



ROYAL COLLEGE OF PHYSICIANS LONDON | 17-19 JUNE 2019

# EUROPEAN HEALTHCARE DESIGN

RESEARCH • POLICY • PRACTICE

## FINAL PROGRAMME

BLURRING THE BOUNDARIES  
DESIGNING PLACE-BASED  
HEALTH SYSTEMS

Organised by:



ARCHITECTS FOR HEALTH



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# Designing for dementia

VISIT US AT STAND 10

VR-EP is Tarkett's evidence-based 'Dementia Filter', which has been heralded as "cutting edge immersive software designed to help improve the lives of those people living with dementia".

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**VR-EP.**  
**See it.**  
**Understand it.**

Vision with dementia

Normal vision

Not an accurate representation – for illustrative purposes only.

 **Tarkett**

**Dear colleagues,**

We are delighted to welcome you to the 5th European Healthcare Design 2019 Congress & Exhibition.

Providing an international forum for researchers, policymakers and practitioners to explore the relationship between health service and system design, technology and the built environment, the congress continues to go from strength to strength and is now in its fifth year.

This year's congress theme, 'Blurring the boundaries: Designing place-based health systems', acknowledges that the lines between the physical, digital and biological worlds are becoming less distinct. As advances in artificial intelligence and personalised medicine create enormous benefits in diagnosis, pharma and treatment, we now also have the digital capacity to connect and integrate healthcare systems, allowing population and place-based models of care to evolve fully.

Globally, this shift is gaining momentum. Providers can no longer focus only on treating the sick and infirm in the traditional hospital, but must partner with other sectors, such as housing, transport, urban planning and the workplace to design healthier communities, helping people stay well by improving opportunities for physical activity, access to nutritious food, and social and cultural interaction.

The definition of healthcare architecture is widening; as medicine and social care share space in community settings, so traditional building typologies become redundant. As our high-street shops fall empty, their replacement with innovative social and healthcare centres that also provide wellness-based services may help sustain town centres. Equally, locating these facilities in places with high footfall, such as transport hubs, will create opportunities to join up public health and healthcare services where needed, improving access, enabling earlier diagnosis, and creating more efficient care pathways.

The arts also have a role to play in this new blurred world – helping to tackle social isolation, providing cognitive stimulation, reducing stress, and supporting rehabilitation. Fusion of art and digital technology in the real and virtual worlds can help improve outcomes and enhance staff and patient experience.

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

In addition to a two-day conference programme with eight streams featuring expert speakers from across the globe, the event will also host a welcome drinks reception (p33), an exhibition of the latest design solutions (p156-170), a garden party (p33), study tours (p34-37) of some of the UK's most innovative new health facilities, and an international awards programme (p39-53).

We look forward to your participation in this exciting congress and to working with you to create and share new knowledge around the value of design in transforming services and infrastructure, and in improving the quality of healthcare in Europe and around the world.

Finally, the organisers wish to take the opportunity to pay tribute to the late Susan Francis. Prior to her passing in 2017, Susan was Architects for Health's programme director, and her tireless efforts helped establish the congress as one of the world's most celebrated events in healthcare design. We hope the congress continues to be a fitting legacy to her work for many years to come.

**CHRIS SHAW**

Chairman  
Architects for Health

**JOHN COOPER**

Past Chairman  
Architects for Health

**MARC SANSOM**

Director  
SALUS Global Knowledge  
Exchange



# BAM - creating Britain's Best Buildings for 150 years

BAM has created over 300 healthcare  
schemes across Britain



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# THE ROYAL COLLEGE OF PHYSICIANS

The 5th European Healthcare Design Congress & Exhibition, 17–19 June 2019, 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

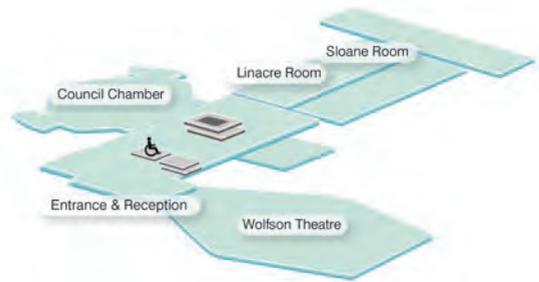
- Main conference plenary sessions, breakout sessions and the EHD2019 Awards ceremony

### Council Chamber

- Breakout sessions, and breakfast and lunchtime workshops

### Linacre and Sloane Room

- Breakout sessions



## FIRST FLOOR

### Dorchester Library

- Poster gallery and the EHD2019 Awards shortlist gallery

### Long Room and Osler Room

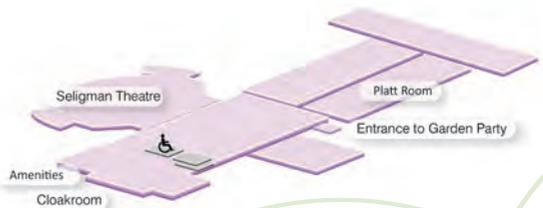
- Lunch, exhibition and the welcome drinks reception



## LOWER GROUND FLOOR

### Seligman Theatre and Platt Room

- Breakout sessions and lunchtime workshops





08.00 REGISTRATION OPENS



**Session 1**

Opening plenary

Chair: Nigel Edwards, Nuffield Trust, UK

08.45 **Welcome and introduction**

John Cooper, Architects for Health; programme chair, EHD2019, UK

08.50 **Chair's welcome**

Nigel Edwards, Chief executive, Nuffield Trust, UK

09.00 **Keynote address: Designing the perfect health system: solving the global workforce crisis**

Mark Britnell, Global chairman and senior partner for healthcare, KPMG International, UK

09.30 **Keynote address: Joining the dots on design for health – from homes to hospitals, bodies to minds, things to data**

Geoff Mulgan, Chief executive officer, Nesta, UK

10.00 **Panel discussion**

10.15 COFFEE, EXHIBITION AND POSTER GALLERY



**Session 2**

Architecture and wellness in the circular economy

Chair: Jeremy Myerson, Royal College of Art, UK

10.45 **Blurring the boundaries – a new generation of NHS buildings**

John Cooper, Director, John Cooper Architecture, UK

11.10 **The benefits of the circular economy on health and healthcare**

David Cheshire, Director, sustainability, AECOM, UK

Sunand Prasad, Senior partner, Penoyre & Prasad, UK

11.35 **The life, death and resurrection of wellness: enriched environments for activated optimal health**

Tye Farrow, Senior partner, architecture, Farrow Partners, Canada

12.00 **Panel discussion**

12.30–14.00 LUNCH, EXHIBITION AND POSTER GALLERY



**Session 3**  
**Foundations of healthcare design**  
 Chair: Mardelle McCuskey Shepley, Cornell University, USA

**14.00 The role of intuition in evidence-based design**

D Kirk Hamilton, Professor of Architecture, Texas A&M University, USA  
 Stefan Lundin, Partner, White Arkitekter, Sweden

**14.20 Research 101: evidence-based design meets design-based evidence**

Upali Nanda, Director of research, HKS, USA  
 Evangelia Chryssikou, Lecturer, Bartlett Real Estate Institute, UCL, UK  
 Dan Flower, Director of design, HKS, UK

**14.40 Accelerating collaboration between clinicians and architects to measure and improve healthcare design**

Andrew Ibrahim, Chief medical officer and senior principal, HOK, USA

**15.00 Panel discussion**

**15.30 COFFEE, EXHIBITION AND POSTER GALLERY**



**Session 4**  
**Beyond the hospital**  
 Chair: Andrew Smith, BDP, UK

**16.00 From hospital to health campus**

Richard Darch, Chief executive, Archus, UK

**16.20 Place-based access to care and research**

James Crispino, Global practice area leader, healthcare, Gensler, USA  
 Richard Tyson, Intelligent places, strategy director, Gensler, USA  
 Chris Smith, CEO, Maplewood Healthcare, USA

**16.40 Panel discussion**



**Session 5**  
**Keynote plenary**  
 Chair: Richard Darch, Archus, UK

**17.00 Keynote address: Designing health systems to respond to the challenges of person-centred care**

Nigel Edwards, Chief executive, Nuffield Trust, UK

**17.45 Panel discussion**

**18.00 Close**

**18.00– 20.00 EXHIBITION, POSTER GALLERY AND WELCOME DRINKS RECEPTION**

Welcome drinks supported by:



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



**Session 6**

**Policy and practice of place-based health**  
Chair: **Sasha Karakusevic**, NHS Horizons, UK

**10.45 Design of place-based health systems – lessons from Scotland**

**Susan Grant**, Principal architect, NHS Health Facilities Scotland, UK  
**Heather Chapple**, Design director, Architecture & Design Scotland, UK

**11.05 Health precinct design**

**Rosemary Burne**, Principal, Conrad Gargett, Australia

**11.25 Envisioning the future of health networks: hospital as part of a sustainable system**

**Eva Henrich**, Architect, Heinle, Wischer und Partner, Germany

**11.45 Designing a global index of future-readiness for healthcare challenges**

**Dr Gerard Briscoe**, Research associate, Helen Hamlyn Centre for Design, Royal College of Art, UK  
**Gail Ramster**, Senior research associate, Helen Hamlyn Centre for Design, Royal College of Art, UK

**12.05 Panel discussion**

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

**12.40–13.50 Lunchtime design workshop:  
How future-ready is your city to deliver healthcare?  
The challenges and opportunities**

Organised by:



See page 135 for the full abstract on the issues that will be discussed in this workshop.

**Led by: Nolan Rome**, Global healthcare lead, WSP, USA  
**Jeremy Myerson**, Helen Hamlyn chair of design, Royal College of Art, UK  
**Dr Gerard Briscoe**, Research associate, Helen Hamlyn Centre for Design, Royal College of Art, UK  
**Simon Kydd**, Director – UK head of healthcare, WSP, UK



### Session 7

Designing for whole-health models

Chair: Simon Kydd, WSP, UK

#### 14.00 How to develop integrated care

**Cressida Toon**, Partner, Sonnemann Toon Architects, UK

**Suzanne MacCormick**, Associate director, healthcare advisory, WSP, UK

#### 14.20 Pioneering the present: learning lessons from Kaiser Permanente

**Tony Burley**, Managing principal, buildings, IBI Group, UK

#### 14.40 Guidelines for planning and design in a 4D healthcare system

**Tina Nolan**, Director of healthcare planning, ETL, UK

**Regina Kennedy**, Associate director, healthcare planning, ETL, UK

#### 15.00 Panel discussion

#### 15.30 COFFEE, EXHIBITION AND POSTER GALLERY



### Session 8

Sustainable design in low-resource settings

Chair: Sylvia Wyatt, Age UK Isle of Wight, UK

#### 16.00 The parametric hospital: a model for all cases

**Luis Gotor**, Project manager, PMMT, Spain

#### 16.20 Building resourcefulness: case studies of building health interventions with communities in Peru and Sierra Leone

**Mikaela Patrick**, Research associate and designer, Helen Hamlyn Centre for Design, Royal College of Art, UK

**Nicole Minckas**, Research associate, Institute for Global Health, University College London, UK

#### 16.40–17.00 Panel discussion

*Stream 2 will be brought to a close at 17.00, whereupon delegates are invited to return to the Wolfson Theatre for the day's closing plenary session (17.00–18.00).*

Stream 3 begins at 10.45 in the Linacre and Sloane Room, after the day's opening plenary session (08.45–10.15).



## Session 9

AI and digital innovation

Chair: Jonathan Wilson, GB Partnerships, UK

**10.45** **Utilisation of a centralised customer management solution with AI-based predictive analytics to improve home-care operations in an integrated social care and healthcare organisation**

**Krista Korpela**, Researcher, LUT University, Finland

**Pentti Itkonen**, CEO, South Karelia Social and Health Care District, Finland

**11.05** **Rural communities reimagined with the innovation in modular construction and digital (AI) technologies**

**Christine Chadwick**, National senior director, infrastructure solutions, GEHC, Canada

**Daniel Zikovitz**, Principal solutions architect, GEHC, Canada

**11.25** **Artificial intelligence and diagnostic radiology – trend or travesty?**

**Dan Gibson**, Director of health facility planning, MJ Medical, UK

**Kate Bradley**, Senior consultant, MJ Medical, UK

**11.45** **Hello Care: autonomous healthcare, home delivery**

**Greg Mare**, Vice-president, healthcare practice leader, Americas, AECOM, USA

**Dale Sinclair**, Director – architecture, technical practice, EMEA, AECOM, UK

**12.05** **Panel discussion**

**12.30–** **LUNCH, EXHIBITION AND POSTER GALLERY**

**14.00**

**Session 10**

Applying technological innovation in practice

Chair: David Martin, Stantec, USA

**14.00 Personalised healing environment enabled by bricks, bytes and behaviour**

**Harry van Goor**, Professor of Surgery, Department of Surgery and Healthcare, Radboud University Medical Centre, Netherlands

**Rene Bleeker**, Director, healthcare real estate development, Radboud University Medical Centre, Netherlands

**14.20 Humanising experience at the Hepatic ICU (Hospital Clínic of Barcelona): learnings acquired in the first year of service**

**Clara Ruis**, Architect and partner, Estudi PSP Arquitectura, Spain

**Mario Garcia**, Biomedical engineer – technology and equipment, Hospital Clínic de Barcelona, Spain

**Miquel Sanz**, Assistant co-ordinator of the intensive care unit, associate professor, University of Barcelona, Institute of Digestive and Metabolic Disease, Hospital Clínic de Barcelona, Spain

**14.40 Implementing a VR platform as an evaluation tool for effective hospital design in Germany**

**Tatiana Epimakhova**, Architect, Heinle, Wischer und Partner, Germany

**15.00 Panel discussion****15.30 COFFEE, EXHIBITION AND POSTER GALLERY****Session 11**

Data-driven design and planning

Chair: Christine Chadwick, GE Healthcare, Canada

**16.00 Increasing the pace and accuracy of design by integrating activity data and functional briefing**

**Conor Ellis**, Head of health, partner, Rider Levett Bucknall, UK

**Georgina Whitham**, Senior consultant, Rider Levett Bucknall, UK

**16.20 The integration of BIM data into the management of healthcare infrastructures**

**Abraham Jimenez**, Head of service innovation, Pinearq, Spain

**16.40–17.00 Panel discussion**

*Stream 3 will be brought to a close at 17.00, whereupon delegates are invited to return to the Wolfson Theatre for the day's closing plenary session (17.00–18.00).*

Stream 4 begins at 10.45 in the Seligman Theatre and Platt Room, after the day's opening plenary session (08.45–10.15).



## Session 12

**From emergency to theatre: the art of design**

Chair: **Noemi Bitterman**, Technion, Israel

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**10.45 Adaptability of an operating theatre suite**

**Rosalind Murphy**, Associate architect, O'Connell Mahon Architects, Ireland

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**11.05 Using the arts to reduce anxiety, aggression and violence at St Thomas' new emergency department**

**Louisa Williams**, Director, Art in Site, UK

**Martin Jones**, Director, Art in Site, UK

**Liz O'Sullivan**, Arts manager, capital development, Guy's and St Thomas' NHS Foundation Trust, UK

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**11.25 Cognitive biophilia: making space for restoration**

**David Navarrete**, Director, research initiatives, Sky Factory, USA

**Bill Thompson**, Director, international operations, Sky Factory, USA

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**11.45 Models of care: comparative evaluation of ophthalmology outpatient clinic design by digital simulation**

**Nirit Pilosof**, Architect and PhD candidate, Faculty of Architecture and Town Planning, Technion – Israel Institute of Technology, Israel

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**12.05 Panel discussion**

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

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**12.40–13.50 Lunchtime planning workshop:  
Building the Long-Term Plan: prevention and wellness,  
place and community**

Organised by:



See page 137 for the full abstract on the issues that will be discussed in this workshop.

**Led by: Jonathan Wilson**, Strategic estates lead, GB Partnerships, UK

**Paul Fitzpatrick**, Director of estates and facilities, Aintree University Hospital NHS Foundation Trust, UK

**Mark Harrod**, Director, KYMA Consulting, UK

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**Session 13****Hospital in the city: design evaluation**Chair: **Sunand Prasad**, Penoyre & Prasad, UK**14.00 Putting Cleveland Clinic in place: findings and implications from mixed-methods research for place-based health****Nicholas Watkins PhD**, Manager of performance analytics, Gensler Research Institute, Gensler, USA**Travis Laird**, Chief business operations officer, Cleveland Clinic, UK**Richard Tyson**, Intelligent places strategy director, Gensler, USA**James Crispino**, Global practice area leader, healthcare, Gensler, USA**Michelle Gandolf**, Director of market research and insights, Cleveland Clinic, USA**Travis Tyson**, Director of architecture and planning, Center for Design, Cleveland Clinic, USA**14.20 On-stage vs off-stage design challenges and solutions: a study at the University College London Hospitals NHS Foundation Trust****Keith Millay**, Managing director, Steffian Bradley Architects, UK**14.40 Transition management of combined health services and infrastructural change: lessons learned in a Dutch case upon relocation into a new facility****Liesbeth van Heel**, Senior policy advisor and PhD student, Program Integrated Buildings, Erasmus University Medical Center, Netherlands**15.00 Panel discussion****15.30 COFFEE, EXHIBITION AND POSTER GALLERY****Session 14****Design quality in cancer care**Chair: **Karin Imoberdorf**, Lead Consultants, Switzerland**16.00 Quality and design in cancer care: what does good practice look like?****Guy Barlow**, Joint managing director, architecture, The Manser Practice, UK**Elizabeth Devas**, Cancer environments design lead, cancer support operations, Macmillan Cancer Support, UK**16.20 "It does not feel like being in a hospital": a therapeutic environment for cancer patients. Oncology pavilion in Aranda de Duero, Spain****Angela Elisabeth Müller**, Consultant and architect, Parra-Müller, Spain**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

**08.55 Welcome and introduction**

**John Cooper**, Architects for Health; programme chair, EHD2019, UK

**09.00 Keynote address: The work of the Rockefeller Foundation-Lancet Commission on Planetary Health**

**Sir Andy Haines**, Professor of Public Health and Primary Care, London School of Hygiene & Tropical Medicine, UK

**09.30 Keynote address: "Culture eats strategy for lunch every day": the science and art of sustainable healthcare innovation**

**Prof Dr Katharina Janus**, Founder and managing director, Center for Healthcare Management, Columbia University New York, NY, USA, and Paris, France

**10.00 Panel discussion**

**10.15 COFFEE, EXHIBITION AND POSTER GALLERY**



**Session 16**

Residential design for health

Chair: **Ruzica Bozovic-Stamenovic**, National University of Singapore, Singapore

**10.45 Designing healthy multi-generational environments**

**Paul Bell**, Ryder Architecture, UK

**11.05 Towards healthful, ageing-friendly and enabling design: a multisensorial study of housing neighbourhoods in Singapore**

**Zdravko Trivic**, Assistant professor, Department of Architecture, School of Design and Environment, National University of Singapore, Singapore

**11.20 Reimagining the boundaries – towards integrated and assimilated nursing homes in Singapore**

**Ruzica Bozovic-Stamenovic**, Assistant professor, Department of Architecture, School of Design and Environment, National University of Singapore, Singapore

**11.35 Reconciling LEED with salutogenic affordances in long-term care environments for the aged: a call for inclusive assessment metrics**

**Terri Peters**, Assistant professor, Architecture, Ryerson University, Canada

**11.55 A final move to your own house**

**Femke Feenstra**, Board architect, Gortemaker Algra Feenstra Architects, Netherlands

**12.15 Panel discussion**

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

**Session 17****Designing for resilience**

Chair: Paul Bell, Ryder Architecture, UK

**14.00 Examining the role of the hospital through the dimensions of environmental, economic and social sustainability**

**Stephanie Costelloe**, Director of healthcare, Asia, B+H Architects, Hong Kong

**14.20 Greybase Hospital case study: resilient, multi-use design in one of the most challenging locations on Earth**

**Kris Noiseux**, Technical principal, building services, WSP, New Zealand

**Adam Flowers**, Director, CCM Architects, New Zealand

**Margo Kyle**, Facilities integration manager, West Coast District Health Board, New Zealand

**14.40 Context as a driver for sustainable healthcare design**

**Ronald Hicks**, Principal, national director, health, Australia, HDR, Australia

**15.00 Panel discussion**

**15.30 COFFEE, EXHIBITION AND POSTER GALLERY**

**Session 18****Place-based health in low-income countries**

Chair: Hank Adams, HDR, USA

**16.00 Design 4 Others and Construction for Change – lessons learned from place-based health, education and community building**

**Jason-Emery Groen**, Design director, HDR, Canada

**Tim Hickory**, Director of operations, Construction for Change, USA

**16.20 Developing an eco-system of place-based healthcare infrastructure in developing markets**

**Jabulile Nhlapo**, Mechanical engineer (associate), property and buildings, Africa, WSP, South Africa

**16.40 Panel discussion**

**Session 19****Closing plenary and awards**

Chair: John Cooper, Architects for Health, UK

**17.00 Closing keynote address**

**Don Parker**, CEO, Carrier Clinic, USA

**17.15 European Healthcare Design Awards 2019**

Supported by (Lead sponsor):



**17.50 Closing address**

**John Cooper**, Architects for Health; programme chair, EHD2019, UK

**18.30–22.00 GARDEN PARTY**

Supported by:



**07.30–08.45 Breakfast workshop:  
Setting new standards: forming a Global Institute of Healthcare Planning**

**Led by:** **Richard Darch**, Chief executive, Archus, UK  
**John Kelly**, Director, ETL, UK  
**Tina Nolan**, Director of healthcare planning, ETL, UK  
**Conor Ellis**, Head of health, partner, Rider Levett Bucknall, UK

*Stream 6 begins at 10.45 in the Council Chamber, after the day's opening plenary session (08.55–10.15).*



**Session 20**  
**Designing for mental health**  
**Chair:** **Alex Caruso**, ACA+I, UK

**10.45 Design for mental and behavioural health**

**Mardelle McCuskey Shepley**, Professor/Chair, Department of Design & Environmental Analysis, Cornell University, USA  
**Naomi A Sachs**, Post-doctoral associate, Department of Design & Environmental Analysis, Cornell University, USA

**11.05 Blurring the boundaries in the built environment to minimise stress and aggression and support healing. Case study: Mental Health Hospital in Vejle, Denmark**

**Birgitte Gade Ernst**, Partner, Arkitema Health, Arkitema Architects, Denmark

**11.25 Cross-border recognition: maintaining dignity and engagement through the design of the psychiatric emergency department**

**Gavin McLachlan**, Senior associate, Montgomery Sisam Architects, Canada

**11.45 Designing a healing mental health campus to create an accessible continuum of compassionate care**

**Don Parker**, CEO, Carrier Clinic, USA

**12.05 Panel discussion**

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

**12.40–13.50 Lunchtime design workshop:  
Hospice design for a new era of patient and family needs**

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

Organised by:

**Ryder**

**Led by:** **Alastair Forbes**, Architectural director, Ryder, UK  
**Rhona Baillie**, Healthcare director, Prince and Princess of Wales Hospice, UK  
**Ivor Williams**, Designer, Helix Centre, Institute of Global Health Innovation, St Mary's Hospital, UK  
**Marte Lauvsnes**, Manager advisory and project departments, Sykehusbygg, Norway



### Session 21

Designing for children's health

Chair: Stephanie Williamson, GOSH, UK

**14.00 A healing environment maintaining life quality for children with cancer achieved by an interdisciplinary approach**

**Thomas Bögl**, Partner and architect, LIAG Architects, Netherlands

**14.20 A new children's hospital of Helsinki: children's rights in focus**

**Mikko Sinervo**, Architect MSc, Architect Group Reino Koivula, Finland

**Riitta Pikkuhookana**, Interior architect, Master of Culture and Arts (IMIAD), Architect Group Reino Koivula, Finland

**14.40 Engaging waiting spaces – creating opportunities to engage with science at the Zayed Centre for Research into Rare Disease in Children**

**Helena Copsey**, Arts manager, Great Ormond Street Hospital for Children NHS Foundation Trust, UK

**Eleanor Richardson**, Healthcare planner, Great Ormond Street Hospital for Children NHS Foundation Trust, UK

**14.55 Providing spaces for prayer and reflection in hospitals: what is the right approach?**

**Crispin Walking-Lea**, Head of healthcare planning, Great Ormond Street Hospital for Children NHS Foundation Trust, UK

**James Linthicum**, Lead chaplain, Great Ormond Street Hospital for Children NHS Foundation Trust, UK

**15.10 Panel discussion**

**15.30 COFFEE, EXHIBITION AND POSTER GALLERY**



### Session 22

Designing for cancer care

Chair: Tye Farrow, Farrow Partners, Canada

**16.00 Designing for cancer research: personalised treatment in personalised places**

**Ged Couser**, Principal, architecture, Manchester Studio, BDP, UK

**16.20 Scandion – building architecture, art and high-tech treatment around the patient**

**Anna Rolf**, Architect, Link Architecture, Sweden

**Li Liljeberg**, Architect, Link Architecture, Sweden

**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).*



Stream 7 begins at 09.00 in the Linacre and Sloane Room, in parallel with the opening plenary session (08.55–10.15).



**Session 23**

**The intersection of medicine and architecture**

**Co-chairs:**

**Eve A Edelstein**, Clinicians for Design and HxLab Perkins+Will, USA

**Dr Emma F Stockton**, Great Ormond Street Hospital for Children, UK



**09.00 Design workshop:  
Designing from the clinician's perspective**

This workshop, organised by Clinicians for Design in collaboration with Building Blocks for Clinicians, will explore the challenges clinicians face across multiple specialisms and in different countries. Participants will develop an understanding of the complexities of designing clinical services and environments, and appreciate the clinician's importance in contributing to a fully interdisciplinary design process.

Organised by:



In collaboration with:



**Led by: Eve A Edelstein**, Research director, Clinicians for Design and HxLab Perkins+Will, USA

**Dr Emma F Stockton**, Consultant anaesthetist, Great Ormond Street Hospital for Children, UK

**Elizabeth Whelan**, Senior lecturer, University of Greenwich, UK

**Jennifer Whinnett**, Senior capital planning manager, Essentia, UK

**Kate Bradley**, Senior consultant, MJ Medical, UK

**Marc Levinson**, Partner, Murphy Philipps Architects, UK

**10.15–10.45 COFFEE, EXHIBITION AND POSTER GALLERY**

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



### Session 24

#### Engaging the clinician

Chair: **Ganesh Suntharalingam**, Intensive Care Society, UK

#### 14.00 Physician engagement and perspective in the Lean facility design process

**Benjamin Bassin MD, EDAC**, Director of critical care operations, associate service chief, Department of Emergency Medicine, University of Michigan (U-M) Health System, USA

**Cemal Sozener MD, MEng, EDAC**, Medical director, Comprehensive Stroke Center; Attending physician, Department of Emergency Medicine, University of Michigan (U-M) Health System, USA

#### 14.40 Hospital design for older people with cognitive impairments: a review of evidence-based design to support inpatients and accompanying persons

**Tom Grey**, Research fellow, School of Engineering, TrinityHaus Research Centre, Trinity College Dublin, Ireland

#### 15.00 Panel discussion

#### 15.30 COFFEE, EXHIBITION AND POSTER GALLERY



### Session 25

#### Designing for translational research

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

#### 16.00 Integrating science and care: empowering patients through translational medicine

**David Martin**, Vice-president, Stantec, UK

#### 16.20 Quadram Institute – next generation for food and health research

**Nora Claudio Familiar**, Senior associate – architecture, NBBJ, UK

**Nick Goodwin**, QI programme manager, Quadram Institute, UK

#### 16.40–17.00 Panel discussion

*Stream 7 will be brought to a close at 17.00, whereupon delegates are invited to return to the Wolfson Theatre for the day's closing plenary session (17.00–17.50).*

Stream 8 begins at 10.45 in the Seligman Theatre and Platt Room, after the day's opening plenary session (08.55–10.15).



**Session 26**

**Innovation in commercial design**

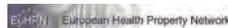
**Chair: Richard Darch, Archus, UK**

**10.45–12.30** **Planning workshop: Strategically planning successful health infrastructure**

Organised by:



ARCHITECTS FOR HEALTH



This workshop session will take a practical look at some of the key challenges in strategic planning in the UK's NHS to provide a sound project platform, and the tactics needed to deliver capital investment in a changing context, while inviting international exchange on common issues and shared problems.

**Panel: John Cole**, Independent client advisor, Queen's University Belfast, UK

**David Powell**, Development director and executive lead for innovation, Alder Hey Children's Hospital NHS Foundation Trust, UK

**Marte Laivsnes**, Project and development hospital planning manager, Sykehusbygg, Norway

**Matthew Tulley**, Great Ormond Street Hospital for Children, UK

**Susan Grant**, NHS National Services Scotland, UK

**John Cooper**, Architects for Health, UK

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

**12.40–13.50** **Lunchtime design workshop: Design solutions for reducing multi-drug resistant healthcare-associated infection**

Organised by:



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

**Led by: Elise Maynard**, Managing partner, Elise Maynard Associates / Water Safety Forum, UK

**Noemi Bitterman**, Founder and chair, Masters in Industrial Design, Technion University, Israel

**Tony Rheinberg**, Marketing manager, Armitage Shanks, UK

**Session 27****Strategic finance and capital planning**Chair: **Jonathan Puddle**, AECOM, UK**14.00 The king is dead. Long live the king?****Burkhard Musselmann**, Architect and managing principal, Stantec, UK**Dean Kaardal**, Alternative Project Delivery sector lead, Stantec, Canada**Joel Martineau**, Digital practice – business analyst, Stantec, UK**14.20 The adaptable estate****Rupert Corbett**, Operations director, estates development team, Essentia, Guy's & St Thomas' NHS Foundation Trust, UK**Peter Ward**, Director of healthcare real estate development, Essentia, Guy's & St Thomas' NHS Foundation Trust and King's College London, UK**14.40 Transforming healthcare: form follows finance****Rhonda Kerr**, Director, economics, health services and planning, GENI (Guidelines and Economists Network International); Principal health services planner, Hames Sharley Architects; PhD candidate, Health Economics, Curtin University, Australia**15.00 Panel discussion****15.30 COFFEE, EXHIBITION AND POSTER GALLERY****Session 28****The business case for flexibility**Chair: **Jonathan Erskine**, European Health Property Network, UK**16.00 FlexX****Upali Nanda**, Director of research, HKS, USA**16.20 Collaborative approach to healthcare design****Martina Cardi**, Associate architect, Bryden Wood, UK**Jacqueline Droogan**, Director of mobilisation, Circle Health, 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).*

# Transforming healthcare through integrated delivery

Design  
Project and Programme Management  
Cost Management  
Building Engineering  
Sustainability

Image: Alder Hey Hospital  
— Institute In The Park

[aecom.com](https://www.aecom.com)

[@AECOMBuildPlace](https://www.instagram.com/AECOMBuildPlace)

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 this year by AECOM, the poster 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 30-31; and pp 39-53) will also be on display.

All the posters are also available digitally on the SALUS Global Knowledge Exchange, an innovative online, knowledge-sharing community resource, which features videos of all the talks from the previous four European Healthcare Design Congresses, and the past two Healthy City Design International Congresses.

To view the digital posters and their full abstracts, visit SALUS at [www.salus.global](http://www.salus.global) and join up for free as an individual member.

**P01 Safety at home – an integrated approach between wellbeing and safety**

Heidi Huuskonen (Finland), Jani Kanerva (Finland), Mika Immonen (Finland), Jouni Koivuniemi (Finland), Kristiina Kapulainen (Finland), Pentti Itkonen (Finland)

[www.salus.global/article-show/ehd2019-p01](http://www.salus.global/article-show/ehd2019-p01)

**P02 Realised community health by embracing the care continuum**

Brenda Bush-Moline (USA)

[www.salus.global/article-show/ehd2019-p02](http://www.salus.global/article-show/ehd2019-p02)

**P03 The unlikely and rewarding partnership between design and transition**

Alice Wainwright (USA), Velma Jackman (USA), Jim Curran (USA)

[www.salus.global/article-show/ehd2019-p03](http://www.salus.global/article-show/ehd2019-p03)

**P04 How will healthcare design in China be impacted by social and health policies, and demographic and population health trends?**

Sophie Crocker (UK), Upali Nanda (USA)

[www.salus.global/article-show/ehd2019-p04](http://www.salus.global/article-show/ehd2019-p04)

**P05 Attention! The link between aesthetic features of the built environment and their restorative properties**

Richard Jedon (Czech Republic), Nour Tawil (Lebanon)

[www.salus.global/article-show/ehd2019-p05](http://www.salus.global/article-show/ehd2019-p05)

**P06 Visualising a global index of future-readiness for healthcare challenges**

Gerard Briscoe (UK), Gail Ramster (UK), Nicola Evans (UK)

[www.salus.global/article-show/ehd2019-p06](http://www.salus.global/article-show/ehd2019-p06)

**P07 Enabling transformative health and social care delivery models through high-quality design**

Jonathan Turner (UK), Nicola Clemo (UK)

[www.salus.global/article-show/ehd2019-p07](http://www.salus.global/article-show/ehd2019-p07)

**P08 Lessons from a new paradigm of designing with community for community**

Tama Duffy Day (USA), Michael Crawford (USA)

[www.salus.global/article-show/ehd2019-p08](http://www.salus.global/article-show/ehd2019-p08)

**P09 Integrating health and social care for the elderly**  
 Paul Yeomans (UK)  
[www.salus.global/article-show/ehd2019-p09](http://www.salus.global/article-show/ehd2019-p09)

**P10 Joining the dots – addressing inequity with unequal care in the first 1000 days**  
 Dr Nick Baker (New Zealand)  
[www.salus.global/article-show/ehd2019-p10](http://www.salus.global/article-show/ehd2019-p10)

**P11 Our changing communities – designing for integrated healthcare**  
 Suzanne MacCormick (UK)  
[www.salus.global/article-show/ehd2019-p11](http://www.salus.global/article-show/ehd2019-p11)

**P12 Socio-spatial dynamics in psychiatric wards: small-scale institutions in the community**  
 Dr Evangelia Chrysikou (UK)  
[www.salus.global/article-show/ehd2019-p12](http://www.salus.global/article-show/ehd2019-p12)

**P13 Carrefour santé d'Orléans – a gathering place for health**  
 Jason-Emery Groen (Canada),  
 Mélanie Potvin-Simon (Canada)  
[www.salus.global/article-show/ehd2019-p13](http://www.salus.global/article-show/ehd2019-p13)

**P14 Designing accessible and affordable place-based healthcare in the US**  
 Erin Sharp Newton (USA),  
 Ben P Lee (USA)  
[www.salus.global/article-show/ehd2019-p14](http://www.salus.global/article-show/ehd2019-p14)

**P15 Should healthcare planning be accredited as a standalone profession?**  
 Paul Sheldon (UK)  
[www.salus.global/article-show/ehd2019-p15](http://www.salus.global/article-show/ehd2019-p15)

**P16 Room with a view: how staff engagement led to a shared vision of the future**  
 Gabryela Feldman (USA),  
 Lisa Dutterer (USA), Helene Burns (USA),  
 Mark Palmer (USA)  
[www.salus.global/article-show/ehd2019-p16](http://www.salus.global/article-show/ehd2019-p16)

**P17 Medical architecture innovation: an evidence-based healthcare design moved to homes for management of long-term chronic inflammatory conditions**  
 Eva Hernández-García (Spain)  
[www.salus.global/article-show/ehd2019-p17](http://www.salus.global/article-show/ehd2019-p17)

**P18 Building Blocks for Clinicians**  
 Kate Bradley (UK), Emma Stockton (UK),  
 Elizabeth Whelan (UK),  
 Jennifer Whinnett (UK)  
[www.salus.global/article-show/ehd2019-p18](http://www.salus.global/article-show/ehd2019-p18)

**P19 More storage and better snacks – have we reached peak stakeholder engagement in health facility planning?**  
 Tina Nolan (UK)  
[www.salus.global/article-show/ehd2019-p19](http://www.salus.global/article-show/ehd2019-p19)

**P20 Systems transcend place, people live it**  
 Tina Nolan (UK), John Kelly (UK),  
 Regina Kennedy (UK)  
[www.salus.global/article-show/ehd2019-p20](http://www.salus.global/article-show/ehd2019-p20)

**P21 Temporary beauty? Modular prefabrication – the quick fix and the long goodbye**  
 Kelsey Price (UK), Nathaniel Hobbs (UK),  
 John Kelly (UK)  
[www.salus.global/article-show/ehd2019-p21](http://www.salus.global/article-show/ehd2019-p21)

**P22 Pharmacogenetics: the patient-centric approach to situated and locationless medicine**  
 Emma Smyth (UK)  
[www.salus.global/article-show/ehd2019-p22](http://www.salus.global/article-show/ehd2019-p22)

**P23 How are existing outpatient waiting areas in China used, occupied and functioning? A pilot study**  
 Sophie Crocker (UK), Upali Nanda (USA)  
[www.salus.global/article-show/ehd2019-p23](http://www.salus.global/article-show/ehd2019-p23)

- P24 Multi-drug resistant pathogens in water systems – key risks and mitigation by design**  
Elise Maynard (UK)  
[www.salus.global/article-show/ehd2019-p24](http://www.salus.global/article-show/ehd2019-p24)
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- P25 GOSH Zayed Research Centre – blurring the boundaries between medicine and research**  
Graham Cossons (UK), Matthew Tulley (UK)  
[www.salus.global/article-show/ehd2019-p25](http://www.salus.global/article-show/ehd2019-p25)
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- P26 How digital and medical technology convergence is transforming health of developing countries**  
Gary Hamilton (USA)  
[www.salus.global/article-show/ehd2019-p26](http://www.salus.global/article-show/ehd2019-p26)
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- P27 The digital divide: examining the use and access to e-health based technologies by millennials and older adults**  
Delana Theiventhiran (Canada), Dr Wally J Bartfay (Canada), Dr Caroline Barakat-Haddad (Canada), Dr Terry Wu (Canada)  
[www.salus.global/article-show/ehd2019-p27](http://www.salus.global/article-show/ehd2019-p27)
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- P28 Creating a second nurse – how can a truly smart hospital empower patients?**  
Matthew Marson (UK)  
[www.salus.global/article-show/ehd2019-p28](http://www.salus.global/article-show/ehd2019-p28)
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- P29 Strategic operations – doing more with less**  
Sarah Holton (USA), Frank Kittredge (USA), Jane Ho (UK) Ben Martin (UK)  
[www.salus.global/article-show/ehd2019-p29](http://www.salus.global/article-show/ehd2019-p29)
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- P30 Wellbeing in crisis: patient-centred journey for mental health patients in the emergency department**  
William Wang (UK), Dr Barbara Cleaver (UK)  
[www.salus.global/article-show/ehd2019-p30](http://www.salus.global/article-show/ehd2019-p30)
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- P31 How architectural elements can influence subjective experience and emotional state of patients and therefore facilitate the healing process**  
Nour Tawil (Lebanon),  
Richard Jedon (Czech Republic)  
[www.salus.global/article-show/ehd2019-p31](http://www.salus.global/article-show/ehd2019-p31)
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- P32 Opportunity for improvement with BIM and Lean methodology in the Santa Caterina Hospital extension**  
Laia Isern Meix (Spain), Albert Vitaller Sanitro (Spain), Eva Roense (Spain)  
[www.salus.global/article-show/ehd2019-p32](http://www.salus.global/article-show/ehd2019-p32)
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- P33 Risk management in NHS healthcare infrastructure projects**  
Songyang Li (UK), Andrew Price (UK), Dr Mohamed Osmani (UK)  
[www.salus.global/article-show/ehd2019-p33](http://www.salus.global/article-show/ehd2019-p33)
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- P34 Healthcare delivery in the 21st century and integration with the built environment**  
Vivienne Reiss (UK), Hannes Koch (UK), Mark Titchner (UK)  
[www.salus.global/article-show/ehd2019-p34](http://www.salus.global/article-show/ehd2019-p34)
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- P35 Building performance for people**  
Eszter Gulacsy (UK), Michelle O'Neill (UK)  
[www.salus.global/article-show/ehd2019-p35](http://www.salus.global/article-show/ehd2019-p35)
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- P36 Kachumbala Health Centre 3 – a new maternity ward for the people of Kachumbala**  
Jessica Karsten (UK), Dan Flower (UK)  
[www.salus.global/article-show/ehd2019-p36](http://www.salus.global/article-show/ehd2019-p36)
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- P37 When does a chapel stop being a chapel? Celebrating the past and embracing the future during the redevelopment of the Royal Sussex County Hospital**  
Anna Barnes (UK),  
Samantha Sharman (UK)  
[www.salus.global/article-show/ehd2019-p37](http://www.salus.global/article-show/ehd2019-p37)

**P38 Health systems on Mars?**

Alice Liang (Canada),  
Karine Quigley (Canada)  
[www.salus.global/article-show/ehd2019-p38](http://www.salus.global/article-show/ehd2019-p38)

**P39 Flexibility and adaptability: needs, types and value in future healthcare design**

Jane Ho (UK), Dan Flower (UK), Paul Sawyers (UK), Upali Nanda (USA), Melissa Hoelting (USA), Ian Hurst (UK), Richard Cantlay (UK), Alex Tomes (UK), Rhydian Morgan (UK)  
[www.salus.global/article-show/ehd2019-p39](http://www.salus.global/article-show/ehd2019-p39)

**P40 Patient-centred materials selection for healthcare design**

Dr Sarah Wilkes (UK)  
[www.salus.global/article-show/ehd2019-p40](http://www.salus.global/article-show/ehd2019-p40)

**P41 Creating a comfortable environment for children and young people with visual and hearing impairment**

Susan Meade (UK)  
[www.salus.global/article-show/ehd2019-p41](http://www.salus.global/article-show/ehd2019-p41)

**P42 Visual contact between patient rooms and corridor: an evaluation of the design in four Swedish inpatient wards**

Anna Arias Ortega (Sweden), Magnus Carlstrand (Sweden), Saga Karlsson (Sweden)  
[www.salus.global/article-show/ehd2019-p42](http://www.salus.global/article-show/ehd2019-p42)

**P43 Healthcare at home: designing for flexibility**

Mohammed Ul-Haq (UK), Neil Orpwood (UK)  
[www.salus.global/article-show/ehd2019-p43](http://www.salus.global/article-show/ehd2019-p43)

**P44 What can healthcare design learn from workplace change management?**

Catherine Zeliotis (UK), Giuseppe Boscherini (UK)  
[www.salus.global/article-show/ehd2019-p44](http://www.salus.global/article-show/ehd2019-p44)

**P45 How to please everybody: making art for toddlers and teens across multiple conditions at Evelina London Children's Hospital**

Louisa Williams (UK), Martin Jones (UK), Peter Shenai (UK), Jason Busby (UK)  
[www.salus.global/article-show/ehd2019-p45](http://www.salus.global/article-show/ehd2019-p45)

**P46 The sensory journey redefined**

Gavin Crook (UK), Jonathan Rush (UK)  
[www.salus.global/article-show/ehd2019-p46](http://www.salus.global/article-show/ehd2019-p46)

**P47 Designing for challenging behaviours: a manufacturer's perspective**

Antonio Lourenco (UK), Richard Burn (UK), Saloni Robinson (UK), Karen Dean (UK)  
[www.salus.global/article-show/ehd2019-p47](http://www.salus.global/article-show/ehd2019-p47)

**P48 Illuminated biophilic design reducing patient anxiety in the healing environment**

Sharon Parish (UK), Steve Nelson (UK)  
[www.salus.global/article-show/ehd2019-p48](http://www.salus.global/article-show/ehd2019-p48)

**P49 Healthcare residence for elderly in Padua, Italy**

Davide Ruzzon (Italy)  
[www.salus.global/article-show/ehd2019-p49](http://www.salus.global/article-show/ehd2019-p49)

**P50 An ancient children's hospital as an efficient sustainable structure**

Nassila Ghida (Algeria), Kenza Boussora (Algeria), Carlo Atzeni (Italy), Ferdinando Fornara (Italy)  
[www.salus.global/article-show/ehd2019-p50](http://www.salus.global/article-show/ehd2019-p50)

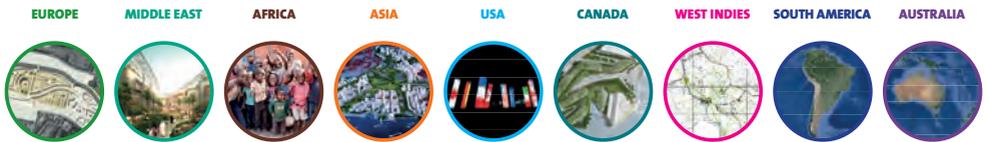
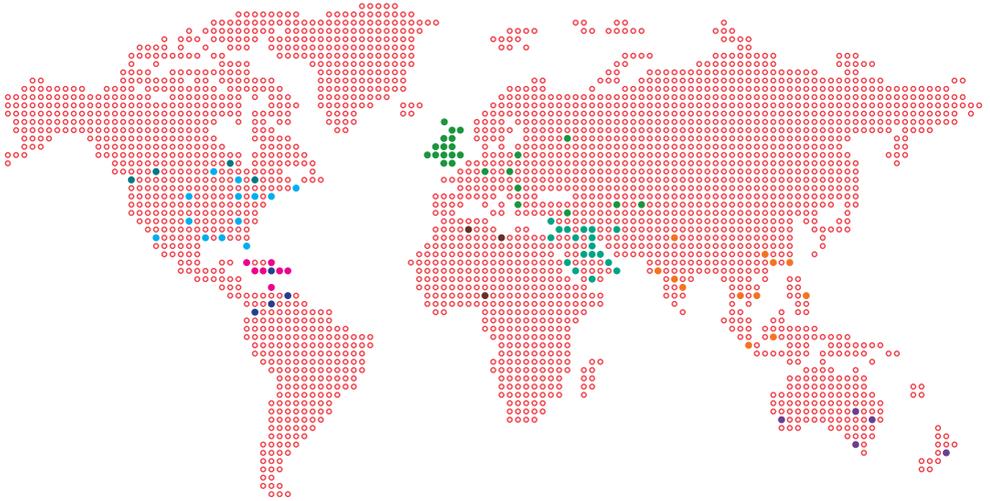
**P51 The evolving role of the hospital as a community anchor and social activator**

Chris McQuillan (Canada)  
[www.salus.global/article-show/ehd2019-p51](http://www.salus.global/article-show/ehd2019-p51)

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# LLEWELYN DAVIES

- Architecture
- Interior design
- Master planning
- Graphic design
- Urban design



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Regarded as the UK's most successful exporter of hospital planning and design, Llewelyn Davies has delivered over 250 healthcare projects in more than 80 countries worldwide over the last 6 decades. We are active in Africa and the Middle East and are currently working on several major hospitals in Greece, Trinidad & Tobago and Qatar.

In the UK, Llewelyn Davies maintains its position as a proponent of flexible, patient-centric solutions for a range of primary, community and acute care developments. Our deep understanding of master planning further underpins our value to healthcare clients in estate planning and in complex planning environments.

## Healthcare Design (Over 25,000 sqm)

- A01** Clinical Services Building, Blacktown Hospital, Australia
  - A02** Defence and National Rehabilitation Centre, UK
  - A03** The Greater Accra Regional Hospital at Ridge, Ghana
  - A04** NewYork-Presbyterian, David H. Koch Center, USA
- 

## Healthcare Design (Under 25,000 sqm)

- A05** The Christie Proton Beam Therapy Centre, UK
  - A06** Cripps Health Centre, UK
  - A07** Haraldsplass Hospital – new ward building, Norway
  - A08** Punmu and Parnngurr Clinics, Australia
- 

## Mental Health Design

- A09** Mental Health Hospital in Skejby, Denmark
  - A10** Orygen and OYH Parkville, Australia
  - A11** Wooden Forest, Netherlands
- 

## Interior Design and Arts

- A12** Erasmus MC, Netherlands
- A13** The New Children's Hospital, Finland
- A14** St Clair Gardens – Recovery Mental Health Centre for Mind, UK

## Future Healthcare Design

- A15**     Munini District Hospital, Rwanda
  - A16**     New North Zealand Hospital, Denmark
  - A17**     Nuuk Psychiatric Clinic, Greenland
- 

## Design for Adaptation and Transformation

- A18**     Carlanderska Hospital, Sweden
  - A19**     Hamad Medical Corporation Medical Education and Simulation Center, Qatar
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## Design Innovation for Quality Improvement

- A20**     NewYork-Presbyterian, David H. Koch Center, USA
  - A21**     Vienna North Hospital – Clinic Floridsdorf, Austria
- 

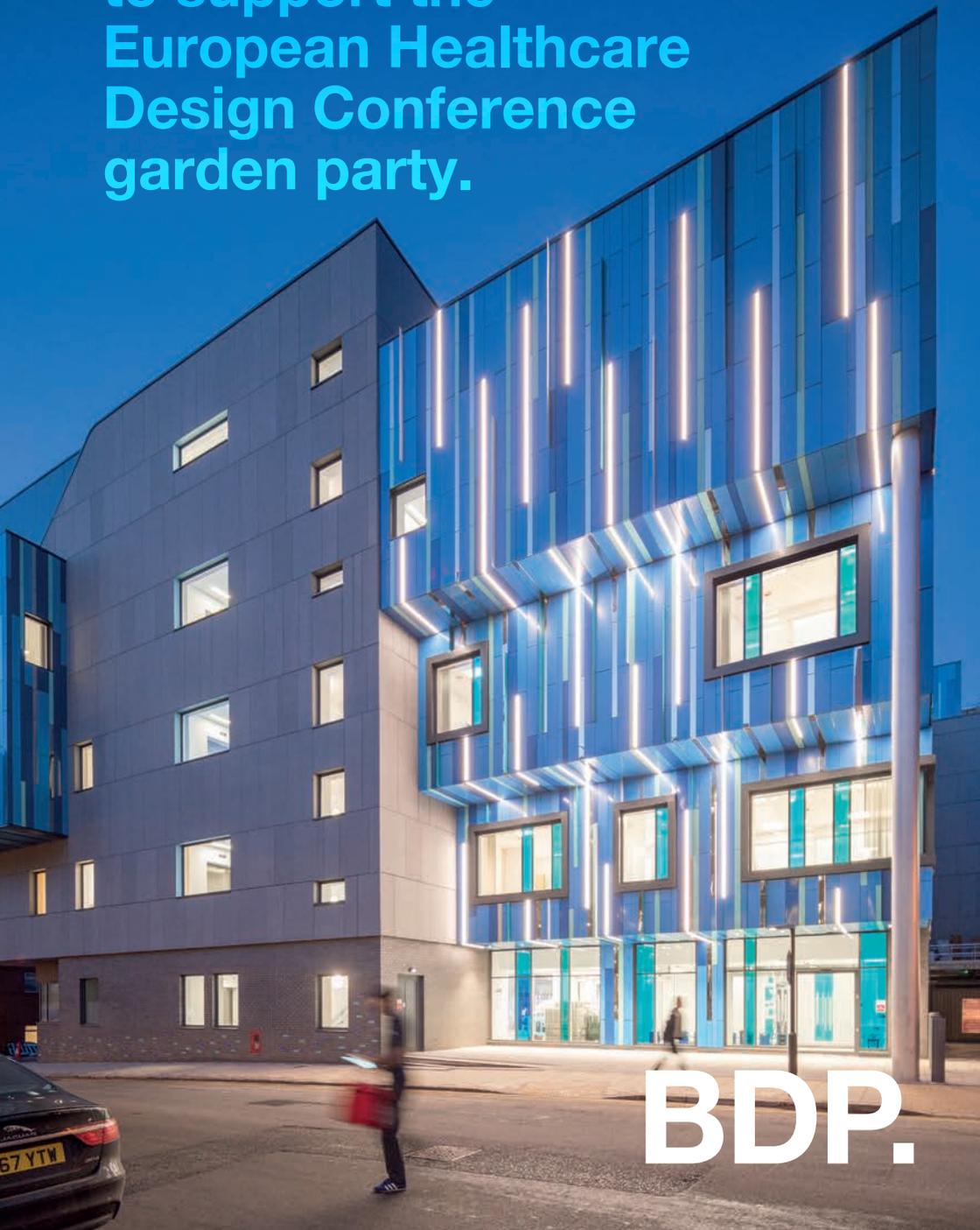
## Design for Health and Wellness

- A22**     Defence and National Rehabilitation Centre, UK
  - A23**     Punmu and Parngurr Clinics, Australia
  - A24**     Sachibondu Hospital, Zambia
  - A25**     Vienna North Hospital – Clinic Floridsdorf, Austria
- 

## Health and Life Sciences Design

- A26**     Alder Hey Children's Hospital: Institute in the Park, UK
- A27**     The University of South Australia Cancer Research Institute, Australia

**BDP is delighted  
to support the  
European Healthcare  
Design Conference  
garden party.**



**BDP.**

## WELCOME DRINKS RECEPTION

**Keynote address: Evidence-based empathy**  
**Magdy El Ridy, Head of global healthcare alliances, Tarkett** (pictured)

The Welcome Drinks Reception takes place immediately after the close of the first day's proceedings on the evening of Monday 17 June in the Osler and Long Rooms.

Offering a fantastic chance to network and unwind, the reception will feature a classical musical performance by the Royal College of Music (RCM).

Founded in 1882 by the then Prince of Wales (later Edward VII), the RCM has trained some of the most important figures in British and international music, including composers such as Holst, Vaughan Williams and Britten; conductors such as Leopold Stokowski, Sir Colin Davis and Sir Roger Norrington; and singers such as Dame Joan Sutherland, Sir Thomas Allen and Alfie Boe.

The European Healthcare Design 2019 exhibition will also be open during the Welcome Drinks Reception.

Supported by:



**Venue:** Osler and Long Rooms

**Date:** Monday 17 June

**Time:** 18.00–20.00



## GARDEN PARTY

Held outside in the informal surroundings of the medicinal gardens of the Royal College of Physicians, the European Healthcare Design 2019 Congress Garden Party will immediately follow the end of the congress and the European Healthcare Design Awards ceremony.

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

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

**Venue:** Medicinal Gardens

**Date:** Tuesday 18 June

**Time:** 18.30–22.00



Supported by:

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Participants in the European Healthcare Design 2019 Congress get the opportunity to choose one of three 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: London

**Departure point:** Melia White House Hotel

**Date:** 19 June 2019

**Time:** 08.45–17.30

#### University College London Hospitals (UCLH)

Delegates will hear presentations on the key learnings of innovative design and construction techniques applied to the 34,600m<sup>2</sup> UCLH PBT (Proton Beam Therapy) Centre and Phase 4 Hospital. A tour of the facility, currently under construction by Bouygues UK, will follow. The centre has been designed by Scott Tallon Walker as architects, CampbellReith as structural engineers, and Arup as MEP engineers. The cyclotron to produce the beam, and the gantries to deliver it to patients, commenced installation in June 2018, with completion of the facility expected in 2020. This is one of only two NHS sites in the UK that will be offering this specialist radiotherapy for cancer patients, and it's thought to be only the second PBT centre in the world to be constructed underground with facilities above. Located above the underground PBT centre will be a modern, purpose-built inpatient facility, which will include up to 135 inpatient beds for specialist care, as well as a complementary short-stay surgical centre. Imaging facilities and critical care support functions will be available on site.



#### Chase Farm Hospital, redevelopment

This £130m redevelopment is said to be the largest project delivered under the ProCure21+ framework. The project was commissioned in 2014, shortly after the merger of the Royal Free London NHS Foundation Trust with Barnet and Chase Farm Hospitals NHS Trust, and completed in 2018. Replacing the outdated campus, the new design responds to campus sprawl through simple, clear wayfinding. Landscaping forms part of the healing process with links to therapeutic gardens, sensory planting, sustainable urban drainage systems, and green roofs. Varying in height from two to five storeys, entry is via both ends of an airy double-height concourse while the reception is replaced by mobile help points. The outpatient department is broken into clusters to form a village with double-height waiting zones and countryside views. A series of small-scale finger blocks of two and three storeys help create a scale that reflects the residential development.



## Study tour 2: London and Reading

**Departure point:** Melia White House Hotel

**Date:** 19 June 2019

**Time:** 08.30–18.00



### Royal National Orthopaedic Hospital NHS Trust

The RNOH is the UK's largest specialist orthopaedic hospital and part of the Royal National Orthopaedic Hospital NHS Trust. The trust has embarked on a programme to redevelop the entire Stanmore site over 12 phases, concentrating development in a central part of the site. The first phase saw the opening of The Stanmore Building (TSB) in December 2018, allowing patients to receive specialist orthopaedic care in a state-of-the-art and fit-for-purpose setting. The TSB is a 119-bed inpatient facility over four floors, accommodating: children and young people; adult acute (over two floors); and private care – with three therapy gyms embedded into the wards. Architects BDP, along with Balfour Beatty, have delivered an HBN-compliant building that meets the RNOH's vision. Updated technology includes the introduction of a new nurse-call system, vocera, as well as Pepper the Robot. Funded by the trust's charity, the artwork installed throughout creates an inspiring, welcoming environment.

### The Rutherford Cancer Centre, Thames Valley

The Rutherford Cancer Centre, Thames Valley provides the South East of the UK with its first proton beam healthcare facility. Delivered by its sister firm, Rutherford Estates, and funded by the group company, Proton Partners International, the £38m centre offers CT, MRI, infusion therapy, high-precision radiotherapy, and proton beam therapy, featuring technology from Ion Beam Applications (IBA), Elekta and Philips. Internally, the experience is more akin to a health spa than a medical institution, carefully designed to help people feel relaxed. The two-storey scheme was delivered with design partners JDDK Architects, Desco MEP Engineering, Fairhurst structural, civil and planning engineers, landscape designer Oobe, and main contractor Graham Construction. Pravida Bau created the radiation vaults, while Veritas delivered the linear accelerator rooms with Smartvue windows to allow natural light into the vaults.





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Rutherford Estates agenda is to transform oncology spaces and as the world's leading developer of precision radiotherapy centres and the asset manager of our own Rutherford Cancer Centres, we are present for the full lifecycle of the building.

Rutherford Estates has created an ecosystem of many leading firms in the design, construction and installation of diagnostic and treatment centres. The patient experience is at the core of our design and we are positively transforming the experience of both patients and their families.

For further information  
**0800 210 0402**  
[therutherford.com](http://therutherford.com)

**Rutherford**  
Estates

**Rutherford**  
Cancer Centres

### Study tour 3: Cambridge

**Departure point:** Melia White House Hotel

**Date:** 19 June 2019

**Time:** 07.45–17.30

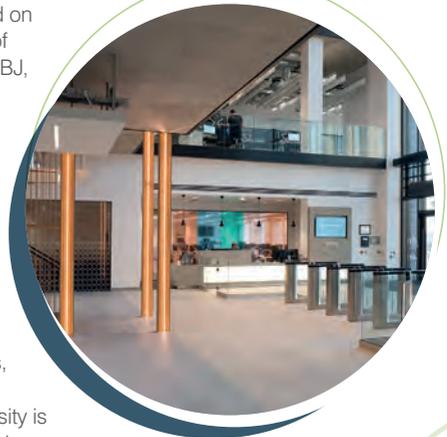
#### Royal Papworth Hospital, Cambridge

Designed by HOK, the new Royal Papworth Hospital is a state-of-the-art cardiothoracic facility on the Cambridge Biomedical Campus. The holistic design concept embraces the NHS Foundation Trust's ambition to thrive as a centre of excellence in cardiothoracic services for the East of England. The new 310-bed hospital is in a beautiful park-like setting and will provide a comfortable, easy-to-navigate environment. Meeting places for patients, family and staff in the main atrium, gardens and restaurant will enhance communication and collaboration across the campus. The hospital layout creates separate zones for outpatient care, emergency services, and diagnostic and treatment functions. Each inpatient floor incorporates two nursing units. An elliptical double-corridor design results in a compact, accessible layout.



#### Abcam, Cambridge Biomedical Campus

Abcam's new state-of-the-art global headquarters is located on the Cambridge Biomedical Campus (CBC), a leading hub of healthcare, science and medical research. Designed by NBBJ, the new 100,000 sq ft life sciences laboratory and office facility forms part of the second phase of CBC's new global healthcare village. The new building, which is now home to more than 450 Abcam staff, including R&D, laboratory, logistics, corporate and commercial departments, provides 75 per cent more space, features fully flexible laboratory configurations, and has new instrumentation and technology for enhanced scientific capabilities. It has also been designed to support agile working and provide introvert and extrovert workspaces. In addition, the building has been developed to meet global sustainability standards, enhance employee wellbeing, and help protect natural resources in the environment. The campus' natural biodiversity is enhanced through indigenous planting, bird boxes, and landscape rainwater management using bioswales.





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Alan Kondys: 07816 514 494 [alan.kondys@vinciconstruction.co.uk](mailto:alan.kondys@vinciconstruction.co.uk)

John Cole: 07802 251 467 [j.cole@srm.com](mailto:j.cole@srm.com)

## Celebrating the finest in global healthcare design

The European Healthcare Design Awards 2019 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 Architects for Health and SALUS Global Knowledge Exchange, 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 5th European Healthcare Design 2019 Congress on Tuesday 18 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.

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](http://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.



## 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:**  
Tricia Down,  
Southmead Hospital, UK  
Ganesh Suntharalingam,  
Intensive Care Society, UK

### Shortlist

**Clinical Services Building, Blacktown Hospital**

Commissioned by NSW Health Infrastructure  
Designed by Jacobs Architects (*pic: bottom*)

**Defence and National Rehabilitation Centre**

Commissioned by Black Stork Charity / BS Stanford  
Designed by Arup, Steffian Bradley Architects and  
John Simpson Architects  
Project managers: Arup  
Cost managers: Osbornes (Quantity  
Surveyors)

**The Greater Accra Regional Hospital  
at Ridge**

Commissioned by Bouygues Bâtiment  
International  
Designed by Perkins+Will (*pic: top*)

**NewYork-Presbyterian, David H.  
Koch Center**

Commissioned by NewYork-  
Presbyterian  
Designed by Ballinger, HOK, and  
Pei Cobb Freed & Partners



## Longlist

### Dumfries and Galloway Royal Infirmary

Commissioned by NHS Dumfries and Galloway  
Designed by Ryder Architecture and NBBJ

### Hospital Maas en Kempen

Commissioned by Hospital Maas en Kempen, Maaseik  
Designed by Gortemaker Algra Feenstra architects

### Ingång 100

Commissioned by Fastighet & Service, Region Uppsala  
Designed by White Arkitekter

### Koc University Medical Sciences Campus

Commissioned by Koc University  
Designed by Kreatif Architects and CannonDesign

### Medicine Hat Regional Hospital

Commissioned by Alberta Infrastructure  
Designed by Diamond Schmitt Architects and Gibbs Gage Architects (architects in joint venture)

### Northern Beaches Hospital

Commissioned by Colliers International representing Healthscope  
Designed by BVN

### Our Lady of Lourdes Hospital, Drogheda

Commissioned by Health Service Executive, Dublin Mid-Leinster  
Designed by Wejchert Architects

### Royal Papworth Hospital

Commissioned by Royal Papworth Hospital NHS Foundation Trust  
Principal contractor: Skanska UK  
Designed by HOK International

### Paula and Joseph C. "Rusty" Walter III Tower

Commissioned by Houston Methodist  
Designed by EYP

### Perth Children's Hospital

Commissioned by John Holland Group for Child and Adolescent Health Services  
Designed by JCY Architects and Urban Designers, Cox Architecture, and Billard Leece Partnership with HKS

### Princess Máxima Center

Commissioned by Board of the Princess Máxima Center  
Designed by LIAG architects and building advisors

### Prinses Máxima Centrum

Commissioned by Prinses Máxima Centrum voor kinderoncologie  
Designed by MMEK'

### Stanton Territorial Hospital

Commissioned by Boreal Health Partnership  
Designed by Kasian Architecture

### The New Children's Hospital, Helsinki

Commissioned by New Children's Hospital Foundation / Haatela Project Management  
Designed by SARC Architects in collaboration with Architect Group Reino Koivula

### Vienna North Hospital – Clinic Floridsdorf

Commissioned by Vienna Hospital Association  
Designed by Health Team Albert Wimmer ZT

## 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 Centre,  
Netherlands

**Panel judges:**

Coen van den Wijngaart,  
Art & Build, Belgium  
Hank Adams, HDR, USA

### Shortlist

**The Christie Proton Beam Therapy Centre**

Commissioned by The Christie NHS Foundation Trust  
Designed by HKS Architects (*pic: bottom*)

**Cripps Health Centre**

Commissioned by University of Nottingham and funded by the Cripps Foundation  
Designed by: CPMG Architects  
Engineers: Arup  
Project managers: Faithful and Gould

**Haraldsplass Hospital – new ward building**

Commissioned by Haraldsplass  
Diakonale Stiftelse  
Designed by C.F. Møller Architects  
(*pic: top*)

**Punmu and Parngurr Clinics**

Commissioned by Puntukurnu  
Aboriginal Medical Service  
Designed by Kaunitz Yeung  
Architecture



**Longlist**

**Chase Farm Hospital Redevelopment**

Commissioned by Royal Free London NHS Foundation Trust with Barnet and Chase Farm Hospitals NHS Trust  
Designed by IBI Group

**Christchurch Hospital – Outpatients Building**

Commissioned by Ministry of Health, New Zealand  
Designed by Jacobs Group and CCM Architects

**Hopewood Campus**

Commissioned by Nottinghamshire Healthcare NHS Foundation Trust  
Designed by Gilling Dod Architects  
Structural engineer: WSP UK

**Hôpital de La Tour**

Commissioned by Gestron / Sete  
Designed by John Cooper Architecture

**Hospital Quirónsalud Córdoba**

Commissioned by Quirónsalud  
Designed by Eneo Arquitectura

**Karratha Health Campus**

Commissioned by West Australian Country Health Services  
Designed by HASSELL

**Saint Josephs, Mount Desert Care Village**

Commissioned by Bon Secours Health System  
Designed by O’Connell Mahon Architects

**Schoen Clinic**

Commissioned by Schoen Klinik  
Designed by BDP  
Principal contractor: ISG

**Specialized Rehabilitation Hospital**

Commissioned by Capital Health  
Designed by HLM

**St Clair Gardens – Recovery Mental Health Centre for Mind**

Commissioned by Coventry & Warwickshire Mind  
Designed by IDP

**The Prince and Princess of Wales Hospice**

Commissioned by The Prince and Princess of Wales Hospice  
Designed by Ryder Architecture

**The Rutherford Cancer Centre, Thames Valley**

Commissioned by Rutherford Estates  
Designed by JDDK





## Future Healthcare Design

A future healthcare project that can demonstrate the potential for outstanding outcomes in masterplanning, placemaking, wellness and sustainability, in alignment with the strategic requirements of the healthcare provider to transform its services within the wider community, regional or national health system.



**Lead judge:**

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

**Panel judges:**

Paul Bell, Ryder Architecture, UK

Hieronimus Nickl,  
Nickl & Partner, Germany

### Shortlist

**Munini District Hospital**

Commissioned by Republic of Rwanda Ministry of Health  
Designed by MASS Design Group

**New North Zealand Hospital**

Commissioned by Capital Region, New North Zealand Hospital  
Designed by Herzog & de Meuron and Vilhelm Lauritzen Architects (pic: bottom)

**Nuuk Psychiatric Clinic**

Commissioned by Agency for Health and Prevention, Greenlandic Health Department  
Designed by White arkitekter (pic: top)



## Longlist

### CapitalMed Medical City

Commissioned by Egyptians for Healthcare Services  
Designed by HKS Architects

### Cayman Islands Long-Term Residential Mental Health Facility

Commissioned by Ministry of Health, Environment, Culture & Housing, Cayman Islands Government  
Designed by Montgomery Sisam Architects

### Dell Seton Medical Center at the University of Texas

Commissioned by Ascension Seton Healthcare Family  
Designed by HKS Architects  
Building services: WSP

### Grey Base Hospital

Commissioned by Ministry of Health, New Zealand  
Designed by Jacobs Group and CCM Architects

### Meir Medical Center – Landscape Design Development

Commissioned by Meir Medical Center  
Designed by Conrad Gargett

### Michael Garron Hospital, Phase 1 New Patient Tower

Commissioned by EllisDon Infrastructure Healthcare, Michael Garron Hospital, Infrastructure Ontario  
Designed by B+H Architects in joint venture partnership with Diamond Schmitt Architects

### New Children's Hospital, Belfast

Commissioned by Belfast Health and Social Care Trust  
Designed by AECOM in collaboration with Isherwood & Ellis

### New Redemption Hospital Caldwell

Commissioned by Liberian Ministry of Health and The World Bank  
Designed by MASS Design Group

### Peel Manor Seniors Health and Wellness Village

Commissioned by Region of Peel  
Designed by Montgomery Sisam Architects

### Puntuturnu Aboriginal Medical Service Healthcare Hub, Newman

Commissioned by Puntuturnu Aboriginal Medical Service  
Designed by Kaunitz Yeung Architecture

### South Tarawa Hospital Master Plan

Commissioned by New Zealand Ministry of Foreign Affairs & Trade (MFAT)  
Designed by Jacobs Group (Australia)

### Südspidol

Commissioned by Centre Hospitalier Emile Mayrisch, Luxembourg  
Designed by Albert Wimmer ZT

### Wakefield Hospital

Commissioned by West Park Healthcare Center  
Designed by CannonDesign

## Health and Life Sciences Design

An outstanding health and life sciences project that supports the alignment of training and education, clinical research, informatics, innovation and healthcare delivery, with a focus to improve patient and population health outcomes by translating research into practice to develop integrated health services.



**Lead judge:**

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

**Panel judges:**

Karin Imoberdorf  
Lead Consultants, Switzerland  
Tye Farrow, Farrow Partners, Canada

### Shortlist

**Alder Hey Children’s Hospital: Institute in the Park**

Commissioned by Alder Hey Children’s NHS  
Foundation Trust  
Designed by Hopkins Architects (*pic: bottom*)

**The University of South Australia Cancer  
Research Institute**

Commissioned by UniSA  
Designed by BVN in association with SPA (*pic: top*)

### Longlist

**Didactic Centre of Medical Simulation, Medical  
University Wrocław, Poland**

Commissioned by Wrocław Medical University  
Designed by Heinle, Wischer und Partner

**Helmholtz Diabetes Center München**

Commissioned by Helmholtz Zentrum München  
Designed by HDR

**Quadram Institute**

Commissioned by Quadram Institute Bioscience  
Designed by NBBJ



## 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:**  
Jonathan Erskine,  
European Health Property  
Network, UK

**Panel judges:**  
Alice Liang, Montgomery  
Sisam, Canada  
Mungo Smith, MAA, Australia

### Shortlist

#### Mental Health Hospital in Skejby

Commissioned by Central Denmark Region  
Designed by Arkitema Architects (*pic: top*)

#### Orygen and OYH Parkville

Commissioned by Department of Health and  
Human Services  
Designed by Billard Leece Partnership

#### Wooden Forest

Commissioned by Stichting Ipse de Bruggen  
Designed by AM\_A Andrea Möhn Architects  
(*pic: bottom*)

### Longlist

#### Fieldhead Hospital – Unity Centre

Commissioned by South West Yorkshire Partnership  
NHS Foundation Trust  
Designed by Stephen George + Partners

#### Hopewood Campus

Commissioned by Nottinghamshire Healthcare  
NHS Foundation Trust  
Designed by Gilling Dod Architects  
Structural engineer: WSP UK

#### Rathview Mental Healthcare Facility

Commissioned by Western Health and Social  
Care Trust; Designed by TODD Architects



#### S136 Journey in Charing Cross Hospital

Commissioned by Charing Cross Hospital, Imperial  
College Healthcare NHS Trust  
Designed by Royal College of Art

#### St Clair Gardens – Recovery Mental Health Centre for Mind

Commissioned by Coventry & Warwickshire Mind  
Designed by IDP

HOARE LEA (H.)

Healing environments  
of the future.  
Human-centred  
healthcare design.

Photo: BDP/Nick Caville

## 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:**  
David Powell,  
Alder Hey Children's Hospital, UK

**Panel judges:**  
Helina Kotilainen,  
Architect, Finland

Jonathan Wilson,  
GB Partnerships, UK

### Shortlist

#### Defence and National Rehabilitation Centre

Commissioned by Black Stork Charity / BS Stanford; Designed by Arup, Steffian Bradley Architects and John Simpson Architects; Project managers: Arup; Cost managers: Osbornes (Quantity Surveyors)

#### Punmu and Parngurr Clinics

Commissioned by Puntukurnu Aboriginal Medical Service; Designed by Kaunitz Yeung Architecture

#### Sachibondu Hospital

Commissioned by Sachibondu Christian Mission  
Designed by Orkidstudio with Structure Mode and HOK

#### Vienna North Hospital – Clinic Floridsdorf

Commissioned by Vienna Hospital Association  
Designed by Health Team Albert Wimmer ZT  
*(pic: bottom left)*

### Longlist

#### Northern Beaches Hospital

Commissioned by Colliers International representing Healthscope; Designed by BVN

#### ONE Heart Care

Commissioned by ONE Heart Care  
Designed by Sanam Samanian

#### Saint Josephs, Mount Desert Care Village

Commissioned by Bon Secours Health System  
Designed by O'Connell Mahon Architects

#### Specialized Rehabilitation Hospital

Commissioned by Capital Health; Designed by HLM

#### St Clair Gardens – Recovery Mental Health Centre for Mind

Commissioned by Coventry & Warwickshire Mind  
Designed by IDP



## Design for Adaptation and Transformation

An outstanding healthcare project that is small in scale but has a high transformational impact on resolving complex and difficult service design challenges in a location with significant constraints.



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

**Panel judges:**  
Chris Shaw,  
Medical Architecture, UK  
Jane McElroy, NBBJ, UK

### Shortlist

#### Carlanderska Hospital

Commissioned by Stiftelsen Carlanderska Hospital  
Designed by White arkitekter (*pic: top*)

#### Hamad Medical Corporation Medical Education and Simulation Center

Commissioned by Hamad Medical Corporation  
Designed by Perkins+Will with Dar Al-Handasah  
(*pic: bottom*)

### Longlist

#### Banner University Medical Center Phoenix – Emergency Department and Patient Tower

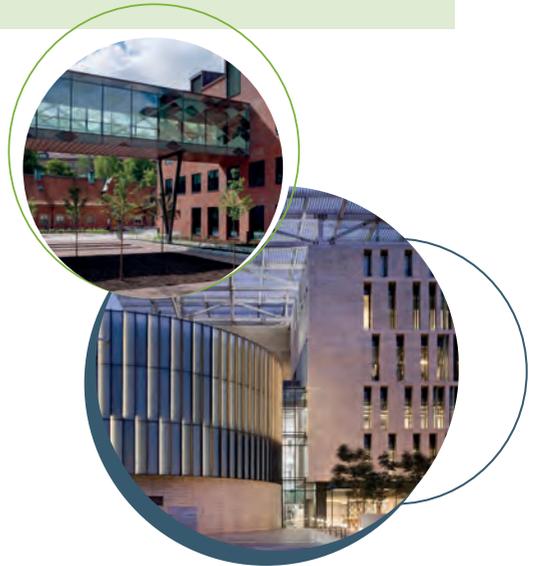
Commissioned by Banner Health  
Designed by HKS Architects  
Building services: WSP

#### Our Lady of Lourdes Hospital, Drogheda

Commissioned by Health Service Executive,  
Dublin Mid-Leinster  
Designed by Wejchert Architects

#### Virtua Samson Cancer Center

Commissioned by Virtua Health System  
Designed by Francis Cauffman 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:**  
Alexandra Coulter,  
Arts & Health South West, UK

**Panel judges:**  
Vivienne Reiss, Arts consultant, UK  
Pam Bate, Hopkins Architects, UK

### Shortlist

#### Erasmus MC

Commissioned by Erasmus MC  
Designed by EGM architects (*pic: top*)

#### The New Children's Hospital

Commissioned by New Children's Hospital  
Foundation / Haahntela Project Management  
Designed by SARC Architects and Architect Group  
Reino Koivula

#### St Clair Gardens – Recovery Mental Health Centre for Mind

Commissioned by Coventry & Warwickshire Mind  
Designed by IDP (*pic: bottom*)

### Longlist

#### Clinical Services Building, Blacktown Hospital

Commissioned by NSW Health Infrastructure  
Designed by Jacobs Architects

#### Homerton Emergency Art Scheme & Wayfinding

Commissioned by Homerton University  
Hospital NHS Foundation Trust  
Designed by Art in Site

#### Specialized Rehabilitation Hospital

Commissioned by Capital Health  
Designed by HLM



#### Stanton Territorial Hospital

Commissioned by Boreal Health Partnership  
Designed by Kasian Architecture

#### The Christie Proton Beam Therapy Centre

Commissioned by The Christie NHS  
Foundation Trust  
Designed by HKS Architects

#### Vienna North Hospital

Commissioned by Vienna Hospital Association  
Designed by Albert Wimmer ZT



# Ongoing innovation



2019

2017

2016



2012

2011

2009

2008

2005

2003



## Design Innovation for Quality Improvement

An innovation in system or service design, technology or industrial design that has had a transformational impact on the design of health services and/or the patient experience, improving quality, efficiency, sustainability and accessibility of care in a specific healthcare setting or across the continuum of primary, community and secondary care.



**Lead judge:**  
Jonathan West, Helen Hamlyn  
Centre for Design,  
Royal College of Art, UK

**Panel judges:**  
Christine Chadwick,  
GE Healthcare, Canada  
Danny Gibson, MJ Medical, UK



### Shortlist

**NewYork-Presbyterian, David H. Koch Center**

Commissioned by NewYork-Presbyterian  
Designed by Ballinger, HOK, and Pei Cobb Freed & Partners (*pic: bottom*)

**Vienna North Hospital – Clinic Floridsdorf**

Commissioned by Vienna Hospital Association  
Designed by Health Team Albert Wimmer ZT  
(*pic: top*)

### Longlist

**DigitalDiagnost C90 TubeHead**

Designed by Philips Design

**Illuminated Biophilic Design reducing patient anxiety in the healing environment**

Designed by Visualite

**Ingenia Ambition**

Designed by Philips Design

**Modul'up**

Designed by Forbo Flooring Systems



# Equipment Capital Planning, Advisory and Procurement

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Equipment Asset Management, Advisory and Procurement Services**

MTS are supported by a specialist team of Bio-Medical Engineers, Clinical Scientists; Radiographers, CIPS Qualified Procurement.

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- Business Cases
- Cost Advisory
- Room Data Sheet Management
- Specification and Technical Advisory
- Procurement and CIP Savings.
- Medical Device Management

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Please contact Ruth Strickland, Director on 01442216785 07775522948 email: [info@mtshealth.co.uk](mailto:info@mtshealth.co.uk)

## Keynote address: Designing the perfect health system: solving the global workforce crisis

Mark Britnell has dedicated his entire professional career to healthcare. Starting out in the NHS, he was the youngest-ever chief executive of a hospital trust, overseeing the largest new-build of a public-private partnership hospital in the UK, in Birmingham.

Mark went on to become director-general of the NHS before leaving to join KPMG in 2009, to head up its Global Centre of Excellence for Healthcare. Mark is now chairman and senior partner of healthcare, government and infrastructure at KPMG International. His experiences of leading health systems at both regional and national levels, working in both the public and private sectors, and for both payers and providers, gives Mark a unique insight into health systems, which makes him sought after to advise both governments and health organisations alike.

Drawing on his experience over the last 10 years, working in the health systems of 77 countries, Mark will explore some of the insights from two of his book publications, *In Search of the Perfect Health System*, and *Human: Solving the Global Workforce Crisis in Healthcare*.

In his first book, awarded best health and care book by the British Medical Association in 2016, and voted best health book in China by the Chinese Medical Association in 2017, Mark argues that no health system is perfect but that every country has something to teach and something to learn. He points to the 10 characteristics of a perfect health system but recognises all are underpinned by a healthy supply of motivated staff.

Unfortunately, as described in his second book, *Human*, this need comes at a time when the world is facing an 18 million shortfall in health workers by 2030. Mark refutes the idea, however, that demography is destiny and outlines his 10 global solutions to alleviate and confront this growing crisis.



**Mark Britnell** (UK)

Global chairman and senior partner for healthcare  
KPMG International



Specialized Rehabilitation Hospital, Abu Dhabi



Originally the Emirates French Hospital, this project is an existing, partially constructed facility (G+8 with 3 levels of basement), designed by AIA (Paris) on behalf of EFH in 2007 as a specialist Surgery Facility with 8 Operating Theatres. Following a peer review by HLM and LD, EFH have retendered the project as the Specialist Rehabilitation Hospital. 166 bed specialist rehabilitation centre with Wates carrying out construction works on site, starting with the stripping back of existing finishes to the insitu concrete structural frame.

Comprising; specialist rehabilitation facilities of: Imaging, Labs, Outpatients, Intensive Care, Paediatrics, Inpatient, VIP suite and Endoscopy unit, the new building is centred on a feature atrium surrounded by support facilities and patient clinical bedrooms to pull under one roof the services that are currently under provided across various locations within Abu Dhabi.

The existing building layout has been rationalised to provide standardisation wherever possible in the form of the bedrooms and ensuite pods, within the design constraints of the structure and basement parking requirements. Accommodation floors have been clustered to provide more efficient stacked service risers. VIP facilities have been moved to the more prestigious upper floors with dedicated access from a private entrance.

The new building will provide the patient with the necessary physical, social, emotional, vocational, and recreational skills to attain the highest level of independence and improve their quality of life. SRH will be developed to cater to an increasing number of patients requiring specialized rehabilitation care and those requiring sub-acute care after traumatic episodes.

**Keynote address: Joining the dots on design for health – from homes to hospitals, bodies to minds, things to data**

Much is known about the causes of premature death. Health services contribute a significant amount but no more – and probably less – than social, behavioural and environmental factors. Yet the focus of policy and spending is almost always primarily on service provision rather than the shaping and design of these other factors.

Hospitals continue to absorb a huge proportion of health budgets and have prompted some very useful thinking about how their designs can be more health-enhancing. Yet homes and workplaces, where people spend far more time, are often ill-suited to promoting long-term health.

I strongly endorse the spirit of this event, which is that health considerations should influence the design of every aspect of our environment, from products to homes, and public spaces to schools and hospitals.

In this keynote, I will share some of Nesta's work on influencing the social and behavioural aspects of health and some past work on mapping value in the built environment, so that planning decisions can better support physical and mental health. We're all familiar with some aspects of this – promoting walking, cycling, healthy diets and access to nature. But I'm also interested in the potential for what I call 'MEEs' – mind-enhancing environments that simultaneously reduce feelings of fear and threat while they also stimulate and challenge in ways that contribute to thriving.

Finally, I will talk about the emerging field of 'intelligence design' – combining data, machine and human intelligence to improve such things as the quality of air in cities. I will argue that this is a vital complement to the more familiar fields of physical design.



**Geoff Mulgan (UK)**

Chief executive  
Nesta



**John Cooper (UK)**

Architect and director  
John Cooper Architecture

## Blurring the boundaries – a new generation of NHS buildings

The 14th century Manichean heresy in the Cathar churches didn't last long. Partly, this was because the Catholic Church waged war on the priests and their congregations; as important, however, was its dualistic notions of opposites – good and bad; God and Satan; black and white – failed to match the adult experience of the world.

At a recent discussion on healthcare buildings at the Wellcome foundation, all the panellists supported integrated models of care and the extension of community healthcare. But the conversation took on a strangely dualistic approach to its architecture, differentiating the gleaming temples to high-tech medicine from the general fabric of community and primary healthcare architecture. This is a somewhat Manichean fallacy because it's not about architectural taxonomy; rather, it's about the patient experience, which is fundamentally the same for those who require diagnosis or healing throughout the system. The difference is one of scale.

The NHS is developing a set of prototype buildings – 'community hubs' – to deliver integrated models of care with a range of services, and migrating, wherever possible, from their traditional hospital locations. This presentation will examine:

- whether they address the fundamental architectural issues described above;
- whether they can be defined, in a Linnaen fashion, as a building type;
- their adaptability in design and terms of tenure to respond to changes in demography, policy, funding, and social and cultural attitudes;
- their incorporation of the digital world's amplification of expectation, delivery and choice, and the blurring of boundaries between public and private space that this creates; and
- the dynamic consequences of combining health and social care, social referral and preventive medicine.

The past 30 years has seen the rise of the super city, in which colossal investment has been made. Elsewhere, many towns and cities are suffering from the privatisation of pleasure and commerce, and the collapse of retail. Healthcare has been no different in disregarding its civic responsibilities, but a new generation of health and social care buildings must regain a strong urban presence. This will require fundamental changes to how the NHS operates, which will only succeed if it can blur the boundaries.

## The benefits of the circular economy on health and healthcare

Recent reports from the UN, World Health Organisation and COP24 all concur: there is an urgent need to scale up the response to prevent diseases and deaths, and business needs to move further and faster.

Construction demands around half of global resources and generates about a third of its waste, with new buildings frequently constructed from hard-won raw materials. The impact on the environment and the health of site workers and local communities is profound. The design and construction industry has a duty to further interrogate its approach.

Industry experts are moving away from traditional 'extract, make, use, dispose' models towards a 'circular economy', keeping resources in use and retaining their value, and creating a regenerative built environment, prioritising retention and refurbishment.

Applying the circular economy to buildings would radically reduce resource demand and waste. Critical to success is early forensic examination of building materials, purging harmful substances to enable reclamation, reuse and recycling. This avoids risks associated with extracting, manufacturing and reprocessing materials, while ensuring an unpolluted internal environment.

The revolution in waste and its management directly impacts health and buildings through improved air and water quality, and elimination of toxins from the environment. The impacts of reduced greenhouse gas emissions can halt the rise in extreme weather events and associated health risks.

The circular economy is a more efficient economy with a capability estimated to increase UK GDP by £3bn. In the health sector, efficiencies including the reduction in waste, increased recycling, and higher-performing business models, will drive down costs, enabling increased investment in service delivery, and drive up the effectiveness and reach of healthcare systems.

Best healthcare practice is based on the unity of the body, especially of the mind and body, and our deep connection with nature. When you combine the principles of circular economy and biophilic design, you connect humans and earth. We cannot fully quantify the health benefits of adopting these principles but logic suggests they will flow from what is a new, deeper way of thinking about humans on Earth.



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## The life, death and resurrection of wellness: enriched environments for activated optimal health

Throughout human history, our attitude towards health and wellbeing has been holistic. We've focused on diet, lifestyle and, critically, on the physical design of our habitations. Over the last 100 years or so, this changed, with 'health' becoming synonymous with 'healthcare'.

Now, however, that reactive model of treating illness instead of creating wellness is shifting towards a more preventive, proactive and technologically driven model. One of the core dimensions of this is 'activated optimal health', a concept driven by space. A growing body of evidence shows that where one lives has more impact on one's health and wellbeing than the medical system. Space is effectively a 'prescription', which can improve our health or limit our ability to thrive.

Through design, we can connect the dots between psychological cognitive and pre-cognitive reactions that have physiological responses. We can create 'enriched environments' that enhance human performance through specific spatial fundamentals, both cultural and causal, and thus support optimal health.

Neuroscientists have confirmed that our built environments can alter and enhance our capacity for thought and social engagement. They can either heighten or suppress our emotions and behaviour.

Research has discovered seven known elements of enriched environments that simulate our brains' biological and chemical operating systems. They're known to improve health, as measured through neurological, physiological, psychological and sociological feedback. These elements include:

1. Nature: places inspired by natural shapes, light and materials;
2. Variety: spaces that offer a range of experiences and a sense of discovery;
3. Vitality: settings that are energetic and restorative;
4. Authenticity: spots that are valued for their realness and rootedness;
5. Optimism: environments that radiate a positive abundance;
6. Sense of occurrence: venues where you feel engaged and stimulated; and
7. Legacy: surroundings that communicate purpose and a sense of something bigger.

This presentation will review the physiological and psychological evidence for these seven elements. Several examples of healthcare projects from across different geographical and cultural boundaries will be referenced.

## The role of intuition in evidence-based design

The authors will explore the role of design intuition, especially as it relates to support for, or challenges to, an evidence-based decision model.

Recognising that many architects and designers produce excellent projects using intuitive decisions far more often than evidence from rigorous research, and noting the increasing interest in an evidence-based healthcare design process, the presenters will seek to find a comfortable theoretical position that accepts both models.

A theoretical decision model will be described, extending from reliance on evidence to best practice, ordinary practice, intuition, and arbitrary choice. Examples will clarify the role of shared, explicit knowledge (evidence) and personal tacit knowledge (intuition). The presenters believe that both are effectively using knowledge, unconscious in one case, to make effective and relevant design decisions. Implementation of purely arbitrary decisions appears to occur in the absence of relevant knowledge.

The presenters expect to moderate a lively and interesting dialogue among an audience of design practitioners and clinicians, among whom some will feel strongly that evidence supports better design decisions and others point to successful designs not based on any form of research.

The expectation is that attendees will be exposed to new thinking and they will leave with a new perspective on the role of both evidence and intuition in the fascination world of architecture and design.



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### Research 101: evidence-based design meets design-based evidence

Practising healthcare architecture presents increased complexity. The need to collaborate with multidisciplinary teams, from engineers and managers to clinicians and patient representatives, requires a fair amount of diverse knowledge to facilitate communication and skills, which normative architecture doesn't necessarily involve.

Dealing with evidence is frequently required. How do we incorporate evidence in the design process, especially since research methodologies are rarely taught in schools of architecture? Moreover, there is increased demand for researchers to be involved in healthcare architecture projects of the entire spectrum, from consultancy to design and build. Yet, few team members need such a level of specialisation.

Understanding evidence and incorporating researchers in the design process from the beginning contributes to the creative process, advancing our understanding of the brief, client expectations, and contributing to projects closer to users' needs.

**Purpose:** This presentation will share a simple approach to how practice can incorporate research in projects, without adding time and resources that don't have a return on investment.

**Method:** Using a simple 'why, how, what, and so what' model, we will share a range of research approaches and methods that are contextual to how a problem is framed. A mixed-methods approach, which balances quantitative and qualitative methods and an interdisciplinary approach that leans on academic and industry partners, will be advocated.

**Results:** We will work through how the broad question can advance research methods, thinking within and outside of the health industry for approaches. We will look at the evidence base, challenge it, and flip the paradigm – exploring how design creates an hypothesis for testing, rather than simply following evidence.

**Implications:** At the end of this presentation, participants will be more comfortable engaging with evidence. They will gain some insight on how evidence can be created and challenged through cycles of design and testing. This presentation is expected to be relevant to: practitioners – as it engages with research methodologies in a designer-friendly manner; researchers – as it explores possibilities of design-related research and cross-disciplinary collaborations; and clinicians and healthcare professionals interested in the built environment.

## Accelerating collaboration between clinicians and architects to measure and improve healthcare design

Healthcare systems are increasingly under pressure to measure and improve the quality of care they provide. Healthcare clients are now asking the same of the architects they hire: to measure and improve the quality of the facilities they build.

This session will comprise three sections.

First, it will review the changing landscape of how healthcare providers are being reimbursed both in the United States and abroad. It will highlight how changing payment models are increasingly tied to patient outcomes after hospitalisation and prioritising population health metrics. Together, they underscore the growing need to measure the health impact of care delivery models and the environments in which they operate. Clinical providers trying to meet these new demands will only be successful if they can integrate the very architects and designers responsible for the built environments.

Second, medicine's slow adoption of quality improvement research will be critically assessed. The example of 19th century surgeon Ernest Codman and his 'End Results Idea' will be traced from its controversial origins to remarkably late adoption. Emphasis will be placed on how Codman's work now directly informs and improves clinical practice.

Finally, the lessons learned from Codman on how to rapidly improve our ability to measure and improve the quality of hospital design will be outlined. Specifically, the challenges Codman faced – lack of measurement expertise, medico-legal liability concerns, lack of client willingness to pay – are all too similar to the challenges faced by multidisciplinary design teams in advancing evidence-based design with clients. Each of Codman's solutions will be reframed for architects, clients and builders to demonstrate they can be successfully applied in practice.

In his final days, Codman lamented: "It may take 100 years for my ideas to be accepted." Sadly, it took nearly that long before clinicians adopted his call for a systematic approach to measuring quality. The broad range of stakeholders designing our next generation of healthcare systems cannot afford to wait as long as clinicians did; they should now heed his advice and embrace systematic measurement and improvement of our work.



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### From hospital to health campus

This paper will set out how thinking of the hospital as a health campus not only gives clarity in linking the physical asset with clinical requirements but also provides a commercial opportunity to use land and buildings to deliver a 'health return' to the local community. It will provide guidance for policymakers on how to bridge public and private financing of projects, and will give examples of where the campus model has been adopted to fund and deliver new buildings.

This presentation will provide evidence of how the health campus allows a focus on wellness, not the treatment of sickness, and can bring the strands of healthy cities and healthcare delivery together.

Linking clinical and physical strategies through focusing on diagnosis, treatment, rehabilitation, and type of bed (rather than number of beds) lends itself to thinking of the hospital as a campus rather than a single building. The technology and clinical advances for each of those areas will change over time, so building flexibility into the diagnostic, treatment and rehabilitation zones is important. Having a bed model that shows projections to, say, 2020 – when the new hospital opens – is meaningless when that hospital could exist until 2100.

This presentation will illustrate current projects, where focusing on such flexibility has identified fluctuations in the release of or requirement for additional land. Where land has been released, the asset has been used to deliver a 'health return' for the community. Areas focused on wellness, fitness and health education, along with housing for elders and the workforce. Further thinking is developing around outdoor gyms, cycle paths, jogging paths, walkways and allotments, in order to build a vision of a health campus for the community, again focused on wellness. Where such commercial assets are developed, they will provide revenue and income streams to support funding of health-related assets.

The presentation will set out how 'commercialisation' of the health campus concept can generate revenue streams to support the funding of new buildings, and the campus itself can become a focal point for wellness.

## Place-based access to care and research

Provision and access to healthcare and health information provide opportunities for providers, systems, developers, designers, planners and regulators to work together in creating care models. These opportunities synthesise access and medical technologies, service distribution, population health, development, and urban planning. In some cases, they require new regulatory models for reimbursement, property development, and health information access.

**Objectives:** Progressive health systems, such as the Hospital for Special Surgery, and health developers, such as Maplewood Healthcare, explore new models within this context. The intent is not only to understand how the current model will be deconstructed by new technologies for care and access but also how this phenomenon can inform urban development strategies to improve the health of communities.

**Methodology:** Using case-study examples, this paper will discuss:

- how new treatment modalities and technologies can be distributed, given that many no longer require a traditional environment;
- how virtual care and telemedicine can support widely distributed models while improving and simplifying access; and
- how existing technologies have capabilities traditionally limited to the doctor's office or hospital.

Consultation and care happen in a much wider array of settings than are traditionally conceived in the current system model.

From an urban planning perspective, however, new models must be supported by a new regulatory environment, permitting what has been defined as medical use in new technologically sophisticated environments that are more easily constructed and operated. Reimbursement models must also be developed. "Care everywhere" is the goal, and the models supporting this idea must be developed so they can be understood, refined, supported and implemented.

This paper will introduce the concept of the deconstructed and highly distributed health system, and ways in which that may manifest. We will use information and illustrations regarding possible future states of highly distributed systems, and present implications for a variety of scenarios. We will then engage in a dialogue on these future states and how they may be achieved, discussing the efficacy of the models, and priorities around system and community planning influencing their creation.

**Results:** Attendees will develop ideas about how to realise accessible and high-performing healthcare.



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### **Keynote address: Designing health systems to respond to the challenges of person-centred care**

Changes in disease patterns, the needs of patients, and the expectations of the public are placing an onus on hospitals and other healthcare providers to rethink how they provide care and relate to each other.

This keynote presentation will look at some of the major themes in this area, based on recent research and work by the World Health Organization (WHO) Europe, and what this means for the shape of health services, how they operate, and how they need to respond to the above issues.

Keynote speaker Nigel Edwards has been chief executive at the Nuffield Trust since 2014. Prior to this role, Nigel was an expert advisor with KPMG's Global Centre of Excellence for Health and Life Sciences. He was policy director of the NHS Confederation for 11 years and has a wealth of experience in health and social care. He remains an honorary visiting professor at the London School of Hygiene & Tropical Medicine.

Nigel has a strong interest in new models of service delivery, as well as offering a practical focus on what is happening at the frontline and in wider healthcare policy in the UK and internationally.

## Design of place-based health systems – lessons from Scotland

The Scottish Government's 20:20 Vision for NHS Scotland established a strategy for safe, sustainable, place-based, person-centred care close to home. Implementation required bringing regional health boards and local authorities together to work in community health and care partnerships, to develop services that support populations across urban and rural areas.

**Objectives:** Central to achieving the strategy is the provision of suitable NHS facilities to support systemic change. Objectives include:

- a clear line of sight from the policy 'vision' to places and services that deliver it;
- local decision-makers and experts working together to enable change; and
- continuous sharing of knowledge, best practice from relevant projects, and emerging trends.

**Methodology:** In 2010, NHS Scotland Design Assessment Process (NDAP) became part of our business case approvals mechanism for all health facility investment (circa >£2m). NHS Health Facilities Scotland (HFS) and Architecture and Design Scotland (A&DS) work in partnership to support NHS boards and their communities to create healing places. We do this through early stakeholder workshops, capturing briefing in plain English with images, then reviewing proposals at key stages of design development, with expert advice ensuring lessons are incorporated.

NDAP independently reports on key project risks, with recommendations for further development where required. This assessment looks at the whole project, not solely the design, to best enable delivery of a sustainable, quality service to suit each place. It can also be used in the planning process as evidence of national agency (A&DS) consultation and their opinion of quality.

**Results:** This decade has seen a sea change in the quality of developments delivered, and NHS Scotland punches consistently above its weight. Our biggest change is the capacity and ambition of the people involved, who take the learning from project to project so that improvement continues.

**Conclusions:** Focus on the value of what each project will deliver (not solely time and budget) shifts attention for all involved. Bringing users with different perspectives together at an early stage helps challenge preconceptions and aids the change process. It also establishes a shared language, enables better engagement and encourages continuous improvement.



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## Health precinct design

Does putting people at the centre of communities and health innovation districts mean creating healthy places and spaces? Does embedding translational research in hospital campuses constitute research-focused care?

Technology and innovation are key enablers of health outcomes. They provide the opportunity to connect, accelerate and drive health initiatives at an individual, local and precinct level. An integrated and collaborative approach to hospitals, community health services, schools and universities, transportation networks, housing and recreation facilities is critical to building health outcomes today and for future generations. How can process and narrative enhance our hospital campuses?

**Purpose:** This paper will present design work from an integrated design practice, expanding the themes of an innovative health precinct and building on the conversation of the designer's role in hospital and healthcare typologies. This presentation is intended to make a case for healthcare architects and designers to be holistic in approach and process, as opposed to a singular health planning approach that is often interpreted as best value for money.

**Outcomes:** As an integrated design practice, working in predominantly institutional environments, we're focused on creating exceptional places for people to visit, work, practice and heal in. This paper intends to demonstrate process and vision for three project examples of varying context:

1. 1 x rural project: Kingaroy Hospital Redevelopment – translational research and health;
2. 1 x suburban project: Victorian Heart Hospital – translational research and health; and
3. 1 x urban project: Mater Hill Master Plan – integrated health, education and research campus.

By comparing design methodology between each project and context, it's possible to demonstrate how an integrated and collaborative approach to healthcare precincts will produce more successful, people-focused built environments, supportive of social and cultural interaction as well as healthy lifestyle choices.

## Envisioning the future of health networks: hospital as part of a sustainable system

Most health organisations share the same challenges: improving outcomes and enhancing experiences, while optimising efficiency and reducing costs. They're challenged to provide the right care at the right time, throughout the health journeys of individuals.

A shift towards a more coherent and continuous health system helps address the rise of chronic disease – a consequence of our lifestyle and environmental factors. Thus, healthcare for highly specialised medicine is being pushed upstream, concentrated at multispecialty hospitals with core medical departments focusing on care for those who are critically ill. At the other end of the spectrum, healthcare is pushed downstream: inpatient care moving to outpatient care, outpatient care moving to home care, and home care moving to smart devices anywhere.

As a result, healthcare is moving beyond the walls of the hospitals into their communities, providing education, prevention and wellness at all scales. This network model breaks down barriers of traditional healthcare. It not only improves proactive involvement of health (prevention) in everyday life but also the health of their communities, by optimising the rapid and efficient access to and delivery of care.

While the benefits of health networks are vast, they come with implementation challenges. As healthcare becomes a civic resource and health facilities an integral part of their community, the planning process of healthcare environments changes respectively.

In this presentation, attendees will learn how architects take the role of facilitators to manage these challenges, and how this trend impacts the design of healthcare facilities, their communities and the larger environment. Case studies from Germany, such as the University Hospital Tübingen, illustrate opportunities of the mixed-used health campus, which integrate community services on site and simultaneously spread their health services into the city. The case examples demonstrate how the infrastructure and connections with diverse transportation options transform the historically more separated hospital islands into integrated parts of their surroundings. Furthermore, this presentation gives an outlook on where healthcare is heading and provides guidance for place-based healthcare architecture.



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### Designing a global index of future-readiness for healthcare challenges

Factors such as climate change, population growth and urban migration are placing ever-greater stresses on healthcare around the world. Cities are becoming the frontline in providing the future of healthcare, with more than half the world's population now living in urban spaces and forecasted to be nearly 70 per cent by 2050.

**Purpose:** We've designed an index to compare the response and preparedness of cities to health challenges, focusing on their future readiness to meet emerging healthcare needs. Identifying trends on issues such as ageing populations, risk of pandemic, and climate change, the index encourages change in healthcare provision to ensure it meets the needs of communities.

**Methods:** This project makes use of design thinking to determine how future-ready cities are to deliver healthcare, including how this can be measured and communicated in a way that raises awareness of the effectiveness of healthcare. Achieving a globally representative design required adopting a 'data as culture' approach to the selection of cities, while engaging with 'subject matter experts' for the selection of index criteria, and encouraging creativity in the selection of criteria indicators. Workshops at last year's European Healthcare Design and Healthy City Design congresses informed the design development.

**Results:** We determined a novel scalable approach for ensuring a culturally representative selection of cities. We've also engaged with dozens of subject matter experts to determine criteria for the future-readiness of healthcare – for example, 'ageing and lifestyle', 'environment and climate', and 'innovation and technology'. We then determined indicators with foresight for these criteria. We also identified a number of insights from gathering data from a selection of pilot cities.

**Conclusions:** This index is designed to compare the future readiness to health challenges of cities around the world, and how ready they will be to meet future healthcare needs. This has included considering data currently available, as well as identifying where new data or judgement are required to ensure inclusive design. We've also considered how best to present it to provide insightful global comparison for policymakers, practitioners and researchers in public health and healthcare.

## How to develop integrated care

With commissioners, providers and the public hoping to make the most of integrated healthcare in the future, how can professionals responsible for developing healthcare estate ensure integrated care has the best physical framework in which to operate? Urban planners, health planners, architects, developers and manufacturers can all contribute to the transformation of health spaces but, too frequently, opportunities for improvement are missed, either through their exclusion from the delivery team or by involving them too late in the design process.

The aim should be to improve health outcomes, social cohesion and health inequalities, supporting people to be more independent and remain part of a healthy community, rather than spiralling into illness and repeated stays in hospital.

**Objectives:** Designing to promote wellness and prevent illness has a greater chance of success if we work with like-minded professionals to co-design future environments. This paper will share experiences that demonstrate the benefits of expanding the traditional design team to include a wider spectrum of designers, in developing integrated care solutions fit for today's demands and tomorrow's technologies.

**Methodology and results:** We will review the outcomes of successful partnerships and processes that are shaping environments for healthier communities, and touch on lessons learnt.

We will showcase examples of collaborative working at different project stages and at differing scales of design, including:

- urban planning and clinical planning: exploring the relationship between designing communities and neighbourhoods for healthy and sustainable development;
- health planning and architectural design: new ways of working and innovative clinical models using telephone triage and remote diagnosis, supported by investment in IT infrastructure;
- architects, developers and commissioners: responding to future demands by fully embracing flexibility: practical cross-project investment and co-authoring of community / health initiatives, and adoption of generic space;
- architects and manufacturers: improved products with fit-for-purpose healthcare specifications that don't look institutional.

**Conclusions:** NHS England's vision for the future is shared by designers involved in shaping healthier environments. By blurring outmoded professional boundaries, working in more integrated teams, focusing on effective solutions, and sharing resources and ideas, we can all contribute more effectively.



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## Pioneering the present: learning lessons from Kaiser Permanente

Kaiser Permanente occupies a special position in healthcare delivery in the United States. Founded in 1945, the not-for-profit organisation has a mission to provide high-quality, affordable healthcare services, and improve the health of their members and communities they serve. The largest healthcare provider in California, it serves more than 12.2 million members in eight US states and the District of Columbia.

Serving as both health insurer and health provider, Kaiser Permanente employs more than 220,000 staff and is the second biggest landowner in California (after the State of California). In 2018, it announced a \$30bn programme of capital works to their estate over the next decade.

This paper will examine the approach that Kaiser Permanente is taking to re-imagine its healthcare system into a whole-health model, including its engagement to address the social determinants of health, focusing on areas such as gun violence research, mental health and wellness, thriving schools, food insecurity, as well as affordable housing and homelessness.

The paper provides commentary on the structures, communications and tools that Kaiser Permanente is evolving to engage with its construction partners, in order to innovate in the provision of healthcare settings in lockstep with transformational healthcare models.

The paper will cover the following key areas with presentation of visual illustrations and diagrams: procurement models; partnering models; templating; innovation; wellness; value creation; and cost mode.

## Guidelines for planning and design in a 4D healthcare system

Data transmission speed and capacity are set to make a leap, enabling new ways of applying technologies in our lives and work. This fourth dimension of our health systems changes how facilities are planned and used.

The health facility brief needs to be managed in a dynamic context capable of accommodating and supporting change. This paper will argue that we're heading towards a complex form of integration that combines place-based systems layered within other regional and medical specialty-based integrated systems.

**Methodology:** This paper will report on two projects adopting opposed planning strategies for developing health design guidelines in response to the need to plan swiftly changing settings and systems for healthcare, research and training.

1. London-based NHS trust: the trust aims to create a vision of a mixed-use future campus, well integrated with the surrounding city. This encompasses flexibility and obsolescence planning, as well as adaptive reuse; a pattern book overlaid on a masterplan.
2. International project: a web-based design standards framework (DSF) was created to provide the building blocks for planning and designing healthcare and health system-related facilities. This goes hand in hand with site-wide masterplanning. It combines local requirements and clinical context with selected international technical standards, referencing current versions. The DSF and the masterplan are components of a live decision-making framework.

**Conclusions:** The implications of planning for swift and constant change are many. To drive change, both rigour and innovation need to be brought to the process. Evidence needs to be gleaned from medicine and environmental psychology to elect planning priorities for a project, and ideas tested via simulation modelling and in practice. Planning and design need to occur hand in hand, as a continuous process, responsive to changing needs. Briefs and standards need to be written to accommodate diversity and change. Planning for the growing and pervasive virtual dimension of the health and care system requires a high degree of technology planning be absorbed into the multidisciplinary planning process, including future-proofing strategies for 4D flows. Planning for those blurring boundaries opens a world of exciting possibilities.



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## The parametric hospital: a model for all cases

Aware that certain growing populations have the urge to build a health network with quality, coherence and efficiency infrastructure, we asked the following question: is it possible to design, construct and equip a hospital in less than a year?

After a long process of trial and error we realised that to design made-to-measure hospitals does not require us to generate as many models as possible cases; rather, we need to be able to conceive a single model that could fit them all. Thus, the parametric hospital is the result of an intellectual process based on an in-depth analysis of the metrics and parameters that define complex healthcare facilities; in other words, those features that are common to every health facility and ensure their proper functioning, regardless of the particular conditions.

To this end, we have strictly selected those parameters that are generic and should be considered in any hospital: organisation and location of the corridors, according to their use; metric of the plot and the spaces; facade modulation; strategies for future extensions; location and hierarchy of the access points; location of installation galleries; and other rules that allow the start of initial construction works to begin only with the definition of the generic functional plan for the property.

The parametric hospital aspires to be like an adjustable spanner: instead of having to use a specific tool tailored to each situation, it has the ability to adapt to any metric. This allows us to overlap and optimise all processes in order to make them more efficient. In places that don't have health centres, running a hospital in the shortest possible time is equivalent to saving lives.

The first parametric hospital was built in El Puyo, a small Ecuadorian town near the Amazon with a large deficit of sanitary infrastructures. There was a need to solve this deficiency urgently. Built in less than a year, the parametric hospital was the ideal solution.

## Building resourcefulness: case studies of building health interventions with communities in Peru and Sierra Leone

STEMA proposes an alternate approach to creating innovation in healthcare. Locating our work in low-resource settings, we've found that interventions and innovations that improve health or access to healthcare often develop outside of the formal health system, and often draw on resources and factors not usually considered components of healthcare innovations, such as wider determinants of health. This requires consideration of both place-specific health problems and opportunities that allow for transformation. We present two case studies: a health clinic in a remote village in northern Sierra Leone and a series of community pharmacies in the Peruvian Amazon, and insights into working between design and health research in low-resource settings.

**Purpose:** Our aim is to improve health and/or access to healthcare in low-resource settings by conducting community-led research and design, developing a framework for building community resourcefulness.

**Methods:** A mixed-methods and exploratory approach was taken, conducting a health systems needs assessment at different levels of the system, participatory research such as mapping and network analysis, and co-creation with communities and health workers to discover how they access care, through people-centred design techniques and other visual exercises.

**Results:** Communities rely on myriad informal systems for care, and accessing formal health services is difficult owing to distance and cost. In Peru, medicine-delivery spaces are being co-designed with a local architect and communities, and offer both a community and social space, as well as a secure, clean storage place for medications. The physical design will be accompanied by a training programme and evaluations of access to essential medicines. In Sierra Leone, the existing clinic is being modified to provide a private, clean space for giving birth and to meet regulations around birth spaces. This will be accompanied by training for community health workers and health education programmes.

**Conclusions:** An integrated and place-based health system should be co-created to form connections between the multiplicity of health systems, building trust, cohesion and sustainability. Furthermore, interventions become most innovative when they're able to mobilise locally available resources to develop community resourcefulness.



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Care District

**Utilisation of a centralised customer management solution with AI-based predictive analytics to improve home-care operations in an integrated social care and healthcare organisation**

Traditional arguments to integrate acute hospitals, primary-care settings and social wellbeing services have centred around better co-ordination in political decision-making and strategy management, financing, ICT and estate investments, common use and recruitment of staff, and sharing other resources in new ways. These arguments were relevant when the South Karelia Social and Health Care District in Finland was established ten years ago, but since then new arguments have developed that are more relevant today and for the future.

Costs are rising strongly in caring for elderly people, but we cannot solve this issue only by adding new human resources and building new hospitals and housing facilities. We need to support home care in such a way that only those patients who really benefit from hospital care go to the hospital.

As regard to technology, we're still in the development phase, where workers are searching patient and customer data from different data sources. To develop simple browsing algorithms, the first phase is to move to artificial intelligence in social and healthcare working patterns.

Last year in South Karelia Social and Health Care District, 250 customers made 68,400 virtual visits, and 60 customers tested a medication robot. The first model to link this data to browsing algorithms is in test phase. A list of addresses is provided of where the nurses need to go and when would be the best time. The nurses also know in advance what the status of the customer is before the visit and what the general circumstances are at the customer's home.

Making use of and benefiting from artificial intelligence not only lies in developing working patterns and processes. Today, social care and healthcare are focused on costs rather than outcomes, wellbeing, quality of life and values. Social care and healthcare systems reward those providers who deliver greater volumes and more bills for services, not those who deliver the most value and wellbeing.

By using artificial intelligence it's possible to measure many new valuable outcomes. For instance, how many patients came back after the service or treatment and used other services? And, as a result, what patient or customer groups are the most expensive?

In the near future, social care and healthcare systems must provide more value instead of greater volumes. This calls for better understanding of holistic measurement of social care and healthcare outcomes, and wellbeing. This is possible only by using artificial intelligence and comprehensive outcome measurement.

## Rural communities reimagined with the innovation in modular construction and digital (AI) technologies

Rural communities often suffer because of lack of access to healthcare. It's therefore not surprising that indigenous (and other rural) communities have reported that poor or no access to culturally appropriate health services, dislocation from cultural support systems, exposure to racism, and poor communication with healthcare professionals negatively affect their health and wellbeing.

Telehealth is recommended as a solution to mitigate healthcare disparities – but, in some cases, it's failed to deliver better healthcare for these communities. A solution is proposed that uses satellite sites called outposts, matched to a regional command centre. Delivery of telehealth via outpost centres can be effective in providing access for specialists, as well as effective treatment for chronic diseases. This theory is demonstrated by a plan to service a First Nations community in Northern British Columbia.

Three technologies – a modular construction solution; virtual care technology; and command centre technology – have been combined to produce a solution that connects 14 outpost healthcare centres to a regional command centre for better access and more personalised care. The modular outpost centres will be shipped to sites via helicopter, as some locations have no road access. The regional hospital will be equipped with a command centre that monitors patients and outposts. The command centre will not only co-ordinate patient and staff visits but also access, monitoring and telemedicine.

Technology at the outpost centres and command centre will use evidence-based algorithms and a customisable platform to support the individual needs of this patient population. The solution used in other remote-access areas simplifies proactive care plans and easily integrates into existing workflows. The technology provides access to clinician-directed health sessions, videoconferencing, mental health modules, and interactive education. It also provides an easy-to-use interface to share health data, educational information, and best practices customised to individual situations. This solution aggregates and analyses myriad patient data, and turns it into actionable insights that can help provide better care.



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## Artificial intelligence and diagnostic radiology – trend or travesty?

The past few years have witnessed an explosion in the development of AI in healthcare. Clinical applications are widespread, but this paper primarily focuses on diagnostic and radiology integration of AI in healthcare. It reviews current and developing uses of AI and machine learning in diagnostics and radiology, to understand the efficacy of the solutions, regulatory requirements, and accessibility and sharing of patients' data. This paper investigates ways in which AI can support and enhance workflows for clinical teams, creating efficiency, and improving patient safety and outcomes.

**Methodology:** An international literature review was undertaken on artificial intelligence and machine learning in healthcare. Semi-structured interviews were undertaken with diagnostic radiology manufacturers, AI development organisations, research institutes, and radiological associations. A small sample of informal semi-structured interviews was undertaken with practising UK radiologists.

**Results:** The research identified a number of subsets of AI, which are different in function and have differing outcomes.

Radiology manufacturers already use AI within imaging modalities, however, diagnostic reporting is most exciting where AI has moved beyond recognition and computer-aided detection to sensing, reasoning, acting and adapting. New AI systems are available to review medical images, spot anomalies, and develop and iteratively refine treatment plans to achieve high success in prediction rates. In clinical pathways, where diagnosis and treatment time are critical factors for long-term prognosis and recovery, the benefits are compelling. Internationally, there is a shortage in training, recruitment and retention of radiologists, who also have among the highest levels of professional burnout in the healthcare sector. AI offers the opportunity to improve the workflow of radiologists, reduce their workload, increase throughput of patients, and enhance human interaction between patients and clinicians.

**Conclusion:** By infusing AI into the physical space of a health system, healthcare can become safer, offer better care and delivery for the patient, and optimise workflow for clinicians. The research suggests the future of AI is in collaboration with humans, working together to enhance healthcare. It will not replace radiologists – but radiologists who use AI may replace those who don't.

## Hello Care: autonomous healthcare, home delivery

Innovative healthcare providers, insurers and designers are challenging aspects of current healthcare delivery. Consumers will expect convenience; personalised medicine will improve outcomes and quality of life; only the sickest patients will need hospital care; "ageing in place" will become a reality with technology-supported care at home; and autonomous vehicles, drones, robots, 3D printers and the Internet of Things will be commonplace.

To identify future design solutions, we considered the challenges of today's systems: access to care; wellness and prevention; higher consumer expectation; and an urgent need to reduce cost. We believe our design solution increases access, improves convenience, enhances preventive care and wellness, improves outcomes, leverages technology, and lowers cost.

Identifying common patient needs and concerns, we asked 'what if you could order your autonomous personalised healing environment online and have it delivered wherever you want?' Our resulting design solution is a modular healthcare space providing diagnostic and interventional procedures, sub-acute or transitional care, and wellness support. A space that allows, through telehealth and robotics, future patients to receive all but the most intensive care in a convenient location.

'Hello Care' is a system of road-ready, self-contained patient care vehicles with a flexible chassis for different terrains and interchangeable patient-care components. With a healthcare technician functioning autonomously, the vehicle is equipped with drones for rapid medication delivery or lab-sample return and advanced diagnostic equipment. It combines robust telehealth with technology to eliminate many typical healthcare trips. With ramp/lift accessibility and comfortable interior space, a caregiver is virtually located next to the patient via a large interactive screen, and patients interact directly at all times.

We believe Hello Care would be welcomed by consumers for the ease, convenience and personalised care it offers. Healthcare providers and insurers would value the improved outcomes and reduced costs resulting from increased access, fewer re-admissions or emergency visits, and reduced hospital-acquired infections. As today's designers conceive future-ready building concepts, anticipation of innovative care solutions will be imperative. The potential impact on volumes, building programme and infrastructure will be a game-changer.



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## Personalised healing environment enabled by bricks, bytes and behaviour

The Radboud University Medical Centre is using a 'less Bricks, more Bytes and changed Behaviour' (BBB) principle, developing a healing environment that contributes to the wellbeing and functioning of patients and caregivers.

**Methodology:** Part of this approach is the 'Room with a view' programme, which creates a personalised healing environment in future single-bed rooms using smart digital technology interacting with smart building technology, wearable sensing and monitoring devices, and track-and-trace and recognition systems. The concept consists of:

- characterising patients for stress, pain, sleep and mobility;
- predicting digital healing environment tools that reduce stress and pain, and improve sleep and mobility;
- monitoring responses on using these tools; and
- analysing these responses via artificial intelligence for continuous improvement.

Two mixed qualitative and quantitative experiments were undertaken at the surgical ward. The first included 20 patients who photographed their stay and noted their experiences about the healing environment. Semi-structured interviews were held with patients, nurses and physicians to identify positive and negative elements, and facilitators and barriers for a healing environment. A second experiment was designed, involving 17 ex-patients who were admitted for 24 hours to a single-bed room at the ward, simulating the second postoperative day after major abdominal surgery. The primary aim was to measure pain, stress, sleep and mobility, and compare these with critical elements in the care path. The secondary aim was to collect patients' ideas of how to improve the healing environment using digital technologies.

**Results:** We designed two experimental single-bed patient rooms (mock-up), ready for use, with technology for (face, voice and movement) recognition, audiovisuals (cinema type), serious gaming, and continuous monitoring of vital signs. The rooms are also equipped with 'domotica' and ambient lighting. Over the next three years, typical care scenarios will be tested, first using ex-patients as volunteers, and thereafter patients. Results will be documented in a blueprint for a 'dynamic, personalised, sustainably improving healing environment in one-bed rooms' to lower stress and pain, and improve sleep and mobility. This presentation will outline the BBB principle and highlight results of the subsequent experiments.



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## Humanising experience at the Hepatic ICU (Hospital Clínic of Barcelona): learnings acquired in the first year of service

With this third EHD conference presentation about the Hepatic ICU of the Hospital Clínic, we want to close the circle, describing what has been learned from implementation, the strengths and weaknesses identified after one year of its opening, and what the next steps are for consideration.

Nowadays, dealing with ICU patients involves looking for infection incidence and propagation but in comfort and safety. This leads to a change in the architectural paradigm of ICU design – from an open area to room confinement, where every patient is isolated in a single room to reduce infection incidence. This involves some clinical aspects, such as medical data externalisation and centralisation, patient isolation and communication challenges, or changes in hygiene protocols, where architecture and technology play important roles. Patient-friendly aspects include: privacy improvements; noise reduction; and patient environment customisation, such as air conditioning, lighting, music, etc.

Representing this paradigm change, the new Hepatic ICU has been fully operational for one year. Examples of how technology and architecture can help in daily clinical practice include: incorporation of home automation functionalities controlled by customised softwares; incorporation of communication and entertainment platforms in every room; the open-space nurse area, which centralises all vital-signs data; or the hands hygiene RFID access control.

In this talk, we will present our experience of the project, describing the pros and cons of implementing all the above solutions, the final user's opinions, and possible ways to improve. All innovations presented, and the considerations extracted from the combined reflections of clinical staff, architects and biomedical engineers, have extraordinary potential. The presenters will give a global vision, describing the expectations and critical points of the project, dealing with the continuous technology expansion and the scepticism in change, and focusing on the next.

## Implementing a VR platform as an evaluation tool for effective hospital design in Germany

The integration of building information modelling (BIM) and virtual reality (VR) open new possibilities in the design process, including better communication with clients, an easier inquiry of precise complex data through parametric modelling, and calculation of financial patterns. BIM is also changing how construction documentation is prepared, documents standards, and the design team structure.

BIM technology and the VR platform have become a popular tool for building virtual reality mock-ups. VR mock-ups could be an effective method for evaluating design solutions and raise the quality of the healthcare design process. In Germany, however, BIM modelling is still a relatively recent topic. This proposal is devoted to one of the first experimental studies using VR mock-ups of a few hospital projects in Germany.

The VR platform provides an opportunity to visualise patient experience and build a virtual scenario for users' perception of spatial characteristics. The selected hospital case studies will be assessed on intuitive wayfinding, orientation, accessibility, and overall users' satisfaction. Data gained from the walk-through in the hospital virtual reality mock-ups will be analysed and users' feedback will be captured through survey and non-structured interviews. Design tools more suited to the achievement of these design goals will be determined.

Also, the VR scenario-based evaluations optimise the hospital planning process, especially at early design development stages, and inform decision-making through assessment of alternative design features and pre-testing of preliminary design settings. The aim of this study is to develop a systematic approach to conduct simulation-based scenarios for future hospital design proposals. The expected result of this study is a toolkit with guidelines that are illustrated by the hospital case studies and recommend how to set up rigorous VR scenario-based evaluation studies.

In this session, the presenters will share lessons learned from the first VR experimental studies of hospital projects in Germany. Attendees will explore the challenges of setting up a VR scenario-based evaluation and learn how VR technology could be beneficial for the design and planning of healthcare projects to improve users' experience.



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### **Increasing the pace and accuracy of design by integrating activity data and functional briefing**

Over the past decade the design industry has witnessed a number of important developments to aid client understanding and reduce risk of adverse or unwanted design mistakes that impact on the client and professional advisor. These techniques include BIM, 3D+, repeatable rooms, standard component products, open architecture in systems, and other techniques. All of these impact positively on aiding and informing clients and planners as to what a building could be visually, remove inefficiency/cost, or reduce and remove design flaws.

One of the main issues in health is achieving a signed-off brief for architects and clients. This is inevitably iterative, and in many parts of the global community tends to involve liaison with commissioners, clinicians, town planners, health organisations and finance.

This means it constantly changes, and across a major project we've often seen 14 or 15 versions. Some projects overlap financial years in planning. Most often, they're two separate models. This creates a lack of speed in making changes and a danger of alterations in one part not corresponding to the final schedules.

Until recently, most attempts to speed up interaction between raw and modelled data, even interactive systems, tend to provide only generic, high-level, typical department adjustments.

In our schemes this year, we will be attempting to build a complete new model that will enable standard areas (compliant with good working practices) to be populated, and where data changes (eg, updates in population, disease incidence, length of procedure/stay, or changes in location) allow for an automatic regeneration of the model to occur.

## The integration of BIM data into the management of healthcare infrastructures

Increasing numbers of buildings are being equipped with smart automation systems, which offer the possibility of integrating real-time data compiled by sensors with the spatial and technical information extracted from a BIM model. Such integration is advantageous in monitoring the performance of systems and construction processes, and in assessing the decisions relating to the administration and operation of infrastructures.

But most projects still don't make the most of the potential of data integrated in BIM for managing facilities and services. The main cause of this disconnection between BIM and the Internet of Things (IoT) is the absence of tools connecting both environments. To give BIM models the capacity to communicate with management systems, we've developed DIN2BIM, a platform that can integrate multiple IoT devices to allow for different monitoring and data visualisation options. Through a dedicated depot, DIN2BIM can perform different data correlations and store information for future in-depth analyses to detect parameters and trends. This tool offers several benefits: systems monitoring; controlling and improving care processes; monitoring patients during their hospital stay; or controlling energy efficiency, among others.

Hospital del Mar is providing its new building as a testing ground. Launched in June 2017, the DIN2BIM project consists of three main components: an IoT network comprising wireless sensors, industrial controllers and virtual servers; a BIM model to supply information on the building's physical components; and a web-based application with visualisation of models and data analysis.

An architects-led team is developing DIN2BIM with the support of the Centre for the Development of Industrial Technology. Energy performance, interior air quality, and airborne bacteria are being monitored. Information collected will be dumped to a virtual model for incorporating data on functioning, services and ambient conditions.

Through this project, we propose to drive data integration for managing healthcare infrastructures, providing a system that supports hospital management in controlling and planning installations and services. Integration of the building's data within the hospital's management processes will not only significantly increase the administration of resources and compliance with care policies but will also inform the design of future healthcare infrastructure projects.



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### Adaptability of an operating theatre suite

Departments such as operating theatres are transformed every year through technological advancement, particularly interventional radiology techniques. These advances have a profound impact on surgical procedures, equipment and, consequently, the design of the theatre suite. As the complexity and scale of these departments increase, so does the length of time to design, procure and construct them, leading to assessments that new developments are often unsuitable for the service needs at completion, and forcing a re-evaluation of traditional procurement and theatre suite design.

This study, conducted for an MSc in Planning Buildings for Health, at London South Bank University, sought to investigate the rate of change of operating theatres during their planning, construction and early operation stages, and offer a framework to minimise both short- and long-term change by altering the approach to capacity planning and theatre suite design.

**Methodology:** Data were collected from 13 large acute hospitals in the UK and Ireland, and included the numbers and specialisms of operating theatres at three stages in the planning and construction process. Data were also collected from a survey of hospital management and clinicians, which investigated their opinion on the adequacy of their current theatre capacity and what might be needed in future.

**Results:** Sixty-two (62) per cent of the hospitals studied underwent change in specialism and/or number of theatres during the planning, construction and early operation period, equating to a deviation of +4 and -3. Generally, clinicians and hospital management believe that more theatres and interventional suites are required to provide for current and future needs; however, only half consider they have the skills to forecast the strategic needs of their department.

**Conclusion:** Planning requires adaptability to ensure that change in capital investment projects is factored in and managed. There has been research into the optimum size of general operating theatres, but little review of the theatre suite and how room arrangements could support adaptability. A minor adjustment in theatre suite layout allows it to be adapted from a general theatre to an orthopaedic, cardiac, interventional, hybrid or MRI intraoperative theatre over its life.

## Using the arts to reduce anxiety, aggression, and violence at St Thomas' new emergency department

This paper describes a refurbishment project at St Thomas' Hospital's new emergency department, which blends illustration, interior design, animation, and documentary film to bring a greater sense of orientation and calm, reducing aggressive and violent behaviours.

**Methodology and results:** After conducting an environmental psychological study, researchers spent two weeks on site, observing and speaking to users, building up a 24-hour picture of the service. Workshops and feedback sessions were held with staff and patients, leading to strategic principles and design prototypes. The project incorporates four features that improve on the predecessor service:

- i. Each department has been given a distinct visual identity in the form of a colour and set of illustrations of the locality. Printed in large format to signal department areas and entrances clearly, these help transform a complex journey into a stimulating experience, thereby improving patient flow and creating a focal point for stressed patients/visitors.
- ii. Strategically placed bodies of text, which inform patients at the point of need – written with communications experts and frontline staff in clear, jargon-free language.
- iii. A documentary film, *Explaining emergency*, features informative graphics and interviews with staff. This plays in waiting areas, helping address patients' often unanswered questions – eg, "why is that person being seen first?" – thereby helping calm worries and promoting better understanding of service processes and staff roles.
- iv. Wayfinding illustrations also feature in a 'moving image' piece, which plays in waiting areas and relatives' rooms. The installation brings Westminster Bridge to life through an assemblage of animated boats, landmarks, cars, clouds, reflections, people, birds and more. Patients and staff contributed more than 2000 lines of poetry, describing everyday encounters and events on the bridge, which appear on the screen in a constantly refreshing four-line stanza. All elements in the animation are controlled by meteorological data, painting a portrait of the surrounding area as it is "right now".

**Conclusions:** According to staff, these interventions are contributing to a drop in aggressive and violent behaviours, less confusion for patients and relatives, and calmer moods.



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## Cognitive biophilia: making space for restoration

Restorative place-based healthcare requires a visual connection to nature, but with long-term urban migration and ageing populations, cities require large metropolitan hospitals. Such deep-plate building design features isolated treatment areas that curtail exposure to natural surroundings. But new research reveals that art can be used for its multisensory ability to generate a palpable experience of perceived open space that yields quantifiable health benefits.

This paper explores multisensory imagery within a virtual skylight framework. Such installations deliver deeper restorative benefits because they alter the observer's perception of space. Optical illusions set within an architectural setting engage the cerebellum, often involved in spatial cognition. By engaging a part of the brain involved in depth perception, multisensory imagery induces perceived vastness in the observer, even in enclosed interiors.

A neurobiological understanding of the malleability of cognitive perception in enclosed interiors reveals a new design framework. No longer beholden to the various limitations of structural space in deep-plan buildings, designers can create perceived open space. These illusory skylights to open skies alter the experience of patients and staff in isolated treatment rooms, pre-op and post-op areas, and other clinical spaces.

This paper cites several neurobiology and environmental psychology studies on the role environmental context plays in modulating visual cortex signal strength. New studies indicate that our memory stores spatial reference frames – spatial relationships that map out our sense of space – that can be tapped at a neural level to create perceived open space in interiors otherwise isolated from natural surroundings.

This new design framework introduces two essential spatial relationships: the perceived zenith and the perceived horizon line, which serve as the restorative barometer of spatial cognition. By connecting isolated spaces with perceived openings to nature, our body schema – the integrated neural representation of the body – automatically extends into the surroundings rather than retracting. Since our body schema is malleable and responds to environmental cues, multisensory imagery is able to recreate the hallmark of aesthetic architectural design: spaces that offer spatial polarity. Generating perceived open space provides a viable, cognitive technology to redress conventional building design.



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## Models of care: comparative evaluation of ophthalmology outpatient clinic design by digital simulation

Healthcare environments are designed to support a clinical and social model of care. Co-design methods, developed to enhance collaboration between architects and stakeholders, require constant evaluation to assure a fit between the desired model of care and the architectural design. This process is subject to limitations in communication between design team members who come from different disciplines and possess different professional experiences.

The study compares two ophthalmology outpatient clinics intended to be constructed in Israel in the near future. The first is located in a new building in Rambam Health Care Campus in Haifa; the second is an extension of the existing outpatient clinic in Meir Medical Center in Kfar Saba. Both projects were designed in collaboration between the architect and the units' clinical teams, and reflect different models of care.

Rambam hospital clinic was designed with a central waiting area to avoid interruptions to clinicians' work, while the Meir hospital clinic was designed with decentralised waiting areas to locate patients as close as possible to treatment rooms for efficiency. A comparative evaluation of the two outpatient clinics illustrates the consequences of these different design decisions.

The study presents a simulation method to predict, analyse and evaluate architectural design options. A digital model was developed to integrate the clinics' spatial environment, its procedures, and users, including patients, staff and family members. Based on interviews and observations in the existing outpatient clinics, patterns of behaviour were defined and implemented in the simulation model. The results, illustrated by spatial data maps, visualise the expected use patterns of the space and the influence of the waiting area locations on the clinics' performance, including patients' wait time, staff walking distances, density, noise levels, and potential for interactions between staff and patients.

A comparative evaluation of the two design options by stakeholders revealed correlations between the design and the clinic performance, resulting in reconsideration and optimisation of the design.

**Acknowledgement:** This research was supported by a European Research Council grant and the Azrieli Foundation Fellowship.

## Putting Cleveland Clinic in place: findings and implications from mixed-methods research for place-based health

Cleveland Clinic London is the latest addition in the health system's international business strategy and an example of the evolution of its inpatient facilities based on research of consumers, care providers and their communities.

**Objectives:** This session will describe and share the research methods and projects deployed to inform design and operational decision-making that helped Cleveland Clinic arrive at its current inpatient facility model.

**Methodology:** The mixed-methods, multi-layered approach allowed integrated design teams to target high-priority solutions while framing subsequent layers of investigation and hypotheses.

A post-occupancy evaluation study of more than 2000 patients from 12 inpatient facilities was a first step towards a holistic understanding of design impact across the health system's portfolio. Facilities were assessed in aggregate and compared on facility design and patient experience measures.

**Results:** Overall, facility design had a profound impact on patients' loyalty and likelihood to recommend. Findings revealed opportunities to improve patient experience through facility design, including specific interventions. Additional opportunities to optimise patient experience and return on investment were identified and prioritised. Post-occupancy evaluation methods also underscored a need to give weight to the latest advances in computational design tools, as healthcare organisations shift from generic square-foot management to contextual place-based approaches instrumental to population health and preventive medicine.

**Conclusions:** Innovative approaches to portfolio management can integrate extensive and cumbersome data streams into accessible and intuitive tools that inform advances in population health, community planning, personalised medicine, telehealth, and outpatient services, among others. In turn, these tools equip healthcare administrators, providers, and facility designers to work as integrated teams through shared decision-making. We now have the ability to integrate and visualise data streams on facilities, patient experience, care quality, demographics, real estate, among others. Predictive analytics and machine learning can be applied to identify quantifiable indicators of performance, often undetectable to the naked eye and contemporary visualisation methods. The shift in portfolio management and development can transition facilities from risky liabilities to agile partners in care service innovation and population health.



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### **On-stage vs off-stage design challenges and solutions: a study at the University College London Hospitals NHS Foundation Trust**

The outpatient facility of the University College London Hospitals NHS Foundation Trust (UCLH Phase 5) is located along Huntley Street in central London. It will put two existing services under one roof: the Royal National Throat Nose and Ear Hospital, and Eastman Dental Hospital.

**Purpose:** This site for Phase 5 is constrained and extremely urban. The building occupies a portion of a traditional city 'block'. Surrounding properties include residential, institutional, retail and offices. As a result, integration of the clinical and architectural elements of the proposal building began with a search for a 'narrative' in a 'building design strategy'. A key aspiration was to create an inspiring clinical environment rather than a visually sterile one, and link this to the surrounding dynamic urban context.

**Methods:** The trust was central in shaping the final solution, both overall and at department level. The design team documented a wide range of similar facilities or benchmarks to support discussion and understand the implications of various approaches to the design of outpatient facilities. The overall organisation of the typical consult/exam room floors ended up in a very different configuration from that first envisioned by the trust.

**Results:** The final design, now nearing completion, consists of three below-ground levels and eight above-ground storeys. It's based on the on-stage/off-stage principle, where public circulation and patient waiting are positioned along an outer wall, with exam/treatment and staff areas separated with dedicated circulation behind clinical 'gates'. This organisation permits the zoning of the project into public-patient-staff/service areas. The design incorporates waiting areas located against the external facade. As a result, these areas have impressive views of the surrounding cityscape and the facade will be very 'animated' when viewed from the exterior.

**Conclusions:** Key design features include: education and research provision integrated into the clinical setting; multidisciplinary procedure rooms with adequate recovery bays; visual linkage through the building to Shropshire Place; and a facade responding to dual aspect of the street – medical campus and residential.

## Transition management of combined health services and infrastructural change: lessons learned in a Dutch case upon relocation into a new facility

There is virtually no systematic evaluation of combined health services and infrastructural change, apart from work done by Tucker, Barlow *et al.* Such an evaluation is important, because the design of a new hospital is typically used as a catalyst for change, redesign and implementation of new work processes to improve health services. However, employees may resist these new work processes or be unable to adapt for various reasons, such as staff shortages. This may blur the boundaries between a successful healthcare infrastructure project and the implementation of business redevelopment.

The recent relocation of the largest Dutch academic hospital added a new dimension, as it created an opportunity to address how the organisation used change agents to shift over two decades from first conception to actual relocation. This study aims to gain insight into how our organisation used change agents, and differentiated responsibilities and position in the change process, to fully utilise the new care environments during various phases.

Conducting case study research in this field is important, as it adds to the knowledge base for what, in many cases, is a 'once in a lifetime experience': improving and innovating estates, processes and services to better suit present and future health service needs.

**Methodology:** We adopt an interpretive case study approach, in which in-depth interviewing will be combined with an extensive analysis of documents collected over time. So far, more than 15 interviews were conducted, including key members of senior and middle management, as well as frontline staff within the project organisation. Analysis will be conducted using software for qualitative data analyses (Atlas.ti). Earlier examined concepts, such as 'change agents, champions, boundary spanners and knowledge brokers', will be used as sensitising concepts and can be considered deductive codes.

**Results:** First results will be compared against outcomes earlier reported. We expect to add insights regarding decision-making processes and governance, as well as about the changing content of concepts, such as 'risks and safety' over time.



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## Quality and design in cancer care: what does good practice look like?

Macmillan works in partnership with NHS trusts to improve cancer environments by providing grant funding for partner organisations to raise the quality of the finished scheme, and by providing expertise gained by developing more than 250 projects for cancer treatment, care and support. This 'blurring the boundaries' of relationships and responsibilities between the NHS and a charity organisation such as Macmillan means that their combined research and expertise can enhance the design and operation of medical facilities.

This case study of the NGS Macmillan Unit at Chesterfield Royal Hospital, a new cancer centre that includes treatment area, outpatients and a Macmillan Information and Support Centre, will demonstrate how the clinical and wellbeing briefs were developed in partnership between Macmillan, the Chesterfield Royal Hospital NHS Foundation Trust, and an architectural practice. Particular focus will be given to the importance of the operational policy in developing the brief for combined clinical and wellbeing services.

The presentation will interrogate what 'quality' means in the context of cancer care environments, and investigate the ways in which quality can be evaluated and improved during the design process to ensure that it's delivered in the final building. The talk will then look at the implications of the post-occupancy evaluation and how this feeds into a continuous quality improvement loop, both for the NHS trust and for Macmillan's research.

Based on Macmillan's evidence-based research, we'll attempt to define what 'quality' means for patients and for staff, before illustrating the implications this can have on the design process, and how 'quality' can substantially affect the way cancer buildings operate and feel.

The paper will include a look at the design tools developed during these investigations, and consider how art and branding should be integrated into buildings, using built examples to illustrate what 'good practice' looks like.

**“It does not feel like being in a hospital”: a therapeutic environment for cancer patients. Oncology pavilion in Aranda de Duero, Spain**

This project did not begin as planned. Specialising in birth environments, we were called by the hospital to solve some problems at the maternity ward. During the visit, however, we had sight of the oncology department and immediately our priorities changed.

**Purpose:** This project offered challenges such as designing for a diverse group of oncology patients (ambulatory and inpatients, across a wide age range), resistance of certain staff members, and the advantages and disadvantages of being in a village with an extreme climate situation. Limited space and time also led us to explore new options.

We had no experience with oncology departments but wanted to try something different, not only by adapting to the needs of patients and staff but also in offering a healthy environment using different materials and construction solutions.

**Methods:** During chemotherapy, each patient has different needs, and in one treatment cycle the same patient might experience very different treatment days. One day, they need company, another day they prefer to be left alone or ask for a quiet corner, while another patient wishes to be next to the television. The reality, however, is that individual needs are not always met. Oncology day care centres in Spain are located in hospitals, usually in mixed areas (outpatient and inpatient) in often desolating environments that offer little distraction or beauty. For this project, a light wooden pavilion for quick construction, and a “breathable” building capable of adapting to different climate situations were chosen.

**Conclusions:** One aim was to provide a design rarely associated with a hospital. Relocating the unit into the hospital building during the few months of construction was key to the final outcome, as staff and patients lived and worked in three different environments during a short period of time, and we could do follow-ups to inform our conclusions. We also intend to share some ideas about oncology care environments that we couldn't include because of the lack of space and time afforded us on this project.



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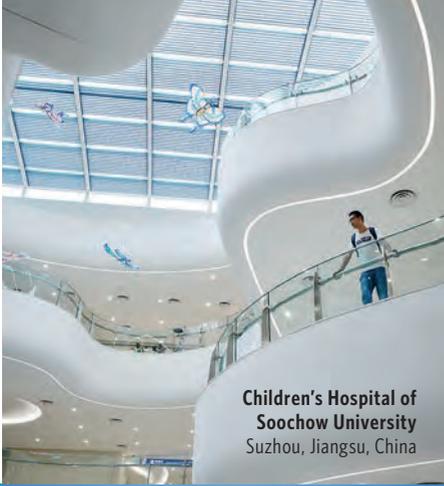
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**British Columbia Children's  
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## Keynote address: The work of the Rockefeller Foundation-Lancet Commission on Planetary Health

The last century's advancements in public health, agriculture, industry, and technology have created the conditions for better health for billions of people. But this progress is taking a heavy toll on the Earth's natural systems. Relentless consumption of the planet's resources, along with population growth, are degrading nature in ways that are now undermining our wellbeing.

There is growing evidence that the planet's capacity to sustain the growing human population is declining. Degradation of our air, water, and land, combined with significant loss in biodiversity, have resulted in substantial health impacts.

Planetary health is a new field of study rooted in understanding the interdependencies of human and natural systems. In exploring the scientific basis for creating this new field – and to make policy recommendations – the Rockefeller Foundation and the medical journal *The Lancet* formed The Rockefeller Foundation-Lancet Commission on Planetary Health.

In July 2015, the commission published a report that explored this scientific foundation. In this keynote, chair of the commission Sir Andy Haines gives delegates an overview of the report's findings and the commission's broader work programme.



**Sir Andy Haines (UK)**

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### **Keynote address: “Culture eats strategy for lunch every day”: the science and art of sustainable healthcare innovation**

Since the medical revolution in the mid-19th century, innovation has driven healthcare market developments and contributed to growing budgets. While healthcare costs, in general, continue to grow, investments in innovation – be it technology, drugs, devices or management – have been scrutinised and are increasingly driven by regulatory and reimbursement considerations. The industry’s response to make innovation sustainable and secure investments in research and development has been the creation of governmental and regulatory affairs departments, which aim at influencing key opinion leaders and governmental decision-makers.

In this context, cross-cultural sensitivity is key. It describes the knowledge, awareness and acceptance of other cultures (national, professional, organisational). At the individual level, it allows people to navigate successfully a different culture that they are interacting with, whereas it’s considered one of the primary factors that drives the way organisations behave. The toolbox of cultural sensitivity relates to comprehensive research (hard facts) and human behaviour in context (soft facts). Very often, however, “Hard (numbers/plans) is Soft” and “Soft (relationships/culture) is Hard” (Peters, Watermann; 1982).

I will provide examples from my work around the world on how doctors’ motivation is driven by similar factors in San Francisco, USA, and Hanover, Germany, despite very different healthcare systems, meaning that professional culture overrides national culture in medicine. Another example is the implementation of performance measurement systems in the US, where performance is “cool”, and Germany, where “best in class” do not usually show off. I will talk about the need to support online training and sales in France with personal interaction while, from an American perspective, it does not make sense that in France we have endless lunches without closing a deal.

As Lou Gerstner said: “Culture isn’t just one aspect of the game – it *is* the game.” In my talk, I go a step further by calling for cultural sensitivity – because we’ve been talking, researching and acknowledging the importance of culture for years. Sustainable innovation depends, however, on the sophisticated use and implementation of sensitivity for and of national, professional and organisational cultures. In this context, listening is the ultimate mark of respect. In my work, I listen to understand, not necessarily to respond. Ben Stein described personal relationships as “the fertile soil from which all advancement, all success, all achievement in real life grow”. If you wish to do business globally, have empathy for the world around you because “culture eats strategy for lunch every day” (Janus; 2003).

## Designing healthy multi-generational environments

The UN predicts that there will be more than 500 cities with a population of more than 1 million people by 2030. But perhaps a more surprising metric is that by 2030, 60 per cent of urban populations will be under 18 years of age.

This paper will discuss various design approaches to treating the health issues of a multi-generational population through connecting healthy building principles with broader placemaking and housing policies. We'll articulate an approach to sustainable development adopted across our recent projects and illustrated by the following:

1. Health and wellbeing: Connecting health with broader placemaking and housing policies to improve active travel infrastructure, providing good quality affordable housing, improving air quality, and providing attractive open spaces are principles that we apply to masterplanning and building design to positively impact on health and wellbeing.
2. Place and multi-generational community: Co-design processes on our Future Homes project, in collaboration with Newcastle University, have provided the opportunity to research the needs of a diverse cross-section of communities, including occupational therapists and mental health professionals, informing an understanding of aspirations, key design drivers, and challenges in developing places that support and promote multi-generational communities.
3. Housing: Adaptable and affordable urban housing provision is at the heart of creating quality multi-generational environments, in which our growing urban population can age well. Our senior living project for Central and Cecil is based on extensive research of northern European models and will pilot a flexible, menu-based approach to senior living settings, where residents can be independent, benefit from light-touch support, or receive substantial care services within the same development.
4. Accessibility: AllGo is a design collaboration that creates personalised, accessible environments across a variety of sectors, including the private rented, care and residential environments.
5. Digital connectivity: Our Future Homes project will ensure full connectivity throughout the development, allowing residents greater control to analyse and adapt their home and lifestyle.

By drawing together these themes, we'll highlight opportunities to identify connections, promoting a research-based approach to design supporting inclusivity, wellbeing, connectivity and flexibility.



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## Towards healthful, ageing-friendly and enabling design: a multisensorial study of housing neighbourhoods in Singapore

Owing to associated declines in motor, sensory and cognitive functions as they age, elderly citizens' perception and use of the urban environment change dramatically. Sensory and cognitive impairments affect profoundly their overall sense of wellbeing and quality of life, and challenge almost all segments of their everyday functioning. Common consequences include reduced mobility, increased risk of falls, challenges in spatial orientation, and communication difficulties, which often lead to lower confidence and autonomy, and social withdrawal. Housing neighbourhoods, however, rarely go beyond passive universal design principles.

This paper explores multisensorial approaches to design and planning of high-density housing neighbourhoods and their capacities, to build up senior residents' physical and mental abilities at different stages of ageing. It outlines a study conducted in Singapore to capture and evaluate multisensorial qualities of two housing neighbourhoods from the perspective of senior residents.

Research methods combine: on-site documentation (spatial mapping of users' activity, sensory recordings using a multi-function environment meter); photo journeys inspired by situationist theory (student workshops); 290 surveys and eye-tracking sensorial journeys; and interviews with 60 residents, the majority of whom are elderly. The proposed multi-sensory framework was used to synthesise, cross-reference and visualise the rhythms and patterns of such diverse sensory data, inspired by Henri Lefebvre's 'rhythm-analysis' (2004).

Workshop and survey findings reveal residents' concerns with walkability and wayfinding, safety, aesthetics, cleanliness, smell, crowdedness and noise in the neighbourhoods, as well as limited opportunities for inter-generational interaction. The ongoing eye-tracking analysis reveals the walking patterns and spatial elements that senior residents look at most frequently, augmented by the qualitative narratives about specific segments of their walking experience.

Eye-tracking and the multi-sensory framework are effective means for systematic capturing, articulating and analysing residents' subjective sensory and emotional encounters with a familiar outdoor environment. They also show capacities to inform meaningful, empathetic, inclusive and context-specific design and planning of healthful, ageing-friendly and enabling neighbourhoods. Housing neighbourhoods can take a more active role in supporting the health of all ages by embracing an alternative yet relevant and needed multi-sensorial approach.

## Reimagining the boundaries – towards integrated and assimilated nursing homes in Singapore

The rapidly ageing population in Singapore imposes unforeseen demands on both caregivers and care providers. This paper examines the relevance of boundaries and reveals their pivotal role in rethinking the concepts of design for elderly care.

Our working hypothesis is that the current linear design model should transform to a more comprehensive network design model, which allows the fulfilment of aspirations through environmental choices and opportunities. Paths, nodes and surfaces are constitutive elements of spatial networks. Boundaries are essential in this proposed model as they co-ordinate the network system agents – people and places.

We state two major factors that define the network model of nursing-home care and respective design:

1. Elderly users who interact with places, according to their abilities to respond to environmental stimuli, and thus establish and activate spatial networks.
2. Design control and co-ordination of the boundaries and their characteristics depending on their position, on micro (nursing home), mezzo (neighbourhood) and macro (city) levels.

Therefore, the main objectives are to explore: the nature of the boundaries that shape the nursing home environment; properties of the boundaries that allow, affect, control and create enabling environments; relations of their objective-material and subjective-experiential characteristics; and the potential for improvements through design co-ordination and smart technologies.

**Methodology:** This study is part of multidisciplinary research on person-centred elderly care and new nursing homes design. It taps into results of the extensive and in-depth mixed-method survey of six existing cases and two new design projects. The issue of boundaries is discussed from both objective-material and subjective-experiential standpoints, based on physical data collections, ethnographic surveys, sensorial mapping, and focus group discussions.

**Results:** Results transpire from triangulation of data sets and suggest two important findings:

- the redefined boundaries in existing nursing homes could significantly contribute to the efficiency of the current care model and wellbeing of elderly users; and
- transparent, smart and responsive boundaries are prerequisites for spatial and social integration, and assimilation of future models of nursing homes.



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## Reconciling LEED with salutogenic affordances in long-term care environments for the aged: a call for inclusive assessment metrics

In the past decade, multiple evidence-based research studies have drawn linkages between environmental design affordances and positive health outcomes among aged populations in long-term care (LTC) settings. A parallel movement promoting sustainable architectural design with various rating systems has also emerged. One such certification programme is LEED, launched in the US in 2000 as a points-based rating system, whereby a candidate building and its immediate site and neighbourhood are assessed based on their level of energy-saving ecological responsiveness.

There are signs that architects are increasingly using LEED to proclaim both a facility's sustainability or greenness and as a badge denoting its overall architectural excellence. LEED, however, functions in parallel to and autonomously from the salutogenic design movement, with each realm adhering to its own guiding theories, operative assumptions, research literatures, professional organisations, and design awards programmes.

The aims of this investigation are threefold: to examine a cross-section of North American LTC settings by, first, identifying the criteria on which a facility is bestowed LEED certification at the gold, silver or platinum level, and, second, to examine LEED's rating metrics in relation to a set of widely accepted salutogenic design affordances. The third aim is to originate a composite LEED/salutogenic score for LTC facilities and their campus environs based on the assumption that such an integrative approach can significantly aid healthcare organisations in the commissioning and operation of higher-quality care environments.

To this end, 20 LEED-certified LTC facilities in North America were systematically analysed for specific sustainability features, together with their specific salutogenic amenities, rated on a scale integrating both dimensions of architectural/site planning excellence in a single set of metrics, based on an assessment scale comprising 26 factors. It was found that LEED certification only somewhat and inconsistently correlates with salutogenic design excellence. Numerous design attributes are cited among the 20 case studies in support of this conclusion. The call is made for an internationally based, more inclusive, and ecological/salutogenic LEED-type rating system, which reflects this need for a broadened perspective.

## A final move to your own house

Many people suffering from dementia are able to reside in their own house initially but eventually end up in a residential care centre. At this point, these people lose the feeling of having their own place or being able to manage their own lives.

**Purpose:** Residential care centre Cornelia by Allévo, in the Dutch city of Zierikzee, is developing a new building aimed at providing residents with their own home in the last phase of their lives. All residents will have their own front door, leading to a park. Every visitor will be able to use this front door, with residents able to go in and out of their own volition. The paper examines whether this concept provides a sense of ownership and control for residents – a feeling of having their own home.

**Practical application:** Ninety-three residencies will be built in the care centre. Residencies at the front of the building have a front door to the outside and a door to the central area of the building, where communal rooms are situated. Because residencies aren't situated immediately next to a communal room there are more possibilities to place residents with like-minded people and according to the same interests. Visitors can park their cars near the front door or put their bicycles against the outside of their loved one's house. The covered area next to the front door offers a space to sit outside, with a bench and wooden frame offering protection from the sun.

**Outcomes and implications:** Can having a personal front door provide a feeling for residents of having their own home? Does it help to have a choice when to go outside? Is it nice to be able to choose between different communal rooms to spend your time, such as a kitchen or a music room? This new building at Cornelia care centre seeks to return a sense of home ownership to people with dementia.



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## Examining the role of the hospital through the dimensions of environmental, economic and social sustainability

Hospitals are rapidly evolving into place-based, mixed-use facilities embedded into their environmental and social ecosystems, possessing both the opportunity and responsibility to become community hubs for sustainable living. Addressing this sea change requires a three-pronged approach to sustainability, weighing the environmental impacts alongside the economic and social aspects.

**Purpose:** Environmental sustainability asks whether the design has reduced or eliminated its effect on the environment? A sustainable hospital is one that stands the test of time through quality materials, technology and construction practices, and an adaptable, functional design that can be reconfigured, repurposed or recycled over time. Hospitals also need to demonstrate fiscal responsibility in capital and whole-life costs, as well as material procurement practices. Economic sustainability, however, extends far beyond the project budget; it considers the hospital's role in providing care for all segments of society, elevating quality of life for all. Socially sustainable design represents our responsibility to design for the poorest and most vulnerable, the youngest and oldest. Sustainability, through this lens, involves the creation of 'places' with a sense of physical and emotional security, accessibility, opportunity and wellbeing.

**Methodology and outcomes:** Singapore's Changi General Hospital reimagines the traditional health campus to address sustainability in its broadest sense. Passive design strategies, such as naturally ventilated wards, photovoltaic panels, green roofs, and passive shading/cooling, ensure the building gives back more than it takes from its environment, as well as reducing lifecycle costs. Socially, the hospital plays a key role in re-integrating recovering elderly patients back into their community by reimagining the traditional six-bed ward as a five-bed 'house'. Patients are empowered to make a return to independent living through an environment that fosters community support, reinforces identity and purpose, and facilitates social interaction as part of the healing process.

**Conclusions:** This paper will demonstrate how sustainable healthcare design, viewed through environmental, economic, and social dimensions, can influence wellness of a society through the creation of durable and socially responsive hospitals that form the bedrock of communities.

## Greybase Hospital case study: resilient, multi-use design in one of the most challenging locations on Earth

Greymouth is a seaside city on the west coast of New Zealand's south island. The hospital serves the entire west coast, which, while sparsely populated, is cut off from the rest of the country and tertiary services every year, owing to storms closing the alpine passes.

**Method:** The Ministry of Health in New Zealand commissioned a new facility on behalf of the West Coast District Health Board. The facility had to be rich in services, as local residents frequently lose access to the tertiary hospital on the other side of the alps during winter.

The facility integrated space for GPs and clinics, as well as general and specialist services, and a dental suite – all designed to be highly flexible, with boundary areas between departments able to be easily reconfigured. The building lifespan was specified as 50 years, which created challenges in the architectural shell design, detailing, material selection, and construction. Adding to the difficulty was the facility's location, less than 400m from the ocean, and the fact it needed to be constructed to Importance Level 4 (IL4), which stipulates the facility has to be fully operational immediately after a 1:500-year earthquake. This required innovative design solutions for the architecture movement joints, structural design, and services reticulation.

**Solution:** This paper will report from three perspectives on:

- a. Challenges with the existing facility and services, discussing the process of engaging with clinical staff across multiple sites and key stakeholders in the community, including local iwi, to ensure an inclusive and culturally appropriate design brief.
- b. Design solutions that meet the design brief and include planning solutions, seismic movement design, and material selections to achieve the required earthquake resiliency and weather tightness requirements. The place-based design process of the building exterior and grounds, as part of the larger indigenous population context, will also be explored.
- c. The services design, focusing on resilience to allow for emergency post-event triage care. Sustainability will also be discussed in the context of both environmental factors and patient wellbeing.



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## Context as a driver for sustainable healthcare design

Increased focus on sustainable design extends beyond environmental responsibilities to a broad range of architectural and socio-economic factors. Context informs responsive design, but this is more than the creation of appropriate place. A commitment to context should influence all aspects of the design and delivery process. Commitment to context needs to inform how users experience buildings, the broad efficiencies of design, how buildings interact with the environment, and how the process comes together with a commitment to environmental sustainability.

**Objectives:** This paper will explore these concepts in a case study of the Sunshine Coast University Hospital in Queensland. As the largest non-replacement hospital built in Australia in the past 25 years, the design represents a commitment to context for a public health facility. Its design response and focus on environmental awareness have seen the hospital achieve six Green Stars – equivalent to LEED Platinum.

**Results:** The design responds to a specific physical environment and regional socio-economic setting. The paper will analyse a range of considerations, including:

- economics – the public private partnership delivery model, the ongoing operational arrangement, and the creation of employment opportunities;
- masterplan – the hospital in the broader health network and the socio-economic response;
- placemaking – the facility within the civic and social fabric – eg, community role, education and employment;
- context as a driver to clinical planning concepts, workplace design, efficiency and amenity;
- architectural expression and detailing – eg, appropriate scale materiality and detailing;
- biophilic design drivers – landscape and access to natural light and fresh air;
- salutogenic drivers in the design of patients' and carers' spaces;
- passive sustainability initiatives embodied in the contextual design response – eg, orientation, facade shading; and
- overall sustainability credentials and innovative environmental operational policies.

**Conclusions:** The Sunshine Coast University Hospital has a specific social conscience. As architects, our approach to context has informed an innovative design response that offers sustainable solutions that provide stimulating spaces and a humanised environment. The paper will explore and interrogate the validity of this approach.

## Design 4 Others and Construction for Change – lessons learned from place-based health, education and community building

In 2006, Design 4 Others (D4O), a pro-bono organisation, was established with an ambition to make health accessible to all through design rooted in place. Construction for Change (CfC) was started by a small team of volunteers, raising funds and building structures, one facility at a time. Its mission is to partner with non-profit organisations to build spaces where people can become healthier and better educated, and increase economic mobility. D4O and CfC joined forces in 2015 to bring design services to CfC projects and assist in completing the 30/30 Project – an initiative to build 30 medical facilities worldwide and bring access to quality, affordable healthcare to those who need it most.

**Objectives:** This case study will outline both the theoretical framework and conceptual approach conceived for both D4O and CfC, as well as the practical application and lessons learned in the development of projects.

**Methodology:** The session will cover the practical application and lessons learned in the maturing of both organisations through mutual work on joint efforts. The session will conclude with a summary of the next steps for each organisation, and implications on the future of global practice. Myriad projects will be presented to illustrate outcomes.

**Results:** One facility in Uganda, the Foundation for International Medical Relief of Children (FIMRC) clinic, was designed to increase capacity and offer a welcoming environment. FIMRC received a grant from the 30/30 project to better support clinical activities on site. Since the clinic opened in 2016, the average number of patients seen each day has doubled, helping address the health disparities for a larger group of residents in the area through clinical care, prevention and education. The presentation will focus on key projects, and how D4O and CfC are translating lessons learned from these developments.

**Conclusions:** Implications stemming from partnerships, developing new typologies and scaling funding streams will be discussed, with a focus on how these experiences have influenced place-based systems of care in areas of need and regions, including established healthcare systems in other societies.



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## Developing an eco-system of place-based healthcare infrastructure in developing markets

Achieving universal health coverage remains key to the Sustainable Development Goals and the New Urban Agenda. In many developing markets, however, challenges to attaining these targets in the set time frames are precipitated by existing infrastructural barriers of often ageing, oversubscribed medical facilities. These challenges are compounded by rapid urbanisation, growing populations and changing demographics, rising consumer demand, and continued economic uncertainty.

Adding to the pressures are wide gaps in access between cities and rural communities, as well as between primary, secondary and tertiary tiers of health services. Where a sparse or lack of formal facilities across remote and rural areas leads to large populations not having sufficient access to quality health services, people's health tends to deteriorate into more complex illnesses, including increasing occurrence of chronic diseases and co-morbidities.

How do we change this? In remote and rural areas – particularly where even basic healthcare services may be lacking – a more decentralised approach is needed. This can be achieved through place-based wellness centres, which creates an opportunity to give weight to a larger number of smaller facilities to deliver quality services and care across wider geographic areas.

Whether a standalone facility in a remote area or an add-on to existing primary healthcare clinics, placed-based community wellness centres can be designed and constructed with modular units – making them flexible, adaptable and suitable for the evolving needs of the communities they serve.

Based on our experience in Africa, our findings address:

- characteristics of the modular community wellness/healthcare units (building design and construction, core offerings, building services, etc);
- rendering of a workable case study concept design; and
- the potential of integrating community wellness centres into existing healthcare infrastructure ecosystems, including: the impact that digital transformation and advanced technological developments will have on the ability to provide better care (from centralised patient information systems to telemedicine to access specialists, or UAVs/drones used to deliver essential medical supplies, etc); and opportunities for collaboration with local public transportation systems for patient transportation to hospitals in town or cities.

## Closing keynote address

Don Parker MSW is chief executive of Carrier Clinic, the largest nonprofit behavioural health system in New Jersey, and president of Hackensack Meridian Health Behavioral Health Care Transformation Services / Integrative Medicine.

He also serves as a board member on the National Association of Psychiatric Health Systems, the New Jersey Hospital Association, the Somerset County Business Partnership, and the Atlantic Cape Community College board of trustees.

With more than 30 years' experience in medical and behavioural healthcare, Don is able to offer insights into a number of mental health-related issues, including:

- the 25-per-cent rise in suicide rates across the United States;
- industry challenges, such as the battle against opioid abuse;
- the latest industry practices;
- emerging urgent-care services in addiction and behavioural health;
- mergers between hospitals and mental health centres; and
- the redesign of behavioural health centres.

Prior to his appointment at Carrier Clinic, Don held the position of chief operating officer at Carlisle and Associates, a healthcare consulting firm. Previously, he was vice-president of Physician Practices and Ambulatory Care at St Joseph's Healthcare system, and president of AtlantiCare Health Services from 2003 to 2011. His milestone achievement at AtlantiCare was as a member of its leadership team when it was awarded the Malcolm Baldrige Award, a presidential recognition for quality and achievement.

An accomplished speaker, Don has featured in numerous industry publications and was named by *NJBIZ* magazine in its 2017 and 2018 Power 50 Health Care list, a prestigious roster of those people judged to be the most important, influential, successful and powerful individuals creating and influencing change within the healthcare industry in the state of New Jersey.

Don earned his MSW from Rutgers Graduate School of Social Work and is a NJ-licensed clinical social worker.



**Don Parker (USA)**

Chief executive  
Carrier Clinic



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**Service Manager**  
Adult's Emergency, St Thomas'



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**Art in Site**

## Design for mental and behavioural health

This presentation will summarise the status of mental and behavioural health (MBH) design research and describe an empirical study on such facilities. Environmental features that might positively impact outcomes in mental health settings include: private rooms; visual and physical access to the outdoors; heterogeneous lighting; access to diversions such as music; moveable furniture; better acoustics; representational art; higher daylight exposure; homelike design; and proximity and visibility of common spaces from staff stations. Proper MBH facilities can mitigate suicide attempts by excluding fixtures and furnishings that support ligature.

**Methodology:** The purpose of the study was to: develop and test a tool to evaluate psychiatric facilities; evaluate the importance and effectiveness of specific environmental features; generate design guidelines for MBH facilities; and make recommendations for future research. Four research methods were used: a snowball search to identify experts to serve as interviewees; a set of 19 interviews; a focus group to review the draft survey; and a survey to evaluate the importance of specific design features. This survey, the Psychiatric Staff Environmental Design tool, was distributed to psychiatric nursing organisation members.

**Results:** Data from this study suggest several design objectives for MBH environments. These include: features contributing to patient and staff safety; maintenance; positive distraction; visual and physical access to the outdoors; spaces for staff respite; daylighting; noise reduction; attractive décor; de-institutionalised appearance; and orderly furniture, storage and configuration. Guidelines for MBH facilities were generated. The tool was also revised and a companion tool, the Psychiatric Patient Environmental Design survey, was developed and used for another study.

**Conclusion:** Two controversial topics were addressed: private versus shared rooms, and open versus closed nurse stations. No recommendation is yet provided regarding private versus shared bedrooms. We recommend providing a majority of private rooms, as well as some semi-private rooms or large private rooms that could be converted to shared rooms. Additionally, a definitive direction is unclear regarding open versus closed nurse stations. Significant support is provided for open stations, however, a semi-open station with the flexibility to be fully open after minor remodelling is also a thoughtful approach.



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### **Blurring the boundaries in the built environment to minimise stress and aggression and support healing. Case study: Mental Health Hospital in Vejle, Denmark**

This paper addresses the project, design processes and outcomes of the Mental Health Hospital in Vejle, which won the EHD Award 2018 in the Mental Health Design category.

Vejle Mental Health Hospital was planned and developed in close collaboration with staff and former patients, with the goal to reduce stress and aggression, and support patient outcomes around healing and regaining mental balance.

With the focus on security and feeling safe and secure, the following themes were addressed in the design of the mental hospital:

- zoning – degrees of private to public space;
- unguided access to outdoor space and greenery;
- avoiding narrow spaces;
- transparency – and degrees hereof;
- visible and accessible staff, even at night;
- the possibility to screen aggressive or self-inflicting patients within the ward to minimise stress;
- a “fast track” for staff to move through the buildings efficiently without generating unnecessary stress;
- creating spaces for physical exercise;
- a physical connection to the adjoining hospital; and
- avoiding the perimeter wall or fence.

Apart from the “fast track”, which consists of a precise boundary in a secluded private space for staff, all of the above approaches are achieved by redesigning boundaries – to blur, open up, shield, and create transitions and a natural spatial flow.

This project also put an emphasis on: creating a homely atmosphere; daylight; LED light programmes to resemble natural circadian rhythms; and visual and physical contact with nature.

Research at the hospital shows that in the period February to July 2017, there were about 50-per-cent fewer belt fixations compared with the previous year. There have been similar results at Esbjerg Mental Health Hospital, where the principles used at Vejle mental health hospital were developed. After one year, the results at Esbjerg were:

- a fall in belt fixations by 69.9 per cent;
- a drop in long (+48 hrs) belt fixations by 85.7 per cent; and
- a reduction in the total number of patients who have experienced a forceful intervention by 30.7 per cent.

## Cross-border recognition: maintaining dignity and engagement through the design of the psychiatric emergency department

The psychiatric emergency department (ED) sits on the border between two countries, and is the crossing point from a free state at risk to a managed place of total support and loss of agency.

The psychiatric ED suffers in respect that the individual's dignity and autonomy are compromised by the encounter. This is a consequence of the psychiatric ED's odd origins, in its contradictory legacy as an extension of psychiatric treatment, and as a mimetic image of the acute ED in which its praxis was traditionally embedded.

The fabric of the acute ED is shaped by a need to accommodate the unknown infection or the pressures of time and response. Out of necessity it presupposes risk. The now of the patient is eclipsed by all the negative potential they carry.

Looking at two recent projects, we find this is not an appropriate template for the psychiatric ED, as it adds to the trauma carried by the incoming patient and positions the institution as an aggressor despite the care it offers.

The first project, a replacement of an existing urban Toronto psychiatric ED at CAMH, found that, in response to incidents of violence and self-harm, the design puts physical and operational barriers between staff and patients. This isolated both parties from each other and from any meaningful connection to the surrounding city. A subsequent replanning of the department re-introduced a vision of connectivity and engagement.

The second project, a new suburban psychiatric ED at Ontario Shores in Whitby, is in the first stages of visioning. At this preliminary stage, it weighs questions of length of stay with security and the quality of the environment, all towards creating a quality care environment.

Both organisations have discovered that an alternative approach to designing their psychiatric ED is possible. They've found that, with an emphasis on light, views and flexible planning, the patient is provided the opportunity to set the terms of engagement. This point of entry can be a threshold that maintains a continuity of dignity, empowerment and recovery.



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## Designing a healing mental health campus to create an accessible continuum of compassionate care

Historically, patients with long-term mental illness have been warehoused away from the local population. Driven by stigma, lack of understanding, and marginalised resources, citizens with mental health concerns were often isolated further in facilities separated from the community. Access to care is often limited and the continuum of care has been disjointed. It can take five years for a patient to find their place as a functioning member of society, managed and stabilised. How does this fit into a system that focuses on short-term solutions or otherwise long-term isolation?

Carrier Clinic has been a pioneer in overcoming this dilemma. From a farm-based, grassroots initiative, Carrier, in conjunction with NK Architects' Behavioral Health Design team, has designed and developed a unique healing campus. Combining patient-designed care in unison with community-based initiatives and integrated leadership has resulted in the construction of a system of compassionate care that is helping to break through this stigma, and is designing a continuum of accessible compassionate care into the community, and beyond. Compassion for humanity with alternative solutions and evidence-based best practices is the premise of the proposed solution to stigma and isolation.

This presentation will illustrate how the creative intelligence of design can transform and improve the physical and mental environments in behavioural health, and how by working in collaboration with service providers and users, we can design for better outcomes that can reach from an individual sense of dignity to the greater whole – a pebble in the pond, from individual to a global reach.

Examples will be shared of how the physical environment has improved the world of behavioural health, both perceived and physical, demonstrating how facilities once defined by a stone wall with a locked gate to an asylum are changing beyond recognition, as we design dignified environments and reach out to the community to develop awareness and help eliminate stigma.

In a world in which mental illness is still greatly stigmatised, and where many are still struggling to find solutions to the issues impacting behavioural health, addiction and wellbeing, architecture and design solutions can help achieve better outcomes.

## **A healing environment maintaining life quality for children with cancer achieved by an interdisciplinary approach**

As architects of the Prinses Máxima Centre for paediatric oncology, we present how the building took shape and what built measures have been taken to allow the facility to achieve its ambition to be a world-leading centre for paediatric oncology.

The Prinses Máxima Centre opened in May last year in Utrecht. At 45,000m<sup>2</sup>, it's the biggest centre in Europe. Research, cure and care come together in one building. Its mission is to cure every child with cancer while maintaining their quality of life.

Extensive research into healing environments and evidence-based design took place to create a building that allows a normal development of the child despite their disease. The research was conducted by doctors, a psychiatrist, engineers and architects, in collaboration with patients and parents.

The interdisciplinary team established a set of features to be incorporated in the building: daylight; fresh air; views to nature; privacy; outside space; control over own environment; acoustics; activating patients; and smell. These were validated during the process to ensure the vision was met. Evaluations took place by desk research, in mock-ups of every room, and with computer simulations. In some cases, special engineering was necessary to meet building regulations and create a stress-free environment.

A set of rules was established for the set-up of the building to allow stress-free use. These rules became part of the building's bill of requirements. A "one-minute rule", for example, states that parents have to find all the facilities they need within a one-minute walk of their child's room.

Additional spaces were needed to support normal development. Each patient room, for example, consists of two independent spaces adjacent to each other – one for the patient and one for the parents. A sliding door allows users to divide or connect the spaces according to their needs. The outside space connected to each of these units is accessible via the parents' room, enhancing feelings of control and safety. Plans for an extension are already taking shape.



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## A new children's hospital of Helsinki: children's rights in focus

The New Children's Hospital of Helsinki was inaugurated in Autumn 2018. Normally, hospitals in Finland are funded by the regional governing body, but this project was partially funded by a public fundraiser and partially by the state. The hospital houses all medical specialisations except for psychiatry.

Efficiency of medical care and children's rights sit at the core of the design. A list of 10 priorities was used in assessing each design solution. The first priority was the medical process, followed by the child's experience and the carers'. After these considerations came values such as efficiency, safety, operational reliability, etc. The list of priorities was important in situations where compromises had to be made, and helped ensure that core values were met.

In the hospital, parents are able to be with their child around the clock and throughout the care process. For the most part, rooms are single with an extra bed for the carer. Wards contain spaces for carers to take breaks, and there is a larger joint living room with an area for work. At the intensive care unit, carers have access via their own hallways. The interior design is inspired by nature in the Finnish archipelago, incorporating original graphic design, paintings and texts from Tove Jansson's Moomin stories.

In the lobby, there is a saltwater aquarium joined by a two-storey virtual aquarium. Children can colour in their own fish, scan them, and add to the artwork. The hospital also contains its own play and activity centre, while each room has a tablet PC for keeping in touch with friends and loved ones. Upon arriving at the hospital, the child is assigned an avatar to represent them, allowing parents to follow the progress of their child's operation from the living room. Patient privacy is protected, less reporting is required from staff, and parents have reliable information on the progress of procedures.

The new hospital is a complex feat of design, in which procedures, architecture and support functions have been reconceptualised to support medical procedures while supporting family connections.

## Engaging waiting spaces – creating opportunities to engage with the science happening inside the Zayed Centre for Research into Rare Disease in Children

Central to the vision for the Zayed Centre for Research is the desire to promote translational research by encouraging interaction between scientists, clinicians and patients, and making the work taking place within the building more publicly visible. When patients and families arrive at the centre for an appointment they'll be able to see directly into the principal research laboratories. Patients and families will share a single entrance with scientists that passes above these laboratories. Extensive internal glazing will also create strong visual connections between research and outpatient areas.

It's anticipated that patients and families will be curious about what they have seen in the laboratories. Outpatient waiting areas provide a logical space in which to satisfy this curiosity, providing opportunities to engage patients and their families in activities that will help them understand the research taking place in the building.

Following research into different methods and best-practice examples of science engagement for family audiences, the design team developed a brief as part of an art and engagement strategy. Fundamental to the project is an ambition to engage children, young people and scientists to co-design the scientific content to ensure it's appropriate for the audience, scientifically accurate and relevant to the research taking place in the building.

In response to the brief, design agency Designmap is creating interactive installations for the outpatient waiting spaces. These will engage and distract children and young people while they wait, interpreting the science work conducted at the centre through playful games and digital displays, such as a puzzle about cells and an app about gene editing.

This paper will consider:

- developing the arrival experience and engaging waiting spaces;
- interpreting the ethos of a building through an arts and engagement strategy;
- approaches to science engagement for family audiences;
- using co-design processes to develop scientific content and user experience methodologies; and
- the potential to empower patients and families by creating innovative opportunities to learn together and better understand science and health research.



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**Providing spaces for prayer and reflection in hospitals:  
what is the right approach?**

Despite an increase in persons reporting no religious affiliation and a reduction in those identifying as Christian (ONS, 2011 Census), it remains common practice to provide built facilities for prayer, religious worship and reflection in UK hospitals. In recent years, 'multi-faith rooms' have been provided, which are designed to be suitable for patients, visitors and staff of any faith or none. These rooms, however, can often be very unwelcoming and invariably fail to satisfactorily meet the needs of any faith group.

Increasingly, NHS trusts and acute healthcare providers must consider the efficient use of their buildings and the value for money associated with certain services. Therefore, space allocation for 'soft facilities', such as prayer spaces, can be seen as a low priority.

Great Ormond Street Hospital (GOSH) has adopted a different approach, providing specific rooms for specific faith groups together with non-denominational reflection spaces. This approach has been driven partly by recognition that different faith groups use their prayer spaces in different ways and seek different functionality from them. Furthermore, the approach responds to the increasing proportion of the UK population identifying as Muslim, a faith group acknowledged to have particular requirements for prayer space.

Holistic patient care will necessarily include consideration of the spiritual needs of patients and families. This presentation will demonstrate how the approach of GOSH supports a model of spiritual care that is ecumenical in nature, while supporting patients and families to continue the rituals and practices associated with their own faith.

The history of faith spaces in UK hospitals will be reviewed, while alternative and emerging approaches to provision of prayer spaces will be explored. The benefits and disadvantages of the different approaches will be considered, and the success of GOSH's approach discussed. While the UK's predominant religion remains Christianity, there will be discussion around how the needs of this population are different to the needs of other religions such as Islam.

The presentation will conclude by providing guidance on the design standards for prayer spaces, largely neglected in current literature.

## Designing for cancer research: personalised treatment in personalised places

Precision medicines are dramatically improving cancer survivability rates, which have doubled since 1970. Immuno-oncology therapies empower the immune system to recognise and react to tumour cells, and biomarker-guided therapies target the mutation in tumour cells at a molecular level – in effect, creating a personalised approach to treatment, and treating the disease at a systemic level.

In parallel, a number of new cancer treatment centres in the UK are being created, which are also predicated on personalised cancer care. Adaptable spaces are being created for treatments to take place in environments that can be personalised, with individual flexible chemotherapy bays incorporated into departmental layouts. Patient choice is also becoming increasingly important so that, for example, a variety of waiting spaces are available to allow patients to be in a social or solitary setting.

Fully single bedrooms are also being provided in the majority of cancer treatment centres, which also echoes a personalised approach. To counterbalance that approach, higher-quality group settings are now required to give patients appropriate places to interact within ward environments.

The concept of 'team science' is also developing, whereby medics are working collaboratively with researchers to develop new thinking. Clinical trials and drug discovery couldn't run without collaboration, and we're being challenged as designers to create spaces and places that facilitate that.

The connection between research and treatment methodologies became apparent during the design of a 25,000m<sup>2</sup> cancer research facility for the Christie and the 28,000m<sup>2</sup> Clatterbridge Cancer Centre in Liverpool. These two projects will be presented to demonstrate how facilities are being designed to respond to rapid changes and advances in treatment, therapy and technology. Additionally, several other cancer treatment and research projects will provide a powerful source of data and references, including:

- Astra Zeneca Research Centre Cambridge;
- Christie Paterson research facility;
- Brighton 3Ts Cancer Treatment Centre;
- Hampshire Cancer Treatment Centre;
- Clatterbridge Cancer Treatment Centre; and
- Royal Marsden Cancer Research and Treatment Centre (client permission to be sought).



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## Scandion – building architecture, art and high-tech treatment around the patient

Close to the university hospital of Uppsala is the Scandion clinic, Scandinavia's first cancer clinic for treatment with protons.

Planning the clinic involved three major concerns:

- technical and staff challenges;
- the political challenge, with seven out of 21 Swedish health regions co-operating; and
- designing a healing environment combining art, landscape and architecture, and focusing on young patients.

Designing the clinic offered an exciting architectural challenge to unite all the complex construction technology requirements and features, including a highly advanced radiation treatment, preparation room, offices, conference room, hotel and restaurant. Together, they create a pleasant, effective and comprehensive care environment for patients, co-workers and visitors. Locating several different activities in a common space supports the architectural idea of the project.

There was a strong desire to create an indoor environment unlike hospitals. It inspired us to work, as far as possible, with natural materials and colours. Bright walls and laser-panelled walls meet a colourful palette created by artist Filippa Arrias. Together with daylight and daylight simulation, the colours give energy to patients and employees. A carefully designed garden is also located centrally between the waiting room and the wake-up room.

The Scandion clinic has now been up and running for three years, and the following conclusions can be drawn:

- political co-operation has taken a long time to get in place;
- client ambition has led to a prize-winning project, giving Uppsala a new profile building that supports the brand of the clinic; and
- the indoor, 'non-hospital' environment has proved a success with both patients and staff.

We're now completing a second proton-beam treatment facility in Aarhus, Denmark.

## Designing from a clinician's perspective

While clinicians are often involved in elements of the design process, how much do they understand about the overall process and their ability to influence it? The impact of hospital design on clinical staff has an influence on patient outcomes but this often escapes evaluation until post-occupancy.

International network Clinicians for Design has been gathering insights from specialists representing anaesthesia, radiology, cardiology, neurosurgery, infection control and other settings. Studies demonstrate new methods to map the distribution of clinical equipment sounds, which may interfere with speech intelligibility and increase the risk of medication error. The findings also reveal that some design conditions – including module layout, circulation and room design – can not only impede staff's ability to perform but may also influence clinician health, wellbeing and burnout. Proposed methods for the integration of clinical design champions to new solutions that enhance the quality of care by design will be discussed.

In the UK, a recent study identified concerns with the understanding and expectations placed on clinicians during the design process. This identified that while clinicians are frequently asked for input into projects, they often lack understanding of the process and are unable to become fully engaged in the interdisciplinary design of clinical services and environments. The study led to development of a course called 'Building Blocks for Clinicians', aimed at assisting clinicians in understanding the NHS project and design processes, and empowering them to maximise their input.

This workshop and panel session, organised by Clinicians for Design in collaboration with Building Blocks for Clinicians, will explore the challenges clinicians face across multiple specialisms and in different countries. Participants will develop an understanding of the complexities of designing clinical services and environments, and appreciate the clinician's importance in contributing to a fully interdisciplinary design process.

Organised by:



In collaboration with:



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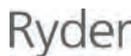
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## Physician engagement and perspective in the Lean facility design process

Clinician involvement is essential to the success of any healthcare design project centred around patient care delivery. There are many challenges in obtaining optimal physician engagement in longitudinal design projects, including time constraints, differing priorities, competing interests, insufficient knowledge of design and development process, and prospectively understanding the value of their contribution.

**Purpose:** This paper will review practising physicians' involvement in the Lean facility design process, in their perspectives and lessons learned. Thoughts and viewpoints from physicians involved in active clinical practice, as well as a multitude of healthcare design projects, and the perspective of a physician architect will be presented.

**Methods:** Evaluation of the perspective of practising clinicians on the facility design process in order to understand the value a strong clinician advocate can provide a successful project; exploration of how physicians think, and how that can impact architectural project goals.

**Results:** Development of design guidelines for optimising communication, engagement and satisfaction of clinicians involved with the design team, to ensure a successful project that not only meets all desired patient care goals but also leads to a design that is functional, effective and lasting.

**Implications:** Practising physicians can contribute valuable clinical knowledge to healthcare design projects to ensure the final product meets desired patient care goals.

Because many challenges exist to optimising physician participation in the process, balancing the perspectives of both the practising clinician and the healthcare administrator are paramount in creating successful healing environments.



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## Hospital design for older people with cognitive impairments: a review of evidence-based design to support inpatients and accompanying persons

Cognitive impairment (CI) is common among older patients in hospitals and arises from a range of syndromes, from intellectual disability and acquired brain injury to dementia and delirium. For these patients, the complex and challenging environment of the hospital can negatively impact their ability to navigate, feel at ease, and remain physically and socially active.

The need to improve the appropriateness and usability of hospitals for patients with CI is receiving greater attention. The most common way of describing the responses to this need is through “dementia-friendly design”. This has some inherent limitations but is a prevalent and pragmatic descriptor for inclusive design, which includes due attention to CI and the many related underlying syndromes.

**Purpose:** This research examines the effectiveness of design in acute hospitals to support older patients with CI and their accompanying persons (APs). It focuses on inpatient wards and has two objectives:

- assess the effects of built environment interventions, in the form of hospital planning and design approaches and features, on the health and wellbeing of older inpatients with CI, including dementia and delirium; and
- assess how built environment features support APs as they assist or accompany the patient during the hospital stay.

**Methodology:** A systematic literature review was conducted through the Cochrane Review process, involving databases, medical registers and grey literature.

**Results:** Early results show much design activity in this area and many interventions have been completed in retrofit or new-build projects. This study categorised these interventions according to six patient outcomes, including: engagement and participation; people-centred environment; patient safety, wellbeing and health; balancing sensory stimulation; legibility, orientation and navigation; and space to support the needs of patients with CI.

**Conclusions:** There is growing realisation that the hospital environment must support patients with CI. Studies exclusively focusing on the environment are still lacking, and therefore it's difficult to isolate the effects of design from confounding factors – for instance, different models of care, staffing levels, or new technology.



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**David Martin** (UK)

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## Integrating science and care: empowering patients through translational medicine

This presentation will provide an overview of the history, challenges and emerging trends inherent in a translational medicine facility, as well as showcasing, through examples, the integration of translational life sciences research institutes with university hospitals and medical schools.

Emphasis will be placed on key areas related to: a) patient wellbeing; b) patient motivation; and c) patient empowerment. These will be summarised in relation to the benefits to patients, created by:

- removing gaps of communication, and barriers between scientists and clinicians;
- bench-to-bedside enterprise of harnessing and transferring knowledge from basic sciences to produce new devices treatments and drugs, and rapidly generate innovations for patients' wellbeing; and
- the interface between science and clinical medicine: the conclusion of this process is the creation of new patient treatments that can be brought to market.

This is how we will heal people in the 21st century – through the development of synergies between clinicians, patients and scientists, integrated with education and industry partners while focusing on a vision to improve:

1. Patient wellbeing – following a few decades of translational medicine facility developments, the presentation will focus on how 'caring' and 'curing' may converge and intertwine, allowing the insights of each to be mutually informing while promoting a positive patient environment and enhancing wellness.
2. Motivation and inspiring patients – how a neuro-psychiatric environment can be supportive to patients, and the value this brings to clinical diagnosis in informing the interior design and how the design creates simple-to-navigate, non-intimidating environments, while also promoting 'chance meetings' for a vulnerable patient population.
3. Empowering patients – suggestions that participation in ongoing research has therapeutic benefit are analysed through case studies and data analysis of patient wellness, where goals of 100-per-cent patient participation were initially set. Has this goal been achieved and what impact has the translational environment had by empowering patients to participate in a facility dedicated to neurological and psychiatric diseases, including Lou Gehrig's disease, multiple sclerosis, Parkinson's, Alzheimer's and resistive psychosis?

## Quadram Institute – next generation for food and health research

Bringing scientists from different disciplines together with the practitioners who will put their findings into use comes with significant benefits, but accommodating the diverse needs of both groups in a consistent, integrated design is a challenge.

The Quadram Institute is a transformational research facility that translates research in plants, genomics, microbiology, and the science of food and the human gut into cures for diseases, and commercial opportunities in pharmaceuticals and the food industry. Quadram also holds Europe's biggest colorectal surgery and gastrointestinal endoscopy unit.

The project brief set out several key goals, with the end product delivering a building that is 'home' to scientists, clinicians and support staff, while being functional, connecting the campus, and making people proud.

The concept design stage was interactive and consultative, comprising a series of design workshops, meetings and presentations. Stakeholder groups discussed aesthetic, operational, technical and security details to ensure the building was optimised for all end users.

Through design and consultation, it was discovered that several elements were paramount in delivering a building that would encourage and stimulate collaboration. Visual connectivity is key to foster mutual interest and awareness, casual space for impromptu discussion leads to collaboration, flexible spaces encourage lean working practice, and high-quality shared and outdoor spaces are important to provide comfort for patients and staff alike.

This approach is validated by workplace research. Working with academics from the University of Washington has shown that decision-making is significantly accelerated where spatial layouts enable users to meet informally.

A hospital department is quite a different environment to a research laboratory. Putting clinicians and scientists together in such close proximity is ambitious, and a challenge was to make their different activities work in an integrated and co-ordinated fashion.

The key to this is the state-of-the-art clinical trials unit, where clinicians, fresh from their daily lists in endoscopy, can help shape and design experimental trials, and gain a deeper understanding of what's going on in the body and why. This will provide more convincing answers, and lead directly to new therapies, advice and new products.



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## Planning workshop: Strategically planning successful health infrastructure

As health systems shift towards a population health-based model and become more accountable to outcomes within an evermore restrained financial climate, the commissioning, planning, procuring, building and operating of healthcare facilities are becoming increasingly complex and risky.

In the UK, navigating the funding, policy and planning challenges of transforming the healthcare estate, through implementation of the Naylor Review and sustainability and transformation plans, are not only a significant national test but also reflect some of the universal health issues faced around the world. These include:

- power, decision-making and effective project governance structures;
- planning to get the best from your estate assets;
- advice on working with the wider health economy;
- selecting the right consultants and advisors;
- navigating through project turbulence; and
- commissioning and transition to a successful operating environment.

This session will take a practical look at some of the key challenges in strategic planning in the UK's NHS to provide a sound project platform, and the tactics needed to deliver capital investment in a changing context, while inviting international exchange on common issues and shared problems.

Organised by:



ARCHITECTS FOR HEALTH



**John Cole** (UK)

Independent client advisor



**David Powell** (UK)

Alder Hey Children's Hospital



**Marte LaUvsnes** (Norway)

Sykehusbygg



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## The king is dead. Long live the king?

Since the 1980s public-private partnership (PPP) models have emerged as the dominant form of procurement for large hospital projects. It's estimated, however, that PPP hospitals cost the UK's NHS around £2 billion every year in maintenance and operational costs. Much of this burden is the result of an approach that has prioritised commercial considerations in the design and construction of the built asset, resulting in poor building performance and correspondingly high costs during the operational phase.

Meanwhile, the operational contract – typically over 25-35 years – has seemingly involved no accurate forecasting and no cap on profits. Unitary charges are high and profit from revenue streams, such as rental from retail units, has gone back into the PFI vehicle rather than providing an income for the trust.

**Objective:** Despite its negative reputation and past challenges, will PPP really be abolished in the UK or return rebranded and transformed? If the latter, how can new PPP schemes be influenced and bettered by design? As new PPP models emerge, such as the mutual investment model in Wales, and the Scotland-wide hub initiative, significant technological advances have been made in the way design consultants develop, manage and document building design.

**Methodology and results:** Using case studies of PPP healthcare facilities, the panel will present how these type of schemes can be better by design. Issues to be addressed include:

- How design consultants can improve healthcare schemes under emerging PPP models and learn lessons from the past; case studies – Tunbridge Wells Hospital, Pembury; South West Acute Hospital.
- How design consultants can improve PPP healthcare schemes globally; case studies – Bridgepoint Active Healthcare Redevelopment, Canada; Sunshine Coast University Hospital, Australia.
- How BIM can transform the design and delivery of healthcare schemes commissioned under emerging procurement routes.

**Conclusions:** Key learning points will include:

- advantages and disadvantages of new PPP models for design consultants, and limitations and opportunities to influence them;
- challenges and solutions regarding achieving value for money through design for PPP projects; and
- new ways to more accurately predict and test facility management processes through BIM.

## The adaptable estate

The Guy's & St Thomas' NHS Foundation Trust's estates development plan (EDP) is a significant programme of work that will have an impact on all trust staff, local and regional economies, and London's built environment. It will support the UK Life Science Industrial Strategy and is likely to set the agenda for other developments in London and nationally, as it delivers built assets and the space for collaboration, healthcare, research and education.

**Objectives:** A key consideration in the design of the buildings comprising the EDP will be a strategic brief to ensure they meet the trust's fit-out requirements and allow future changes in use. That way, the estate will respond to future clinical and research use needs, adapt at minimal cost, and maximise commercial opportunities.

**Anticipated outcomes:** Buildings delivered under the EDP will adopt a commercial property development structure with the trust developing adaptable base buildings and tenant(s) – including the trust, King's College London, and industry partners – entering agreements to fit-out and lease space within the buildings. The fit-out of each project will be based on a separate clinical/research brief and use distinct funding streams where necessary; tenants' manuals will also provide guidance on the fit-out of adaptable space.

The adaptable estate specification will identify the extent and specification of the 'shell and core' buildings, including the structural frame, cladding, primary plant, and services distribution. The specification will be issued as part of a tender pack to potential development partners, who will respond with concept designs alongside commercial offers.

A team of architects, engineers and cost managers will develop this strategic delivery specification, which identifies the scope and specification of works to be delivered under the 'shell and core' works package. They will give the development market scope to innovate, and meet spatial and servicing requirements for clinical and research space, while meeting the trust's present and future needs.

**Conclusions:** Although common in other sectors, this approach marks a paradigm shift from the traditional model for clinical real estate delivery. Benefits include: speed of construction; maximisation of development area; delivery cost; and ease of future adaptation.



**Rupert Corbett (UK)**

Operations director, estates development team, Essentia Guy's & St Thomas' NHS Foundation Trust



**Peter Ward (UK)**

Director of healthcare, real estate development, Essentia Guy's & St Thomas' NHS Foundation Trust and King's College London



**Rhonda Kerr** (Australia)

Director, economics, health services and planning, GENI (Guidelines and Economists Network International);  
Principal health services planner, Hames Sharley Architects;  
PhD candidate in Health Economics, Curtin University, Australia

## Transforming healthcare: form follows finance

The fourth industrial revolution is transforming society and options for health. Capital investment is about effectively delivering the platforms for the next generation of clinical services.

Evolving technologies, precision medicine, telemedicine, real-time monitoring from wearable and implanted devices, robotics, and AI-assisted diagnostics and treatment all point to the next generation of clinical services being unlike those of the past. Effective capital funding for clinical information systems, structures and medical equipment are the enablers of vital clinical service transformation. But, in a time of rapid change, how can the core values of equality of access to safe, high-quality clinical care be assured?

**Purpose:** This is a health economic review of allocative, productive and dynamic efficiency of capital allocation systems for effective acute clinical care.

**Methods:** This research has evaluated a new model for funding environments for clinical transformation according to the golden trio of equity, effectiveness and efficiency. Based on an Australian public hospital performance framework, three capital funding models have been evaluated against 35 measures. Key areas were assessed to determine if the new model and existing methods of capital allocation funded clinical care that was equitable, appropriate, of the expected quality, responsive to patient and clinical change, supportive of evidence-based innovation, and sustainable, both financially and environmentally.

**Results:** Comparing the Australian system of capital allocation, depreciation-based systems and a new diagnosis-based model of capital allocation found directions for effective capital funding to transform health service delivery, enhancing equity, effectiveness and efficiency. The new model translates technological and clinical standards into new physical settings using evidence-based clinical pathways. The critical enabler is the form of capital funding supporting patient-focused continuous improvement.

**Conclusions:** In a time of significantly diverging methods of treatment for different diagnoses, the new model for capital cost allocation built on evidence-based clinical pathways empowers new modes of effective care, demonstrating qualities of allocative, productive and dynamic efficiency, equity and effectiveness. This model provides funds at the patient level for effective, equitable and efficient clinical care in the most appropriate setting.

## FleXX

This research is a continuation of previous work on Clinic 20XX, which found that flexibility in healthcare design was a core tenet of change readiness. The definition, understanding, investment and return on investment (RoI) around flexibility is, however, unclear.

To investigate further, an architecture firm and manufacturing firm undertook a literature review and national survey of three stakeholder groups: C-suite officials, nurse administrators and facility managers. A simple framework emerged: versatility, modifiability, convertibility and scalability. Key findings include:

Flexibility involves myriad considerations, including: user/owner perspective; built elements that are affected; soft/hard; level of ease; duration of time to complete change; and when/how much investment should occur. Stakeholders believe facilities must be flexible for organisations to adapt, and they rate versatility and modifiability as more important than convertibility and scalability.

Stakeholders are willing to pay close to 20 per cent in premium costs for convertibility and long-term scalability, with eyes on improving their bottom line, and keeping patients and employees satisfied.

More than 70 per cent of stakeholders believe flexibility doesn't always need to cost more and is part of good design. Flexibility isn't just spatially defined, as stakeholders also consider it in terms of time, roles and resources.

The two biggest causes of lack of flexibility appear to be "stuff" (furniture/equipment, etc) that isn't modifiable, and spaces that can't easily be converted. The two biggest successes appear to be multi-use spaces and standardised rooms able to modify to support different functions. Moveable/demountable walls are seen as a major need but are contextual to the entire building system.

While survey participants believed that standards are valuable and could improve operational flexibility, their perceived use of standards was rated at about the industry average. The top three considerations for flexibility were amount of space, variations in sensory environment, and ability to use the same space for different purposes.

It isn't clear to stakeholders how RoI can be measured and over what period. A comfort zone seems to be one to five years, and the metric combines: organisational growth; improvement in the bottom line; ease of change; increased patient satisfaction; and improved employee satisfaction.



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## Collaborative approach to healthcare design

Circle Health is an independent healthcare company delivering a range of private and NHS-commissioned healthcare services. In 2010, it opened its first facility, Circle Bath hospital, which reflected its ambition to deliver a healthcare environment distinguished by an emphasis on patient experience. This provided the foundation for all future Circle Health facility designs.

Over the last decade, Circle has continued to set itself apart from its competitors. The Circle Reading Hospital, which opened in 2012, was designed to increase in scale and adapt to local needs, while maintaining a focus on patient experience.

In addition to prioritising patient experience, Circle Health facilities have needed to adapt to a changing healthcare landscape. Challenges to operational mobilisation and different funding flows in Circle Reading influenced the need to employ a design that could respond to an emerging and evolving business case.

The company's second brief for Circle Birmingham reflected key features of the Reading facility, while clearly stipulating a requirement for flexibility to accommodate a dynamic business case aligned with the organisation's strategic development.

This flexibility was fully exploited. Following the initial design for the elective surgery facility, a new large-scale rehabilitation facility was incorporated. This will be the first large-scale centre of its kind in the UK and has been designed to provide the missing link between acute and community care provision. By adopting best practice from Europe and the United States, our facility will:

- provide intensive therapy that exceeds NHS levels and is proven to improve patient function;
- enable care to be delivered at 30-per-cent lower cost compared with the cost of an NHS acute bed;
- release about 10-20 per cent acute beds, enabling local NHS trusts to increase their operational facility and flow; and
- increase patient functionality, resulting in reduced long-term care cost – 80 per cent of patients in European facilities return home, leading to significant potential benefits in relation to independent living and return to work.

Our vision is to employ this generic design to inform multiple rehabilitation facilities, responding to commercial and environmental factors while prioritising emerging place-based healthcare needs.

## Lunchtime design workshop

**Monday 17 June, Council Chamber**

**12.40–13.50**

### How future-ready is your city to deliver healthcare? The challenges and opportunities

Factors such as climate change, population growth and urban migration are placing ever-greater stresses on health systems around the world, while science, technology and innovation create exciting new opportunities. With over half the world's population now living in urban spaces and expected to be nearly 70 per cent by 2050, cities are the new frontline in the provision of healthcare that is equitable, accessible, effective, affordable and qualitative.

WSP and the Helen Hamlyn Centre for Design, Royal College of Art, in collaboration with SALUS Global Knowledge Exchange, have designed a global index to compare the response and preparedness of cities to meet health challenges, focusing on their future readiness to meet the emerging healthcare needs of their populations – identifying emerging trends concerning priority issues such as ageing populations, technological advancement, risk of pandemics, and climate change. It therefore seeks to encourage change in healthcare provision to ensure it meets the needs of communities.

Following successful workshops at the European Healthcare Design and Healthy City Design Congresses in 2018, conducted to support the design development of the Index, the project is nearing completion. Nevertheless, in a rapidly changing social, economic, political environment, the dialogue continues, and the way cities and healthcare providers jointly plan and prepare for changes in system design, service delivery, technology and infrastructure needs must respond.

### Workshop leaders



**Nolan Rome (USA)**  
Global healthcare lead,  
WSP



**Prof Jeremy Myerson (UK)**  
Helen Hamlyn chair of  
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**Dr Gerard Briscoe (UK)**  
Research associate,  
Helen Hamlyn Centre for  
Design, Royal College  
of Art



**Simon Kydd (UK)**  
Director – UK head of  
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# 150



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## Lunchtime design workshop

**Monday 17 June, Seligman Theatre  
and Platt Room**

**12.40–13.50**

### **Building the Long-Term Plan: prevention and wellness, place and community**

The newly published NHS Long-Term Plan aims to “finally dissolve the historic divide between primary and community health services”. Over the next ten years, policy will intensify the strategic focus on personalised care, prevention and the mainstream adoption of digitally enabled services.

To date, models of community care have been evolving around two key ideas:

- integrated care – dissolving the traditional boundaries between health, mental health and social care, and providing these under one roof where possible; and
- place-based care – co-locating clusters of relevant services within specific communities.

These models have spawned new building typologies that aim to harness principles of health and wellness within shared flexible space, to promote multi-agency collaboration and improved space utilisation.

This interactive workshop will explore the extent to which community-based assets can help dissolve the barriers to truly integrated care, while also considering the challenges. We will encourage participants to consider how the built environment and integrated technology can drive new community-centric innovative service models, supported by experiences and lessons from diverse exemplar projects and programmes.

### Workshop leaders



**Jonathan Wilson**  
(UK)  
Strategic estates lead,  
GB Partnerships



**Paul Fitzpatrick** (UK)  
Director of estates  
and facilities, Aintree  
University Hospital NHS  
Foundation Trust



**Mark Harrod** (UK)  
Director, KYMA  
Consulting

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## Breakfast workshop

**Tuesday 18 June, Council Chamber**  
**07.30–08.45**

### Setting new standards: forming a Global Institute of Healthcare Planning

Healthcare planning is a term often adopted to support advisory activities to help clients plan, deliver and better manage their healthcare infrastructure. The planning, design and construction of such infrastructure is a multi-billion-dollar activity worldwide yet, surprisingly, there is no clear definition or upholding of standards in healthcare planning. The aim of the institute is to address this and bring oversight and accreditation to qualifications and practice in this field.

Healthcare planning is without any clear definition of practice, so the definition that the institute is embracing is to recognise three strands of activity: strategic planning; clinical planning; and space planning.

Strategic planning embraces population health, epidemiology, and an understanding of how demography and population health needs to drive demand for services and the configuration of those services. Clinical planning supports the transformation of clinical requirements into physical requirements, and the environments and technology required to deliver high-quality healthcare. Space planning is the detailed and technical activity of generating specifications and standards to inform healthcare building design.

These definitions embrace professionals from different disciplines, including clinicians, human geographers, sociologists, epidemiologists, architects and engineers. The role of the institute will be to accredit courses that enable these professionals to undertake post-graduate study in their chosen discipline of healthcare planning, as well as developing and maintaining standards of practice internationally.

A new global institute will drive up quality and standards to deliver better training, education and client service, and create a community of practitioners focused on improving healthcare environments for all. This “healthy breakfast” workshop will set out a vision for a new Global Institute of Healthcare Planning, inviting multidisciplinary participants to share their ideas and expertise in the development of the professional practice of healthcare planning.

### Workshop leaders



**Richard Darch (UK)**  
Chief executive  
Archus



**John Kelly (UK)**  
Director  
ETL



**Tina Nolan (UK)**  
Director of healthcare  
planning  
ETL



**Conor Ellis (UK)**  
Head of health, partner  
Rider Levett Bucknall

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## Lunchtime design workshop

**Tuesday 18 June, Council Chamber**

**12.40–13.50**

### Hospice design for a new era of patient and family needs

The future of palliative care faces a new era of challenges, including ageing population, multi morbidity, fluctuating trajectories, and treatment later into the course of illness.

How can we ensure palliative care continues to enable people to live well, alongside providing end-of-life care against an uncertain backdrop? Through exploratory research across Europe and a collaborative approach to palliative care design, the Prince & Princess of Wales Hospice (PPWH) in Scotland has realised a world-class facility to deliver 21st-century hospice care. The PPWH has taken this major step forward through a pioneering approach to the intersection of palliative care and architecture.

This interactive workshop will introduce short presentations from leading palliative research, design and client perspectives, followed by discussion and engagement with the panel exploring a wide range of influencing factors, including models of care, key design lessons, technologies, as well as clinical and academic integration.

### Workshop leaders



**Alastair Forbes (UK)**  
Architectural director,  
Ryder



**Rhona Baillie (UK)**  
Healthcare director,  
Prince & Princess of  
Wales Hospice



**Ivor Williams (UK)**  
Designer, Helix Centre,  
Institute of Global Health  
Innovation, St Mary's  
Hospital



**Marte Lauvsnes**  
(Norway)  
Manager, advisory and  
project departments,  
Sykehusbygg

# Safer water delivery in hospitals

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## ***Visit our lunchtime workshop***

**Design Solutions for Multi-Drug Resistant Pathogens in Water Systems  
on Tuesday 18th June from 12.40-13.55**

## Lunchtime design workshop

**Tuesday 18 June, Seligman Theatre and Platt Room**

**12.40–13.50**

### Design solutions for reducing multi-drug resistant healthcare-associated infection

Healthcare-associated infections are the most frequent adverse event in healthcare delivery worldwide, with the prevalence of hospital-acquired infection (HAI) in developed countries varying from 3.5 to 12 per cent. As multi-drug resistant (MDR) bacteria become an ever-greater global threat to human health, the World Health Organisation (WHO) has developed an action plan with a number of strategic objectives, one of which is to reduce the incidence of infection through effective sanitation, hygiene and infection-prevention measures.

This workshop will explore the potential to reduce the incidence of healthcare-associated infections through the application of technological solutions and several design concepts. Examples of in-situ designs that are capable of allowing the spread of MDR bacteria (even though they comply with healthcare guidelines) will also be discussed, with consideration given to the role of human factors, from installation through to final use.

The WHO requires that better sanitation, hand washing, and food and water safety must be core components of infectious disease prevention. Many MDR bacteria are harboured in hospital drainage systems, potentially compromising these activities. This may occur as a result of incorrect specification and/or installation of clinical sanitaryware, or poor workflow design. Consideration will also be given to: ergonomics around the correct disposal of patient fluid; keeping water clean by easy and effective cleaning of tap components; activity space and minimising splashing from wash hand basins; and fixtures and fittings that can inhibit the growth of harmful bacteria.

### Workshop leaders



**Elise Maynard** (UK)  
Managing partner, Elise Maynard Associates / Water Safety Forum



**Noemi Bitterman** (Israel)  
Founder and chair, Masters in Industrial Design, Technion



**Tony Rheinberg** (UK)  
Marketing manager, Armitage Shanks



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## Architects for Health

Architects for Health (AfH) is the UK forum for healthcare design.

Design of hospital or clinic environments is important for the wellbeing of patients, their friends and families, and people who treat and care. Good design enhances the experience of care and has a positive influence on clinical outcomes. AfH promotes design of better settings for healthcare by providing a forum for the exchange of ideas, promoting best practice, and recognising and rewarding excellent examples of healthcare design.

We work to bring about strategic change to the complex processes of planning and development. Drawing on the practical experience of our expert membership, we aim to make a difference through our work streams on procurement, guidance, strategic planning and design quality. We engage with and influence wider health institutions and communities.

As a non-profit organisation, with about 500 members, we build knowledge networks that inform and support the design of high-quality healthcare environments. We share ideas, experiences and examples through our growing membership links across the UK and Europe.

### Membership

We welcome members from both health and design professions who share our values across healthcare planning, design and delivery. We bring together ideas from clinical practice and architectural design. Our members benefit from displays of our projects at national conferences, discounts to events, information exchange and collaboration, CPD opportunities, and support for ideas for AfH activities and projects.

### Programme of events

Our annual programme of activities promotes a better understanding of health planning and design issues, and keeps members informed across the whole range of healthcare topics. All activities are wide-ranging and include joint events with clinical societies and Royal Colleges, or with representatives of organisations active in health facilities procurement.

### Innovation and best practice

New methods of treatment and emerging technologies mean that health environments are constantly facing new challenges. Cultural, workforce and qualitative expectations drive change in design. To understand this evolving health infrastructure and reflect best practice, we arrange study visits to health facilities at home and abroad, which keep our members appraised of the latest ideas and innovations.

### Nurture and learning

Designers care for the future. AfH is collaborating with schools of architecture and design to proactively support the inclusion of healthcare-sector buildings in the curriculum. We have a well-established programme of Student Design Awards, which is now in its 13th year.

You can follow AfH on Facebook and LinkedIn. For more information, please visit: [www.architectsforhealth.com/join/](http://www.architectsforhealth.com/join/)

## 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 the earth's finite resources – as inextricably linked.

SALUS aims to build interdisciplinary professional communities and networks that will facilitate collaborations through a range of media, publishing, events and training activities, which promote the application and interaction of art, science, research, culture and innovation.

### Conferences, seminars and workshops

All our events focus on the development of knowledge and sharing of ideas, since we believe that interesting and inspiring content attracts leaders and innovators. By bringing researchers, policy advisors and practitioners together to tackle the key health and sustainable development issues facing the world, we aim to build bridges across geographic, cultural and socio-economic divides, promote and disseminate the latest scientific and research findings, and inspire the commercial development of innovative products and solutions.

In addition to organising the 5th European Healthcare Design 2019, on 14-15 October, we return to the Royal College of Physicians for the 3rd Healthy City Design International 2019 Congress & Exhibition. HCD2019 ([www.healthycitydesign.global](http://www.healthycitydesign.global)) is a cross-sector, multidisciplinary congress looking at the role of design in creating healthy cities and communities.

### Education and training

We also organise bespoke training courses and study visits in the design, health and wellbeing sectors. Courses can be combined with study visits to leading UK hospitals and are primarily provided for delegates from the health infrastructure divisions of ministries of health, as well as public-sector and commercial practitioners.

### Media and publishing

All talks at our congresses are filmed and published on the SALUS Global Knowledge Exchange. Launched in 2017, this dedicated network for the healthcare design and healthy cities communities provides an online environment for sharing knowledge in these fields. Available at [www.salus.global](http://www.salus.global), it features conference videos, posters and papers, an online journal, and a fully searchable projects database, alongside a variety of innovative community tools.



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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.

Originally built in 1914, Alder Hey has now developed into: 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; a designated children's major trauma centre; a leading diagnostic centre, including intra-operative 3-T MRI scanning; and a centre for research, innovation and education.

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## Australian Health Design Council

The Australian Health Design Council (AHDC) represents the health design sector in providing expert advisory services in health facility design, planning and management for industry and government.

Our key objectives are to establish and promote a shared vision for high-quality, efficient and effective health facility design that responds to the needs of the Australian populace. The AHDC is committed to encouraging the further development of the Australasian Health Facility Guidelines, and the effective implementation of integrated project briefing and Building Information Modelling (BIM) technologies.

Our vision is of an industry that shares knowledge, information, technology, research and experience to promote consistency and effectiveness of health design across all projects – in both public and private sectors.

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## Bartlett Real Estate Institute, UCL

The Bartlett Real Estate Institute, UCL is a new global institute that is rethinking the traditional view of real estate. The BREI MSc programmes, short courses and research critically evaluate real estate within its wider societal, economic and environmental context.

The MSc in Healthcare Facilities provides an integrated and interdisciplinary programme related to healthcare facilities in the widest sense. This MSc is the first of its type in the UK and Europe, and one of only a few in the world. It covers all aspects of the process of creating, designing, renewing or managing healthcare facilities.

The MSc programme aims to provide a means of transforming the wider healthcare stakeholder community's view of the role, design and operation of built forms that support health activities.

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Lecturer, programme leader, MSc  
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## Brighton and Sussex University Hospitals NHS Trust

Brighton and Sussex University Hospitals (BSUH) is an acute teaching hospital working across two sites: the Royal Sussex County Hospital in Brighton, a centre for emergency, specialised and tertiary services, and the Princess Royal Hospital in Haywards Heath, a centre for elective surgery. These sites include the Royal Alexandra Children's Hospital, the Sussex Eye Hospital, and the Sussex Orthopaedic Treatment Centre.

BSUH provides district general hospital services for 450,000 people in and around the city of Brighton and Hove, mid Sussex and the western part of East Sussex. Our specialised and tertiary services treat patients from across Sussex and the South East of England. We are the major trauma centre for Sussex and the South East. The trust is planning a £480m redevelopment of the Royal Sussex County Hospital site.



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## Building Blocks for Clinicians

Building Blocks for Clinicians was established in 2017 to address a need for additional support for clinicians in the design process. This culminated in the development of a course, Building Blocks for Clinicians, which assists such health practitioners in understanding NHS project and design processes, empowering them to participate and maximise their input.

The course has a multidisciplinary faculty combining lecturers, clinicians, healthcare planners, architects and researchers. The faculty team provides twice yearly courses for clinicians and plans to support interdisciplinary design through a course tailored for architects. This new course will assist the design team in the understanding of the complexities of designing clinical services and environments, and ensure an understanding of the clinician's importance to the design process.



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Co-founders

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## Clinicians for Design

Clinicians for Design (CfD) is an international network of leaders with a vision to inspire and accelerate the design of environments and systems.

CfD offers a forum for clinicians to apply their insights and experience to the design of settings and systems that serve medical practice. Its mission is to engage clinical professionals in research, education and practice, to inform the design of healthcare spaces, delivery, technologies, systems and policies to enhance patient outcomes.

CfD was co-founded by Drs Anderson and Edelstein. Dr Anderson MD is a "dochitect", combining educational and professional experience in medicine and architecture. Dr Edelstein PhD, F-AAA is a "neuro-architect" who, in her capacity as director of the Hx Lab at Perkins+Will, applies her research with the University College London, and clinical service with the National Hospital for Neurology and Neurosurgery, among others.



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## Construction Industry Council

The Construction Industry Council (CIC) is the representative forum for the professional bodies, research organisations and specialist business associations in the construction industry.

Established in 1988 with just five founder members, the CIC now occupies a key role in the UK construction industry, providing a single voice for professionals in all sectors of the built environment through its collective membership of 500,000 individual professionals and more than 25,000 firms of construction consultants.



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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.



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## Design Quality Indicator

Design Quality Indicator (DQI) is a process of evaluating and improving the design and construction of new buildings and the refurbishment of existing buildings. It's designed to set and track design quality at all key stages of a building's development and incorporates post-occupancy feedback.

DQI for Health is used as a design quality evaluation tool for all types of healthcare projects. This health assessment builds on the solid foundations of DQI while also incorporating the best features of the now obsolete Achieving Excellence Design Evaluation Tool (AEDET).

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Director

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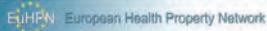
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## Essentia at Guy's and St Thomas' NHS Foundation Trust

Essentia designs, builds and maintains healthcare infrastructure that is vital to the smooth running of healthcare services. We are an essential 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.

We have also developed a commercial arm called ETL, which helps clients, predominantly in the public sector, become more efficient and effective. We provide consultancy and services in areas ranging from strategy and estates development, to sustainability and IT.

We use our experience and expertise gained from many years in the NHS to support other organisations – and all profits are reinvested in Guy's and St Thomas'.



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## European Health Property Network

The European Health Property Network exists to share information and expertise on how best to plan, design, build, maintain and finance all forms of health property – from hospitals to health centres. The network was established in 2000, in the Netherlands, as a non-profit trust to promote excellence in health property provision and management.

The EuPHN holds an annual workshop, hosted in a different country each year. This year's event takes place in Basel, Switzerland, on 18-20 September, with the theme 'Getting it right, first time, for patients'. Previous years have focused on: sustainable, green design for health buildings; incremental versus 'big bang' planning; design for mental health facilities and dementia care; the effects of new technologies on healthcare building design; tools for strategic asset planning; and how best to balance private and public capital financing.

The network also organises regular regional seminars across Europe.



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## Great Ormond Street Hospital for Children NHS Foundation Trust

Great Ormond Street Hospital (GOSH) is an international centre of excellence in child healthcare.

Each year, it receives more than 268,000 patient visits, including referrals to its specialised services from hospitals across the UK, and an increasing number of overseas patients. Together with our research partner, the UCL Institute of Child Health (ICH), we form the UK's only academic biomedical research centre specialising in paediatrics.

GOSH representatives will be presenting in session 21 on 'Designing for children's health' on 18 June in the Council Chamber.



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### Maquet Variop in comparison with average conventional OR\*



#### Construction period

**40%** faster than conventional

#### Retrofitting

**60%** faster than conventional



#### Retrofitting

**23%** less expensive  
(excluding downtimes costs)

\*Obermeyer Planen + Beraten GmbH · ROI: Modular vs. conventional building methods

This document is intended to provide information to an international audience outside of the US.



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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. It's an international leader in people-centred and inclusive design – the process of designing products, services and systems for ease of use by the maximum number of people.

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.



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## North Bristol NHS Trust

North Bristol NHS Trust provides hospital and community healthcare for the residents of Bristol, South Gloucestershire and North Somerset. The trust is also a regional centre for neurosciences, plastics, burns, orthopaedics and renal services.

Completed in 2014, the new Southmead Hospital PFI was constructed at a cost of £430m.

Designed by BDP, the project presents a high-quality public face utilising a semi-randomised facade aesthetic, which gives a non-institutional character to the bedroom wings.



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## Sykehusbygg

Sykehusbygg (Norwegian Hospital Construction Agency) was founded in November 2014.

Sykehusbygg 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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## University of Greenwich

The University of Greenwich was founded in 1891 as Woolwich Polytechnic. Over the years, it's incorporated several other institutions, including Dartford and Avery Hill Colleges. It became a university in 1992 along with other polytechnics.

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The university offers a wide range of undergraduate and post-graduate degrees across the digital arts, education, nursing, business, engineering science, the built environment and architecture. The university's Department of the Built Environment provides education from HNC to PhD.

Our degree programmes include MSc Construction Management & Economics; Facilities Management; International Project Management; Sustainable Building Design and Engineering; Safety, Health and Environment; and Occupational Hygiene. At undergraduate level, our offering includes BSc Quantity Surveying and BA Property Development and Management.



## ViewPoint

Across 21 countries, ViewPoint technology is gaining feedback in efficient and innovative ways, including through: patient experience surveys; service quality feedback; employee engagement; post-occupancy evaluation; contract performance evidence; performance monitoring; event feedback; and many more applications.

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ViewPoint feedback devices offer an invaluable opportunity to discover all you need to know about your performance. Our range of feedback solutions, including feedback terminals, tablets, online or text, are designed to capture high-quantity and quality responses.

Responses are loaded on to a live dashboard in real time, accessible through a secure portal. Here, you will see an overview of performance, with the functionality to drill down to the detail you need. With this information at your fingertips, decisions can be made on any necessary changes or service improvements, in addition to evidencing results in presentations and reports.



## Media partner: HealthManagement.org

The HealthManagement.org leadership community engages in cross-collaboration and promotes management, leadership and successful practices in healthcare.

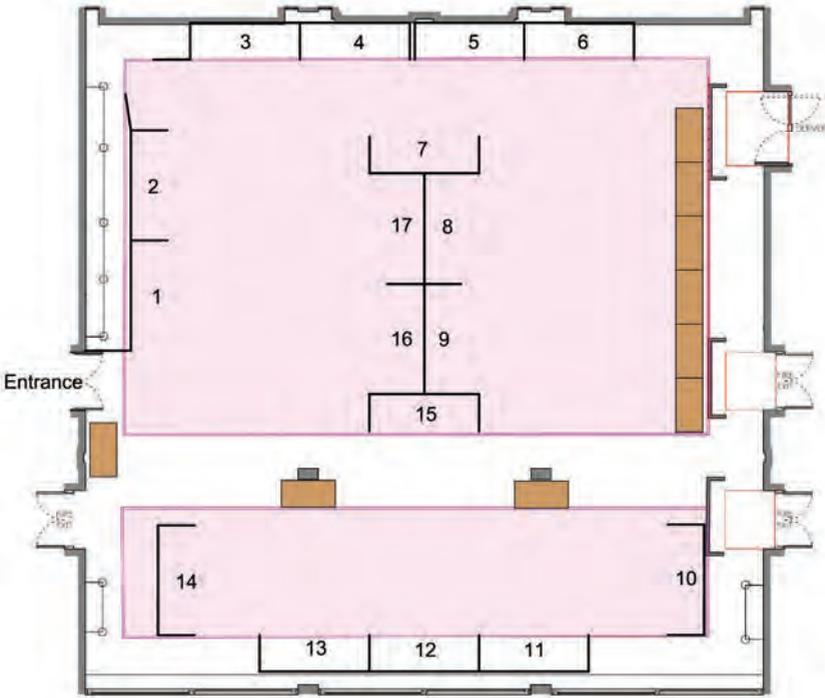
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With the active engagement of thought leaders and almost 100 well-respected national and international associations and congresses, HealthManagement.org provides comprehensive information relating to executive management, imaging, healthcare IT, cardiology and intensive care units.

**OPENING TIMES:**

Monday 17 June 10.00-17.00  
 Monday 17 June 18.00-20.00  
 Tuesday 18 June 10.00-17.00

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 17 June.



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## AECOM

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KNOWLEDGE PARTNER

## AECOM

Consistently ranked as one of the world's leading healthcare and science designers, AECOM is sought after to deliver its services for highly respected providers worldwide. Drawing on the expertise of professionals in 150 countries, the vision of its healthcare practice is to create smart environments and systems that are people-centred and focused on improving health outcomes.

The company's teams are engaged across the entire health economy, from the fundamental scientific research that enables the delivery of modern healthcare, through to acute hospitals, mental health facilities and aged care centres. Its healthcare professionals have a deep understanding of the challenges faced by care providers.



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EXHIBITION PARTNER

## Altro

Altro has been at the forefront of innovation for almost 100 years. Today, working closely with architects, end customers, engineers, designers and contractors around the world, our insight and expertise help transform everyday spaces into environments that can improve the wellbeing of everyone who uses them.

Working with experts, we understand the importance of creating a safe and positive environment to promote patient recovery, and enhance staff confidence and morale. Altro floors, walls and doors come in up to 43 colours and include wood-look, stone, linen and tile options, as well as bespoke options for walls. You can use art and imagery to bring the outside in, with images from nature to create a sense of calm. Our adhesive-free floors have no associated odours that could cause residents discomfort.

## ARCHUS

ADVISORY • INVESTMENT • DEVELOPMENT

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KNOWLEDGE PARTNER

## Archus

Archus is an advisory, investment and development partner with health and social infrastructure clients. Our proposition, culture and philosophy are based on adding value and delivering quality services to our stakeholders and customers.

We have a wide variety of skills and experience to offer an integrated approach to health and social infrastructure projects. We also have working relationships with and access to some of the country's top advisors and institutional investors.

Our team has a track record of funding, developing and delivering approximately £200m of health infrastructure projects. We have project managed a further £500m of capital projects, managed public-sector property portfolios of £350m-plus, and provided strategic healthcare planning for many of the UK's largest new hospital build projects over the last 25 years.



with people in mind

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 EXHIBITION PARTNER

## Arjo UK

At Arjo, we're 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.



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 KNOWLEDGE PARTNER

 EXHIBITION PARTNER

## Armitage Shanks

Armitage Shanks is the commercial arm of Ideal Standard with a major focus on healthcare products. The Contour 21+ and Markwik 21+ offer an advanced solution for hospital sanitaryware, taps and mixers.

The range was designed with the aim of reducing the opportunities for pathogenic bacteria growth in healthcare facilities, and features a number of innovations, including a new clinical basin that reduces splash by more than 90 per cent.

Taps and mixers are often good havens for bacteria. To address this, the Markwik 21+ range has been designed to hold less water, comes with a higher content of brass, and has a number of built-in features that allow engineers to cleanse fittings quickly.

Recent research has validated that pseudomonas (common bacteria found in soil and water) are eradicated when fittings are stripped down and placed in a washer/disinfector.

## Art in Site

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 EXHIBITION PARTNER

## 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, design and wayfinding for healthcare environments.

Recent projects include: apps for children to relieve fear and anxiety at A&E; sculptures and illustrations that bring wellbeing benefits to mental health patients in long-term care; and a suite of artworks offering reassurance, dignity and better orientation for cancer patients receiving treatment.

When we began, art provision for UK healthcare was limited. Since then, we've developed nationally endorsed, best practice methods across the creative process, from community and stakeholder engagement, to the development of relevant and insightful art strategies, through to the selection of artists, design, compliance and quality control, and the co-ordination and manufacture of artwork.



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KNOWLEDGE PARTNER

## BAM

From its origins in 1869 as a carpentry workshop in the heart of the Netherlands, Royal BAM Group has become a successful group of companies with activities in numerous European countries and others worldwide. Today, it ranks among the largest construction companies in Europe and is the market leader in the Netherlands.

With around 28,000 employees, BAM operates in the construction, property, civil engineering, public private partnerships, mechanical and electrical contracting, and consultancy engineering sectors.

Our industry is going through massive change – most of it for the better – as construction becomes more focused on users of buildings, and long-term sustainability and cost-effectiveness. We're embracing this change.

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BRONZE PARTNER

## BDP

BDP is an international, interdisciplinary practice formed of highly experienced and creative architects, designers, engineers and urbanists. We work closely with users, clients and the community to create places that are social, useful and beautiful. We design at every scale and at every stage in the process of placemaking, from visioning to briefing, design, delivery and operation.

Founded in 1961, the practice has grown to more than 1200 people working from a collaborative network of studios across the UK, Ireland, Canada, China, India, the MENA region, Netherlands and Singapore.

Healthcare is a significant area of focus for the practice and we've designed award-winning places for healing and wellbeing across the world, always putting the user and operator experience at the centre of our thinking.



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EXHIBITION PARTNER

## Getinge

Getinge is a global provider of innovative solutions for operating theatres, intensive-care units, sterilisation departments, and life science companies and institutions.

Our extensive portfolio of trusted products, solutions and consulting services has been brought together under one single brand – Getinge. With brands such as Maquet, Lancer, Atrium, Pulsion, Datascope, Steritec and Stericool – just to name a few – we're now a global market leader in many healthcare and life science segments.

Based on our first-hand experience and close partnerships with clinical experts, healthcare professionals and medtech specialists, we're improving everyday life for people, today and tomorrow.



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 EXHIBITION PARTNER

 AWARDS PARTNER

### Guldmann

V. Guldmann A/S was established in 1980 by Viggo Guldmann, with the concept to develop, manufacture and market technical aids for the disabled and working tools for their carers. Today, we supply products and services under two trademarks: Guldmann and Stepless.

Guldmann has created a comprehensive, modular range of lifting and moving solutions, drawing on more than a quarter of a century of experience supplying assistive technology products designed to help people live their lives to the full.

Stepless is a division of V Guldmann A/S specialising in accessibility. Stepless ramps and lifting platforms give the walking-impaired and wheelchair users physical access to the outside world.

## Halton

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 EXHIBITION PARTNER

### Halton

Halton Group is the global technology leader in indoor air solutions for demanding spaces. We specialise in healthcare environments, and provide safe environments for efficient patient and professional flow in healthcare and laboratory industries.

Our latest innovation – Halton Vita OR Space is now compliant with all UK and European Standards.

We offer the following products, services and solutions that combine excellent indoor environments, safety and energy efficiency for customers who value people's wellbeing:

- Halton Vita OR Space – a revolutionary operating theatre ventilation system that is suitable for 'high-risk' (UCV) theatres and 'hybrid' theatres;
- Halton Vita Patient – specifically designed chilled beams and radiant panels for patient rooms and ward applications; and
- Halton Vita Iso – accurate and adjustable control for isolation rooms.



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 KNOWLEDGE PARTNER

### HDR

We use the power of design thinking to reimagine space, environments, programming, planning, operations and function. We blend our deep knowledge of healthcare delivery with our understanding of how environments can shape behaviours and outcomes to create solutions 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.



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SILVER PARTNER

## HLM

HLM is a leading design practice headquartered in the UK, offering a rare combination of design skills from the four strong and integrated elements of our business: HLM Architects, HLM Landscape & Urban Design, HLM Interiors and HLM Environment.

HLM is a creative organisation with significant experience in the design and procurement of healthcare buildings in the UK and internationally. We recognise the importance of design quality, sustainability, and innovation in the creation of truly therapeutic environments.

We have a proven track record in the design and procurement of all types of healthcare buildings, from the masterplanning of large hospital sites to the configuration of individual rooms in acute, primary care, and mental health settings.



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AWARDS PARTNER

## Hoare Lea

Hoare Lea is an award-winning engineering consultancy with a creative team of engineers, designers and technical specialists. We provide innovative solutions to complex engineering and design challenges for buildings.

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 that they perform in operation as well as they look.



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AWARDS PARTNER

## Integrated Health Projects

Integrated Health Projects (IHP) is a leading provider of outstanding healthcare solutions. A fully integrated joint venture, IHP combines the stability, capacity, coverage and experience of Vinci Construction UK and Sir Robert McAlpine. Both are major organisations working in the UK and abroad, focused on development, construction and facilities management.

IHP was formed in April 2003, specifically to act as a principal supply chain partner (PSCP) for ProCure21/21+/22. We've delivered 157 projects, valued at around £1.2bn, for 65 NHS clients. We're proud to have achieved 81 per cent re-appointments and value the relationships that have been formed.

We're committed to achieving the benefits available to NHS clients through ProCure22, working with them to provide better value for money through imaginative and sustainable solutions, which offer capital, operational and life-term efficiencies.

## LLEWELYN DAVIES

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### Llewelyn Davies

The original partnership of Llewelyn-Davies Weeks was founded in 1960 by (Lord) Richard Llewelyn-Davies and John Weeks, both innovators in the design of flexible, highly serviced environments.

Llewelyn Davies has since pioneered new thinking in the planning and design of health and science buildings, delivering more than 250 health projects in 75 countries.

Llewelyn Davies is also one of the UK's leading masterplanners. From Milton Keynes to the urban renaissance agenda of the 21st century, through policy guidelines and development strategies, the company has influenced the UK Government's vision for planning and design.

These combined specialist skills of hospital design and masterplanning provide a cogent force for reinvention and renewal in the UK, and expansion and development internationally.



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### Medical Architecture

Medical Architecture is a multidisciplinary healthcare architectural firm. Founded in 1991, we have a special focus on the health sector, providing a full range of services from envisioning, strategic and clinical planning, estates development planning, architecture, interior design and post-occupancy evaluation.

The practice is based in the UK with offices in London and Newcastle upon Tyne, but we work locally and globally, having delivered projects in Australia, North America, Africa and Europe.



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### MTS Health

MTS Health is a leading provider of equipment asset management, advisory and procurement, supported by a specialist team of: bio-medical engineers; clinical scientists; CIP qualified procurement specialists; PRINCE 2 project managers; and construction project management interface personnel. We help healthcare organisation clients plan the equipping requirements and costs of new hospitals.

MTS is working with NHS clients to oversee the strategic management of their medical equipment assets. We're providing cost reductions, cost avoidance, CQC compliance and governance, while providing interim and permanent personnel on site.

Now in our 20th year of operation, MTS has successfully commissioned more than 30 large hospital redevelopments in the UK and internationally, and is accredited to the BSI ISO9001: 2015 Quality Management Systems standard.



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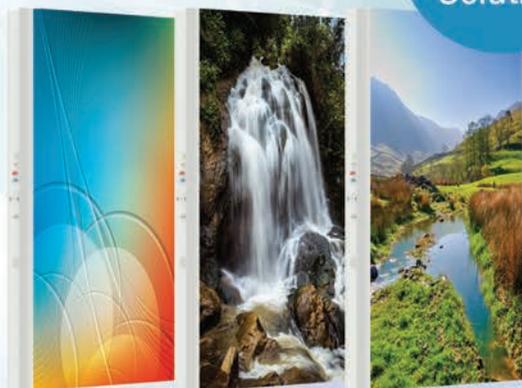


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 KNOWLEDGE PARTNER

## Perkins+Will Hx Lab

Perkins+Will is an interdisciplinary, research-based architecture and design firm established in 1935. We have over 2000 professionals across more than 20 global offices, which include some of the brightest minds in architecture, interior design, branded environments, urban design, and landscape architecture. Our work has helped shape many of the world's most progressive academic medical centres, research institutions, and hospitals. The breadth and quality of our diverse portfolio have consistently placed us among leading healthcare design firms globally.

Through our Human Experience Research Lab, Perkins+Will proudly supports Clinicians for Design (CfD), an international network with a vision to enrich the healthcare experience.



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 EXHIBITION PARTNER

## ProEconomy

ProEconomy is the global water treatment company behind the Orca copper and silver ionisation system for legionella control. The Orca system is a proven water treatment modality for the control of disease-causing waterborne bacteria, including legionella and pseudomonas.

The Orca is used to control waterborne bacteria at industrial and commercial sites across the UK, Europe and worldwide, including at Windsor Castle, Great Ormond Street Hospital and the European Space Agency. Applications for treatment include but are not limited to: healthcare, care homes, education, residential apartments, food manufacturing, and cooling towers.

The Orca system has been manufactured by ProEconomy in the UK for 25 years, and every system is monitored closely with our dedicated team on hand to ensure site-wide control of waterborne pathogens.



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 KNOWLEDGE PARTNER

 EXHIBITION PARTNER

## Rutherford Estates

Rutherford Estates is the development arm of Proton Partners International and is widely recognised as one of the world's leading developers of proton beam therapy facilities. The networked, state-of-the-art oncology centres that Rutherford Estates has delivered in the UK are operated by our sister company Rutherford Cancer Centres, while a new set of advanced diagnostic centres are being developed and delivered for Rutherford Diagnostics.

Our expertise creates buildings that give patients access to high-energy proton therapy, as well as high-precision radiotherapy, chemotherapy, immunotherapy and diagnostics, in a calm, therapeutic setting aimed at reducing stress among patients, families and staff. They're designed with the patient at their core and in collaboration with clinical staff who operate in the Rutherford network, as well as our equipment partners.

# Ryder

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 KNOWLEDGE PARTNER

## Ryder

Established in 1953 in Newcastle, Ryder now has teams in London, Glasgow, Liverpool, Hong Kong, Vancouver and Amsterdam, and through Ryder Alliance, in Australia, Hungary, Spain and South Africa. Projects, ranging in value from £50,000 to £300m, cover the civic, education, healthcare, infrastructure, leisure, manufacturing, office, residential, retail and science sectors.

Through 'Everything architecture', our goal is simple: to improve the quality of the world around us and, in doing so, improve people's lives. Defining a responsibility to an inclusive society and the future of our planet, it's embedded as much in pioneering science and technology as it is in art.



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 KNOWLEDGE PARTNER

## Sir Robert McAlpine

Sir Robert McAlpine is a family-owned building and civil engineering company operating across the UK, and we're celebrating our 150th anniversary this year.

Our international portfolio of healthcare clients and projects reflects the strength of our delivery expertise and demonstrable track record in providing value for money, whether via public private partnerships, collaborative capital frameworks for design and construction, or direct negotiation.

Through our participation as a 50/50 joint-venture partner in Integrated Healthcare Projects (IHP), we're a key member of the ProCure 22 NHS framework. We also have a corporate relationship with Maggie's, acting as construction partner on new capital investments and sharing fully in the ethos and vision of the organisation.



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 EXHIBITION PARTNER

## Sky Factory

Sky Factory designs evidence-based, virtual skylights via a process informed by neuroscience. Our award-winning Luminous SkyCeilings and Luminous Virtual Windows engage areas of the brain involved in spatial cognition and depth perception.

Our artistic framework, Open Skies Image Technology, has been the subject of an award-winning fMRI study. The company's process includes designed Open Sky Compositions woven into the ceiling surface, through which a deeper multisensory response is generated that alters the observer's experience of interior space.

Our research-verified 'Illusions of Nature' technology is used in virtual skylights and has received recognition from several bodies, including Planetree International, a global patient advocacy group.



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 KNOWLEDGE PARTNER

## Stantec

Designing places for people in healthcare is a passion for our London healthcare studio. We're committed to direct engagement and tailored solutions. Our London team is part of an integrated international healthcare group based in the UK, Canada, US, Middle East and Asia.

Our teams are supported by our proprietary health research, experience in lean design, and expertise in alternative project delivery systems. We place our clients at the forefront of best practice, innovative technology, and new healthcare delivery.



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 EXHIBITION PARTNER

## Static Systems Group

Static Systems Group provides bedhead services solutions for the acute healthcare sector, incorporating trunking, lighting, nurse call and other systems. Its latest solution, Vistr Headwall, can help create a therapeutic environment conducive to patient wellbeing and a quick recovery.

The unit is available with several LED options, including: colour washing to help patients relax and assist in their speedy recovery; PIR-controlled lighting that automatically illuminates at low level as the patient leaves their bed during times of low light; and lighting that quickly guides staff to the appropriate bedside in the event of a patient call or cardiac alarm.



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 BRONZE PARTNER

 EXHIBITION PARTNER

## Tarkett

Tarkett is a market-leading, global flooring manufacturer that combines innovation and expertise with the latest technology and sustainability practices to create flooring for all environments. The firm is showcasing VR-EP – the world's first and only evidence-based dementia filter.

Use an Oculus headset to immerse yourself in a care home environment and see how colour, contrast, pattern and placement compensates for cognitive impairments and reduces resident anxiety. Less anxiety allows a resident to move with confidence and reduces slips, trips and falls, which cost the NHS more than £133m a year and over 698,336 bed days.



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 EXHIBITION PARTNER

## Teal HealthCare

Teal HealthCare is an award-winning solutions-based provider of innovative, high-quality patient seating, ward furniture and specialist products for healthcare, with a focus on ergonomic design, infection management, postural support and pressure care.

Teal is a major supplier to the NHS with success in delivering large refurbishment and new-build projects through a nationwide project management team.



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 EXHIBITION PARTNER

## Veritas Medical Solutions

Veritas Medical Solutions manufactures pre-engineered radiation shielding systems for fast, efficient modular construction of radiotherapy centres. Equipment-specific shielding designs are available for all major machine types and use innovative VeriShield radiation shielding modules and SmartDoor radiation shielded entry-door systems. Veritas shielding includes proprietary VPAC shielding packs, which dramatically increase construction speed. VeriShield is a proven alternative to mass-concrete construction and comes with a 100-per-cent attenuation guarantee.

The SmartVue Shielded Window System brings natural light into a typical radiotherapy treatment room without affecting radiation shielding integrity. Also available are pre-packaged modular radiotherapy facilities for temporary or permanent installation.



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 EXHIBITION PARTNER

## Visualite

Created in 2015, Visualite is a lighting system that incorporates a light source and bespoke image in one, creating a relaxing ambience designed to calm anxiety and enhance wellbeing. Ceiling and wall installations have been reported to be a great distraction that have reduced instances of claustrophobia and stress, while increasing patient throughput and turning a sterile environment into a fun, colourful place.

As well as choosing from any of our beautiful high-definition images, we can also incorporate your own images and artwork to provide the personalised product you desire. Feel the warm embrace of daylight shining down from the ceiling with the magnificent blue-sky scene, or gaze across iconic landscapes no matter where you are.



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 SILVER PARTNER

## WSP

As one of the world's leading professional services firms, WSP provides technical expertise and strategic advice in the following sectors: transportation and infrastructure; property and buildings; environment; industry; resources (including mining, and oil and gas); and energy. We also offer project and programme delivery and advisory services.

Our experts include engineers, advisors, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, programme and construction management professionals. In total, we've around 42,000 people in 500 offices across 40 countries.

In healthcare, we've built a reputation for innovative solutions in advisory, building services engineering (MEP), structural engineering, specialist systems, smart technologies, and commissioning. Our global portfolio of projects include large acute hospitals, children's hospitals, specialist cancer care units, healthcare laboratories and research facilities, along with surgeries and local community facilities for mental health.



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## MEET US

### Monday 17th June

**Presentation: Designing a global index of future-readiness for healthcare challenges**

Session 6 - Council Chamber @ 10:45

Presenters: Gerard Briscoe & Gail Ramster, RCA

**Workshop: The challenges and opportunities: How future-ready is your city to deliver healthcare?**

Council Chamber @ 12:40

Panel: Gerard Briscoe & Jeremy Myerson, RCA  
Nolan Rome, WSP USA & Simon Kydd, WSP UK

**Presentation: How to develop integrated care**

Session 7 - Council Chamber @ 14:00

Chair: Simon Kydd, WSP UK

Presenter: Suzanne MacCormick, WSP UK

### Tuesday 18th June

**Presentation: Grey Base Hospital case study: Resilient, multiuse design in one of the most challenging locations on earth**

Session 17 - Wolfson Theatre @ 14:00

Presenter: Kris Noiseux, WSP New Zealand

**Presentation: Developing an eco-system of place-based healthcare infrastructure in developing markets**

Session 18 - Wolfson Theatre @ 16:00

Presenter: Jabulile Nhlapo, WSP South Africa



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