair,
Architects for Health



John Kelly (UK)
Director,
Lexica (formerly ETL)



Martin Rooney (UK)
Delivery director,
New Hospital
Programme,
NHS England



Jaime Bishop (UK)
Director, Fleet Architects;
Co-chair, Architects for
Health



Lianne Knotts (UK)
Director,
Medical Architecture

Thoughtful design for Sustained Health



RSUA

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of Ulster Architects

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HLM
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Contact Melanie Jacobsen Cox,
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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, publications and broadcasting:

SALUS TV: This is a new resource to complement our congresses, disseminate knowledge and content, and make the virtual experience even richer and more entertaining. Our vision is to stream live and 'on demand' content to a global audience 24/7, featuring people, organisations, innovations and projects designed to deliver better healthcare, and improving human and planetary health by design.

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 over 5000 articles and abridged research papers and 2000 hours of video talks and posters in the field, collaborating with a global network of professional, academic and government organisations.

Healthy City Design International Congress: Launched in 2017, the Congress brings together leading researchers, practitioners and policy thinkers from across the fields of urban health and sustainable development/planetary health. In 2020 and 2021, owing to the pandemic, the Congress was broadcast online with 400 attendees over four days.

European Healthcare Design Congress: Launched in 2015, the Congress brings together interdisciplinary researchers and practitioners from the fields of health system and service design, technology and infrastructure. In 2020 and 2021, owing to the pandemic, the Congress was broadcast online to 1000+ participants from around 40 countries.

Health is made at home: In 2020, in a joint venture with Lord Nigel Crisp, former CEO of the NHS (2000-2006), SALUS published 'Health is made at home, hospitals are for repairs' and broadcast a webinar series titled, 'Building a healthy and health-creating society', designed to promote 'health creation' in society. See www.healthismadeathome.uk

Research advisory: SALUS is in the early stages of growing an independent research advisory arm, and last year it was commissioned by Dorsay Developments Corporation to produce a 'Guiding principles' document to support the development of Veraine, a planned new healthy community, in Pickering, Canada.



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Architects for Health

Architects for Health has been a forum for sharing best practice, knowledge, innovation and thought leadership in the healthcare built environment since 1992.

Started by a collaboration of passionate healthcare architects, including Raymond Moss, Howard Goodman, Roger Dixon and Ann Noble, we give members the opportunity to share thoughts and learning as part of a vibrant and engaged healthcare community.

Today our membership is open to all who share our aims, not just architects. Our work reaches across the UK and internationally: we are a world leader in promoting healthcare design and proudly partner with the SALUS Global Knowledge Exchange to present the European Healthcare Design Congress.

Our annual programme promotes better understanding of current and emerging issues in health planning and design.

In our 30th year, we launched the AfH Knowledge Exchange – a virtual ‘centre of excellence’ for healthcare design, which bridges the gap between academia, professional practice and the NHS.

Our aim is to inspire, challenge and guide the next generation of healthcare designers, through a range of activities including the Student Design Awards (for students of architecture and interior architecture) and the Ann Noble Research Award, focusing on postgraduate research and theory.

Join us at: architectsforhealth.com/membership/

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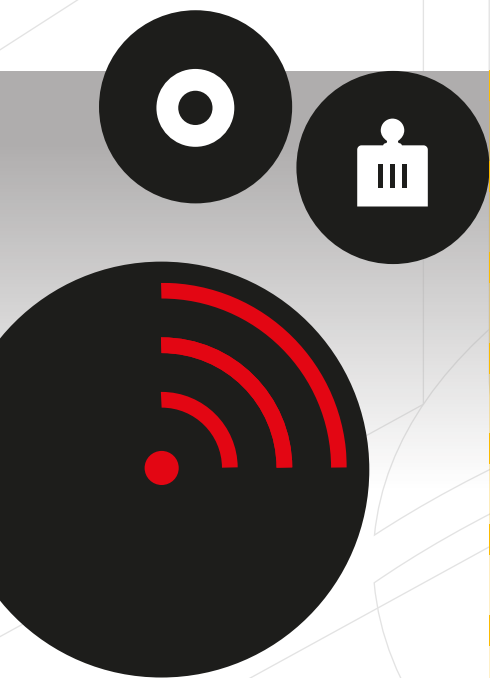


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Contact:
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Development director
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Alder Hey Children's NHS Foundation Trust

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:
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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:
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Executive director

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Canadian Centre for Healthcare Facilities

Canadian Centre for Healthcare Facilities (CCHF) is a national, not-for-profit association. CCHF's goal is to help the healthcare facility sector achieve higher-quality, more patient-focused and lower-cost healthcare environments. CCHF will do this by:

- bringing together cross-disciplinary stakeholders in discussion forums and events (healthcare facilities administrators, clinical experts, researchers, engineers, architects, designers, construction managers) to share ideas and to network to improve business
- canvassing leading-edge developments, such as evidence-based design, design methodologies such as lean, and patient experience; and
- building knowledge networks through research, case studies and expert input, developing discussion papers with the CCHF network.




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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.



Contact:
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Director of place

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Design Council

The Design Council champions great design: design that improves lives and makes things better, improving our built environment and tackling complex social issues.

As an enterprising charity, our work places design at the heart of creating value by stimulating innovation in business and public services. We inspire new design thinking, encourage public debate, and inform government policy to improve everyday life and help meet tomorrow's challenges today.



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Design in Mental Health Network

Design in Mental Health Network (DiMHN) is a not-for-profit, social enterprise company with charitable aims and is open to anyone with an interest in the design of mental health facilities – from architects to nursing staff, from building contractors to service users.

We're driven by one critical fact: design matters. It isn't a 'nice to have' or an optional extra but it's vital to the wellbeing of everyone who works in or uses the services of the mental health sector. We're learning from everyone and improving safety and patient outcomes. If you're keen to contribute, please join our network – it will be stronger for your input.



**European
Health
Property
Network**

Contact:
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Executive director

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European Health Property Network

The European Health Property Network (EuHPN) 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 and guidance authorities, finance and procurement specialists, senior clinicians, hospital directors, and health system planners. We collaborate with a range of networks and organisations across Europe and beyond.



NHS
**Great Ormond Street
Hospital for Children**
NHS Foundation Trust

Contact:
Crispin Walkling-Lea
Head of healthcare planning

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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. Together 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.

Guy's and St Thomas' NHS
NHS Foundation Trust



Contact:
Eve Edelstein PhD, M.Arch
Director of design quality,
Essentia Group

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Guy's and St Thomas' NHS Foundation Trust

Essentia designs, builds and maintains healthcare infrastructure, and is a vital part of Guy's and St Thomas' NHS Foundation Trust. We combine high standards and 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 eight 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:
Richard Darch
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Healthcare Planning Academy

The Healthcare Planning Academy is a membership organisation for healthcare planning professionals that aims to continuously improve standards and knowledge, and to provide entrants and practitioners within the discipline with a professional development resource and an industry-wide framework of recognised accreditation. The Academy helps members 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 Healthcare Planning 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 to the discipline. To express an interest in joining please email.



Contact:
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Helen Hamlyn Centre for Design

The Helen Hamlyn Centre for Design in London is the Royal College of Art's largest and longest-running centre for design research, and an international leader in people-centred and inclusive design.

Founded in 1991 and endowed by the Helen Hamlyn Trust, our purpose is to conduct design research and projects with industry that will contribute to improving people's lives. Our interdisciplinary approach is based around the activities of three research labs – Age & Ability, Work & City and Healthcare. 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. Our expertise in healthcare has extended from design policy and information to the development of systems, services and products.



Contact:
Matthew Tulley
Redevelopment director

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Imperial College Healthcare NHS Trust

Imperial College Healthcare is the sixth largest trust in the NHS and London's largest teaching hospital. It provides care for 2.4 million 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 is part of the UK's first new academic health science centre (AHSC). The Trust is also part of National Institute for Health Research (NIHR) and the NIHR Health Informatics Collaborative.

The Trust submitted its strategic outline case for the redevelopment of St Mary's Hospital in Paddington in September, making the case for state-of-the-art clinical facilities for adults and children with a total of 840 beds, plus dedicated research, education and innovation spaces.

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Contact:
Nikki Nagler
Head of communications
W: www.moorfields.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. We have a reputation, developed over two centuries, for providing the highest quality of ophthalmic care.

Treating patients 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 that require treatment not available elsewhere in the UK. 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 are a national and international centre for research into eye conditions and treatments, leading one of the most extensive ophthalmic research programmes in the world.

Our experts provide teaching and training for a wide range of eye health professionals, including clinicians from around the world who come to learn from us.



North Bristol
NHS Trust

Contact:
Tricia Down
Associate director, strategic
estate development and
sustainable health
W: www.nbt.nhs.uk

North Bristol NHS Trust

North Bristol NHS Trust employs more than 12,000 staff and provides healthcare for the residents of Bristol, South Gloucestershire and North Somerset from our award-winning hospital building at Southmead and other sites in the Bristol area.

We are the regional major trauma centre and an internationally recognised centre of excellence in a range of services and major specialities.

Our Brunel PFI hospital development has set the standard for high-quality design focused on creating the best possible internal environments and biodiverse green spaces for health and wellbeing.



Contact:
Marte Lauvsnes
Project and development
hospital planning manager
W: www.sykehusbygg.no

Sykehusbygg

Sykehusbygg (Norwegian Hospital Construction Agency) was founded in November 2014. It is owned by Norway's four regional health authorities, which, in turn, derive their funding from the Norwegian Ministry of Health.

The aim of the agency is to ensure national know-how for hospital planning, design, engineering and construction at the highest international level. Sykehusbygg seeks to facilitate and contribute to progressive hospital development projects through innovation, experience, standardisation, project management and best practices.

Sykehusbygg looks to ensure that experience from management and operation of hospital property is taken into account in new hospital development projects. The agency must be used by all major Norwegian hospital development projects (over NOK 500 million).



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Contact:
Ray Pentecost
Director
W: www.uia-phg.org

UIA-PHG

The UIA-PHG is one of the working bodies of the UIA, the Union International des Architects or International Union of Architects. It was founded in 1955 and represents members and guests from all continents.

It is the vision of the UIA-PHG that world public health can profit by the dedication of architects to provide efficient, safe and aesthetic healthcare buildings and an environment that can contribute to a more rapid healing of patients, as well as an improvement in staff operations and satisfaction.

To accomplish this vision, the UIA-PHG seeks to share its knowledge and experience not only within the group but also with other architects, engineers and consultants, healthcare managers and providers, healthcare organisations and governments, as well as the general public. It should also initiate research projects that contribute to better healthcare buildings and environments.



Contact:
David Powell
Project director – New Velindre
Cancer Centre
W: velindre.nhs.wales

Velindre University NHS Trust

Velindre University NHS Trust provide specialist cancer and blood services across South and Mid Wales through Velindre Cancer Centre and the Welsh Blood Service. Delivering quality, care and excellence to our patients and donors is at the heart of our organisation.

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, ensuring our outdoor space is calming, encourages improved biodiversity, and gives back to the environment and community.



Contact:
Duane Passman
Acute redevelopment
programme director

W: www.westhertshospitals.nhs.uk/about/contact.asp

West Hertfordshire Hospitals NHS Trust

West Hertfordshire Hospitals NHS Trust provides acute healthcare services for a core catchment population living in west Hertfordshire and the surrounding area. Services are run over three sites: Watford General Hospital, St Albans City Hospital and Hemel Hempstead Hospital.

Watford General Hospital is at the heart of the Trust's acute emergency services – the core location for inpatient emergency care, and for all patients who need specialist emergency facilities. St Albans City Hospital is the Trust's elective care centre, providing a wide range of both elective care and outpatient and diagnostic services. Hemel Hempstead Hospital offers other local healthcare facilities such as diagnostic services, including MRI and cold pathology, as well as an outpatient service that sees in excess of 100,000 patients per year.

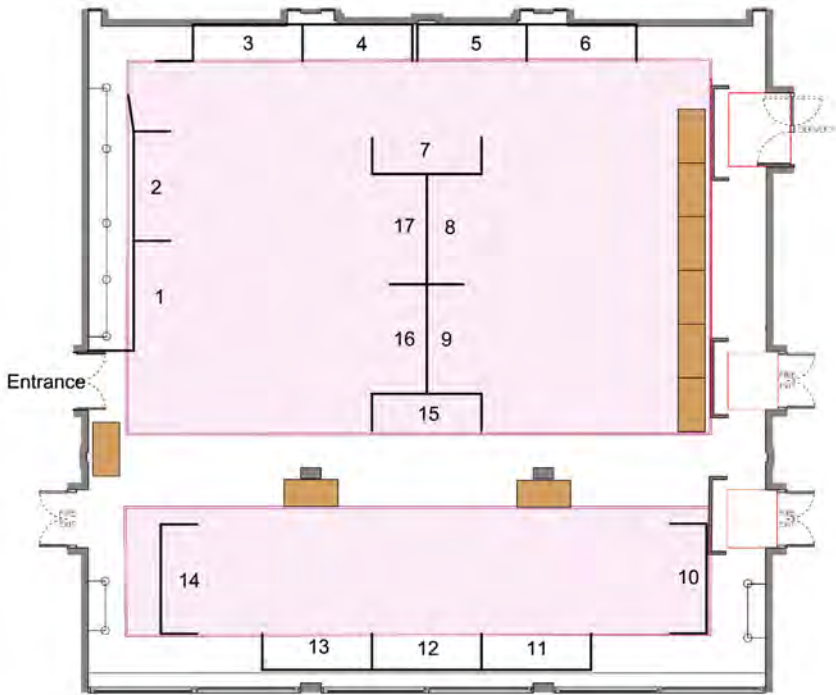
OPENING TIMES:

Monday 13 June 10.00-17.00

Monday 13 June 18.00-20.30

Tuesday 14 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 13 June.



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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. G. 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. Iverswood, 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.00.1.GB.1.AHG <https://www.arjo.com/int/products/safe-patient-handling/ceiling-lift/maxi-sky-2/>

AECOM

Contact:
Richard Mann
Healthcare and science leader,
UK and Ireland

W: www.aecom.com



**SILVER KNOWLEDGE
LEADER**

AECOM

Consistently ranked as one of the world's leading healthcare and science advisors, our professionals are sought after to provide services for leading organisations. Drawing on the expertise of our teams around the world, the vision of our healthcare practice is to create environments and systems that are people-centred and focused on improving health outcomes. We work with clients and their 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 and sustainable planning, design, construction and operations management services allows us to add value as our clients adapt to new frontiers of healthcare delivery.

archipelago

Contact:
Coen van den Wijngaert
Acquisition and business
development; Executive partner

W: archipelago.be/en/



**CATEGORY AWARDS
PARTNER**

archipelago

Based in Brussels and Leuven, Belgium, archipelago creates contextual and sustainable architecture to better live, care, work and learn – offering a holistic vision for complex and challenging projects, among other large-scale hospital projects. We bring life to your projects with a unique and sensitive methodical approach supported by research and innovation, a touch of ingenuity, and the collective expertise of an inspired and committed team.

Our 150-strong team of architects, engineers, urban planners, designers and experts create peaceful environments that reduce stress, encourage mobility and promote healing. We combine innovative approaches with solid experience to provide welcoming, functional and scalable healthcare spaces.

Archus

The healthcare infrastructure specialist

Contact:
Jo Hall
Head of business development,
marketing and communications

W: www.archus.uk.com



GOLD DESIGN LEADER

Archus

Archus is a team of experts who advise on and deliver healthcare infrastructure projects. We are specialists whose sole focus is delivering the future of healthcare – and we have vast experience in this area.

We work across the UK and internationally, tackling big-picture strategy as well as detailed delivery. Our end-to-end advice brings clarity to any healthcare project – and we've already delivered more than 500 healthcare projects in the UK alone.

Our team includes more than 90 health planners, clinicians, project managers, strategic advisors, and technical specialists. We develop strategies for future service delivery and to implement changes to health systems, bringing understanding of both digitisation and sustainability while focusing on improving patient, visitor and staff experiences.



Contact:

Malcolm Harvey, Project manager
Simon Saulis, Sales manager

W: www.arjo.co.uk

 EXHIBITION PARTNER

Arjo UK

At Arjo, we are committed to improving the everyday lives of people affected by reduced mobility and age-related health challenges.

With products and solutions that ensure ergonomic patient handling, personal hygiene, disinfection, diagnostics, and the effective prevention of pressure ulcers and venous thromboembolism, we help professionals across care environments to continually raise the standard of safe and dignified care. Everything we do, we do with people in mind.

Art in Site

Contact:

Peter Shenai
Creative strategist

W: www.artinsite.co.uk

 SILVER KNOWLEDGE
LEADER

Art in Site

Art in Site is an award-winning studio founded in 2003, led by directors Louisa Williams and Martin Jones. We produce integrated art, interior design, and wayfinding for healthcare environments.

"Their approach is exemplary in its focus on user needs, its thoughtfulness in design, its high graphical and artistic standards, and in the practicality of its delivery," says Sunand Prasad PPRIBA, senior partner at Penoyre & Prasad. "The positive response from users is the best testament to its quality."

Recent projects include apps for children to relieve fear and anxiety at A&E; sculptures and illustrations that bring wellbeing benefits to mental health inpatients; and a suite of artworks offering reassurance, dignity, and better orientation for cancer patients receiving treatment.



Contact:

Paul Grainger
Director of UK sales, east

W: www.brandon-medical.com

 EXHIBITION PARTNER

Brandon Medical

Brandon Medical is a UK company that delivers smart turnkey equipment for acute and primary healthcare worldwide.

For 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.



European Healthcare Design 2022

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CALLISONRTKL

Contact:
Beau Herr
Principal, healthcare

W: www.callisonrtkl.com

 **CATEGORY AWARDS
PARTNER**

CallisonRTKL

Around the world, evolving populations are demanding healthcare that is responsive, accessible and smart, so the pressure is on to lower costs, increase efficiency and improve experiences. To meet these emerging needs, we work with our clients on each project to understand the relationship between buildings, the users inside, and the world around them to design future-proof spaces that are planet positive. Complex problems don't always yield architectural solutions, and to fully grasp our clients' needs and equip them with the right information to make the best decisions, we bring together perspectives, ideas and data-driven research from across our practice.

Our passion lies in designing healthy places for a healthy planet. To improve the health and wellbeing of our communities, we capitalise on the diversity of our practice and push ideas upstream to where life actually happens.



Contact:
Tina Nolan
Managing director

W: www.lexica.co.uk

 **GOLD DESIGN LEADER**

Lexica

Lexica is the new name of ETL, and it better describes who we are and our purpose – a leading specialist health and life sciences consultancy.

A wholly owned subsidiary of Guy's and St Thomas' NHS Foundation Trust, Lexica supports health and life sciences organisations in the UK and internationally with the planning, delivery and continuous improvement of their services now and into the future. Lexica's services include: healthcare strategy and planning; property consultancy; cost management; project management; programme management; net zero; and infrastructure solutions.

Clients include King's Health Partners, Imperial College Healthcare NHS Trust, Hamad Medical Corporation, The Pirbright Institute, Harwell Science and Innovation campus, and DEFRA.



Contact:
Gerard Baxter
Director

W: Futurehealthspaces.com

 **EXHIBITION PARTNER**

Future HealthSpaces

Future HealthSpaces is a collaborative programme between subcontractors and manufacturers operating in the healthcare construction market.

We were set up with a mission to shape the design of future healthcare facilities through collaborative thought leadership and cross-trade teamwork. We shine a light on innovation for key influencers in the healthcare sector, providing tangible, meaningful industry knowledge and ideas that enhance health workspaces.

Our quarterly forums bring together like-minded individuals from across the sector to discuss key challenges facing our industry and to share innovations and new ways of working to better our industry in the future.



GRADUS

Contact:
Dan Wetzels
Key account manager –
healthcare

W: www.gerflor.com



BRONZE INNOVATION
LEADER



EXHIBITION PARTNER



CATEGORY AWARDS
PARTNER

Gerflor Flooring UK

Gerflor is an international manufacturer of flooring, wall protection and interior finishing accessories. Our solutions are world-class, high in quality, sustainable, design-led, and innovative for all the contract markets we serve. Every day within a healthcare setting, 100 million patients are healed on a Gerflor floor, and more than 200,000m² of Gerflor floors are installed around the world.

We lead with a focus on safety, hygiene, comfort and durability. All this is coupled with contemporary and 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 through to end of life, the circular economy is a core priority for the group, and Gerflor is committed to making its five key sustainable principles central to both its operational and product development activities.



Contact:
Colin Horn
Director

W: www.grosvenorinteriors.co.uk



EXHIBITION PARTNER

Grosvenor Interiors

At Grosvenor Interiors our mission is to make 'better spaces to get better in'. All of us need hospital care at some time in our lives. We trust in the skills of nurses and doctors to get us well. But other factors also aid recovery, and we believe passionately that the quality of the environment around patients directly influences how they recover. We believe that good hospital interior design has an essential role in good healthcare.

Since 2007, we have been helping numerous charities and NHS trusts all over the UK to enhance interior spaces, providing features such as large-scale immersive wall imaging, bespoke joinery, custom furniture, and lighting. By adopting a bespoke approach to each project, we provide effective, calming and uplifting spaces that enhance the hospital journey for all users.



Contact:
Mark Osborne
Country manager

W: www.guldmann.com/uk



EXHIBITION PARTNER

Guldmann

Guldmann is a Danish-based company that develops and manufactures welfare technology for people with reduced capabilities, and work tools for those who help and care for them. With more than 40 years' experience, we are passionate about creating more 'time to care'.

We focus on improving work procedures and the working environment in the health and care industries, where moving, lifting and positioning, as well as mobilisation and rehabilitation, are prime concerns. The Guldmann product range includes ceiling hoists, mobile lifters, slings, and lifting accessories. Our lifting and moving solutions, along with services ranging from project consultancy and personnel instruction to service and assembly, help ensure that resources in the care system are put to the most effective use.



**FUTURE
HEALTHSPACES.**

Talking tomorrow in healthcare construction.

Future HealthSpaces is a collaborative group that aims to shape the design of future healthcare facilities through thought leadership.

We discuss key challenges faced by the healthcare industry and illuminate emerging innovations which could lead to better ways of working. Our Forums provide a unique opportunity to meet with like-minded leaders and share experiences.

We are an exhibition partner at the upcoming European Healthcare Design Exhibition, so come and see us at stand 17 to learn more about our mission.



**Scan here to learn more at
futurehealthspaces.com**



Contact:
Hank Adams
Global director, health
W: www.hdrinc.com



GOLD DESIGN LEADER

HDR

We use the power of design thinking to re-imagine 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 for clients that respect the human impact of their work – 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. Advancing health and wellness on a global scale and in local communities is at the heart of our endeavours.



Contact:
Chris Liddle
Group chairman, Covalent Group;
Director, HLM
W: www.hlmarchitects.com



SILVER KNOWLEDGE LEADER

HLM Architects

For more than 40 years we have been designing award-winning healthcare projects that provide healing environments that help clinicians minimise the length of time people need to spend in them. From the importance of landscape to the detail of the interiors, we challenge ageing healthcare infrastructure and use our expertise and experience to design healthcare environments that aim to avoid stress, unhappiness, illness and pain, while at the same time understanding the constraints required to deliver a healthcare facility.

Our knowledge and expertise can be applied to all areas of healthcare, from primary care centres that promote wellbeing to rehabilitation environments where better recovery times support operational efficiency. We are also conscious and responsive to rapidly changing technologies that make futureproofing areas, such as oncology, challenging at times.



Contact:
Graham Cossons
Partner
W: hoarelea.com



SILVER KNOWLEDGE LEADER



CATEGORY AWARDS PARTNER

Hoare Lea

We are an award-winning engineering consultancy with a creative team of engineers, designers and technical specialists providing innovative solutions for complex engineering and built-environment design challenges. Irrespective of the scale or complexity of a project, we provide a full range of MEP, environmental and sustainability services, bringing buildings to life and ensuring they perform at their best.

We are at the heart of the transformation taking place in healthcare buildings – balancing people-centred design with evolving clinical standards and innovation. Our experience spans every clinical setting: local health and social care centres; community hospitals and mental health units; research facilities; and large-scale medical campuses.

The delivery of cost-effective, safe, secure healing environments is our number-one priority, together with creating energy-efficient, low-carbon spaces that make the life-changing work of staff that little bit easier.



Contact:
Jonathan Tomlin
EU and UK business
development director

W: www.inprocorp.co.uk



Inpro Europe

Inpro Europe is based in Italy, controlled and managed by Inpro Corporation USA for the sales development of Inpro products in all European countries and constituting an international hub for other countries. The head office in Orvieto is where our stock warehouse is located for customer care, service, and assistance.

Our mission is to provide safe, durable handrails, wall guards, corner guards, and wall protection sheet, made of sustainable materials, to protect buildings and the people who use them.

In 2019, we brought out the Jointmaster range of expansion joints, which can be used in public buildings and other settings. Our Fireline 520 and 140 fire barriers are not only expertly engineered to handle building movement, even in seismic conditions, but they provide protection in the unthinkable occurrence of a fire.



Contact:
Jason Gibbings
IHP framework director

W: www.ihprojects.co.uk



Integrated Health Projects (IHP)

Integrated Health Projects (IHP) has been a leading provider of healthcare solutions since 2003. As an integrated alliance, IHP combines the stability, capacity, coverage and experience of Vinci Construction UK and Sir Robert McAlpine. Both are major organisations focused on development, construction and facilities management. IHP was formed to act as a principal supply chain partner for ProCure21/21+/22 and we have now secured our place on all lots in the P23 framework.

IHP has been appointed on more than 210 projects, valued at £2bn+, and clients have chosen to re-appoint us on 85 per cent of our projects. Committed to providing best value for money through imaginative and sustainable solutions, IHP is also a pioneer in standardisation delivering low-carbon solutions across the building lifecycle.



Contact:
Matthew Holmes
Global solutions director, health
infrastructure

W: 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. We've been working with healthcare providers for more than 50 years, re-imagining approaches to create and sustain well-functioning, thriving and resilient health systems, and contributing to personal, societal and economic wellbeing.

Our global experience is vast, from supporting health rebuild programmes in Canterbury, New Zealand, following the earthquakes in 2010 and 2011, to New South Wales' significant hospital upgrades and replacement programme in Australia, through to delivering projects in Asia and the Middle East. In the USA, we've delivered more than £36bn of health infrastructure for a wide range of health owners and operators.



Contact:
Kelly Hemsley
Head of healthcare bidding

W: www.kier.co.uk



Kier

Kier has been at the forefront of healthcare design and construction delivery for more than 20 years. We have delivered a range of projects, including fit-outs, extensions, refurbishments and new builds across the UK, generating best practice, incorporating lessons learned, and sharing our solutions across the NHS.

Key clients include Guy's & St Thomas' NHS Foundation Trust, University Hospitals Birmingham NHS Foundation Trust, Sheffield Teaching Hospitals NHS Foundation Trust, York & Scarborough Teaching Hospitals NHS Foundation Trust, Frimley Health NHS Foundation Trust, University Hospital Southampton, and Great Ormond Street Hospital for Children NHS Foundation Trust. The majority of our experience has been delivered through the ProCure frameworks (P21, P21+ and P22) with a number of key projects through the Crown Commercial Service (CCS), ProCure Partnerships (PP) and, more recently, the Shared Business Services (SBS) framework.



Contact:
Robert Etchell
Director

W: 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.



Contact:
Paul Yeomans
Director

W: 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. Since starting out in 1991, we have constantly evaluated our work and evolved our thinking to ensure we push the field of healthcare architecture forward.

Our large team of dedicated healthcare designers are based in London and Newcastle upon Tyne, with current projects in the UK, Europe and North America.

The logo for inpro, featuring the word "inpro" in white lowercase letters with a registered trademark symbol, set against a blue circular background.

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We're obsessed with protecting buildings.

How they look. How they function. And how they protect the health and safety of the people who use them every day. That's why we make hundreds of architectural products all under one roof, including **Door + Wall Protection and Expansion Joint Systems**. We work tirelessly to make sure building professionals – and the buildings themselves – succeed.



Visit inprocorp.co.uk to learn more!





Contact:
Ruth Strickland
Chief operating officer
W: www.mtshealth.co.uk



EXHIBITION PARTNER

MTS Health

MTS Health is the leading provider of equipment asset management, advisory and procurement, supported by a specialist team of biomedical engineers, clinical scientists, CIPS-qualified procurement specialists; and PRINCE 2-trained project personnel.

MTS works alongside NHS trusts and other health organisations, preparing equipment budgets; costs; specifications; procurement; installation; and technical advisory. Working with NHS clients to oversee the strategic management of their medical equipment assets, we provide cost reductions, cost avoidance, CQC compliance, and governance, and supply interim and permanent personnel on site to deliver these.

Now in our 23rd year, MTS has commissioned more than 30 large hospital redevelopments in the UK and internationally. Our global project experience comprises a broad range of hospital projects, including clients at the World Bank, Egypt, Malta, Bahrain, Canada and Turkey.



Contact:
Sasha Fewtrell
Specification manager
W: www.krion.com/uk
W: www.porcelanosa.com/uk



EXHIBITION PARTNER

Porcelanosa

Porcelanosa is one of the world's leading manufacturers and suppliers of a wide range of tiles and many other products.

Krion is a new generation solid surface developed by Krion, a company that belongs to Porcelanosa Group. If there is one sector for which Krion is highly recommended, it's the health sector, as Krion's anti-bacterial properties and additive-free composition make it a suitable material for medical centres, clinics, hospital rooms, and even operating theatres, where maximum hygiene conditions are necessary.

Krion solid surface is completely aseptic and easy to clean, while the chemical soldering between the different pieces and the possibility of curving them enable the creation of continuous surfaces without joins or corners, preventing the accumulation of micro-organisms.



Contact:
Ruth Wozencroft
Marketing manager
W: vanguardhealthcare.co.uk
W: www.q-bital.com



EXHIBITION PARTNER

Q-bital and Vanguard Healthcare Solutions

Established since 1999, Vanguard Healthcare Solutions is a world-class flexible healthcare infrastructure provider with headquarters in the UK. Vanguard provides high-quality and sustainable mobile and bespoke modular healthcare facilities, such as operating theatres, surgical hubs, community diagnostic hubs, endoscopy suites, decontamination and sterilisation facilities, wards, clinics, and minor injuries units.

Our mobile and modular healthcare facilities offer specialist integrated clinical environments where a range of procedures can be provided including orthopaedics, ophthalmology, and endoscopy. Our purpose is to assist healthcare providers, to increase patient and clinical capacity, helping to reduce waiting times for procedures.



Equipment Capital Planning, Advisory and Procurement

**MTS Health is the UK's leading provider of Capital Planning
Equipment Asset Management, Advisory and Procurement Services**

MTS are supported by a specialist team of Bio-Medical Engineers, Clinical Scientists; Radiographers, CIPS Qualified Procurement experts.

In our 23rd year of operation, MTS has successfully commissioned over 30 large hospital developments in the UK and Internationally.

We are currently supporting the cohort Hospital developments, part of the New Hospitals Programme.

Services provided include:

- Business Cases
- Cost Advisory
- Room Data Sheet Management
- Specification and Technical Advisory
- Procurement and CIP Savings.
- Medical Device Management

MTS is working with NHS and Private Sector Hospital clients to work collaboratively with all project stakeholders such as NHS Trust personnel, Architects, Construction Companies and other professional advisors.



Ryder

Contact:
Paul Bell
Partner

W: www.ryderarchitecture.com



**BRONZE INNOVATION
LEADER**

Ryder Architecture

Ryder was established in Newcastle upon Tyne in 1953 and now has a team of more than 310 people in Newcastle, London, Glasgow, Liverpool, Manchester, Hong Kong, Vancouver and Amsterdam, reinforced by global connectivity through the Ryder Alliance.

We deliver pioneering architectural and design services across a diverse portfolio of sectors. We have also been recognised with more than 200 awards, most recently with a Queen's Enterprise Award for International Trade, and being named Building's Architectural Practice of the Year 2021.

Stantec

Contact:
Brenda Bush-Moline
Global health sector leader

W: www.stantec.com



**SILVER KNOWLEDGE
LEADER**

Stantec

With more than 3000 architects, medical planners, engineers, project managers and scientists in six countries, our integrated platform is unmatched. Our London studio has been serving the NHS and private sector in the UK since 1990, forming part of our global integrated practice based in the UK, Canada, the US, Australia, the Middle East and Asia. It routinely collaborates on some of our most complex engagements, including the £870m Calgary Cancer Centre in Alberta, and one of Canada's largest new hospitals, The Peter Gilgan Hospital in Mississauga, Ontario, which will deliver specialised care for advanced cardiac surgery, cancer care and geriatric mental health services.



**STATIC
SYSTEMS
GROUP**

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Marketing manager

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EXHIBITION PARTNER

Static Systems Group

Static Systems Group (SSG) enables better healthcare by connecting caregivers, patients and systems through smart communication technology.

Our Ultima Advanced Nurse Call system offers a full end-to-end IP solution, which is interoperable and utilises industry standard IP/LAN infrastructure. It delivers a versatile, scalable and cost-effective scheme to meet the requirements of the NHS digital strategy and modern methods of construction, as well as international standards and initiatives.

Stirling

MEDICAL AND SCIENTIFIC

Contact:
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EXHIBITION PARTNER

Stirling Medical & Scientific

Stirling Medical & Scientific is manufacturer of the Systeméd brand of HTM-compliant fitted furniture for the healthcare environment. Established for over 25 years, and working with leading NHS trusts and private healthcare groups, key healthcare architects and clinical specialists, Stirling Medical has a vast wealth of knowledge regarding medical storage challenges in clinical spaces and the best solutions.

Stirling Medical is a thought leader in room standardisation programmes, future proofing, and repeatable rooms. A new design studio in London showcases repeatable clinical spaces, replicating real-life situations.



Contact:
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Membership manager

W: www.ukihma.co.uk



EXHIBITION PARTNER

UK International Healthcare Management Association

The United Kingdom International Healthcare Management Association (UKIHMA) is a national membership organisation that brings together the best of UK healthcare expertise to offer international clients integrated turnkey solutions. We work closely with our partners in the UK Department of International Trade, Healthcare UK and UK Export Finance in offering a comprehensive portfolio of support from trusted specialists. We offer a single point of contact to a mix of skills and expertise spanning the NHS, prestigious academic institutions, and a range of commercial-sector experts, to provide UK-led solutions for international clients.



Contact:
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EXHIBITION PARTNER

Veritas Medical Solutions

Veritas Medical Solutions manufactures pre-engineered radiation shielding systems designed for fast modular construction of radiotherapy centres. Equipment-specific shielding designs are available for all major machine types and utilise innovative VeriShield radiation shielding modules and Veritas SmartDoor radiation shielded entry-door systems.

Veritas shielding includes proprietary VPAC shielding packs, which dramatically increase construction speed. Veritas SmartDoors are innovative radiation therapy room entry systems, which come equipped with touchscreen technology, remote monitoring, and redundant safety systems. They come in swing, sliding and bi-parting configurations.



Contact:
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Head of healthcare

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DIAMOND THOUGHT
LEADER

Wates

The Wates Group, established in 1897, is one of the leading privately owned construction, residential development, and property services businesses in the UK. With a fully integrated offer, our health experts work with both public- and private-sector partners to inspire better ways of creating the places, communities and healthcare facilities of tomorrow.

We address the key challenges facing the healthcare sector, from delivering a 176-bed intensive care unit for The Royal London Hospital to boost the response to Covid-19, to understanding how to create net-zero hospitals and investing in technology to improve quality and delivery.



Contact:
Anisha Mayor
Director – UK head of healthcare

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GOLD DESIGN LEADER

WSP

WSP is one of the world's leading professional services consulting firms. We are technical experts and strategic advisors, including engineers, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, programme and construction management professionals.

We design lasting solutions in the following industry sectors: transportation and infrastructure; property and buildings; earth and environment; power and energy; and resources and industry. We also offer strategic advisory services.



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facilities around the world.

Collaborating with clients and partners,
we provide solutions for the complexities facing
the healthcare sector today and in the future.

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Our dedicated healthcare team has a combined 40 years' sector experience, with a portfolio ranging from >£100m new build acute hospitals, mental health facilities and cancer centres to <£10m primary care community facilities, refurb emergency departments and diagnostic centres.

To learn more about Wates' capabilities in the healthcare sector and find out how we can help you meet your goals.

Contact healthcare@wates.co.uk

