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JULY 2014

FIRST NATION

North America's first carbon-neutral hospital, St Mary's Hospital respects native traditions

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International Academy for Design and Health

Volume 7 Issue 3

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Architects have a social responsibility to ensure the buildings they design improve the world around us, writes HDR's president, Doug Wignall

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Cover Image
St Mary's Hospital, Canada, designed by Farrow Partnership Architects and Perkins+Will, see pp 12-13

Glocal identities

It's possible to trace the origins of globalisation, and the increasing interdependence of national economies arising from the exchange of knowledge, ideas, technologies and culture to many centuries ago. But it is in modern times that the pace of globalisation has had such far-reaching effects socially, economically and culturally. Yet despite the benefits of globalisation, human beings still demand and need to retain a sense of cultural identity and localisation. In our new INSIGHT report (pp I-XVI), we feature an international architecture and engineering firm, HDR, which has built its global platform on understanding the need to apply a local touch, recognising the balance that is needed between the opportunities that globalisation brings and the basic human need for 'care, context and community'. As China challenges the world's leading economies, this new powerhouse will also need to learn from others if it is to address the challenging health and environmental problems that come with rapid industrialisation and urbanisation (pp 20-29). And others will have to learn to adapt to local cultural Chinese traditions if they are to succeed in this new land of plenty. If you are reading this at the 10th Design & Health World Congress in Toronto, stop for a moment and enjoy the richness of the event, a true reflection of the global, interdependent, knowledge society we live in today.

Marc Sansom
Editorial director

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A special report exploring HDR's global design approach with a local touch (see after p34)

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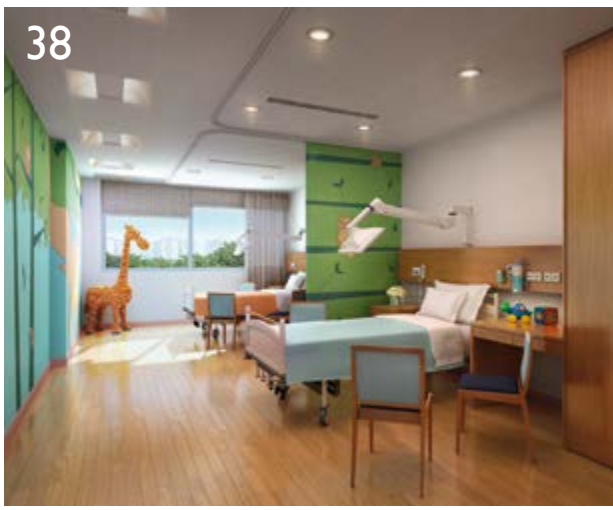


SCIENTIFIC REVIEW

SOLUTIONS

ARTS & CULTURE

Writing prize in memory of late architect

UK: In honour of one of its late members, Architects for Health (AfH) is launching an annual prize for the best essay on the architecture of health. The prize is named in memory of Phil Gusack, who died in 2011 after several years of ill health. While alive, Phil was an active AfH member whose passion for architecture was characterised by a strong belief in disruptive innovation and excellence.

The Phil Gusack Essay Prize is open to all people including students, professionals and journalists. The essay topic should explore a fresh and provocative perspective that addresses the context of the architecture of health. It should demonstrate how good health design can and should happen, without the essay being a survey, a descriptive process or a building study. Judges will also be looking for concise, well-crafted writing that stimulates interest and holds the attention.

The RIBA Journal is partnering Architects for Health on this important new writing prize, which will see awards presented to a winner and runner-up. The winner will receive £500 prize money, with their essay published in the RIBA Journal. The prizes will be awarded at an AfH member event in November.

Participants are asked to register and submit an essay that has not been previously published. Entries should not exceed 2,000 words and must be emailed no later than 1 September 2014 to essayprize@architectsforhealth.com

Ward design stakeholder workshop

Design firm enjoys double delight as advisors

UK/Canada: Specialist healthcare design practice Medical Architecture is celebrating two important business contracts.

Eastern Health has appointed the firm, along with Stantec, as advisors for a new hospital in Canada. The commission involves development of a masterplan and functional programme for a new adult mental health facility to replace the current Waterford Hospital in St John's, Newfoundland.

Medical Architecture director Christopher Shaw said: "This project is a terrific opportunity for us to draw on our experience of international benchmarking and knowledge of recent successful projects, and focus on improving outcomes through research and the application of evidence-based design."

In another major development, the design firm has also been selected for a second time as architects under the consultant's framework for UCLH NHS Trust and the Academic Health Science Network partnership of UCL Partners.

The framework will support UCLH and several allied NHS trusts in developing new acute medical facilities in London for the next four years.

Commenting on the company's selection, Shaw added: "We will draw on more than 20 years' international knowledge and experience to deliver very high-quality planning and design for hospitals at the frontiers of clinical practice."

Agreement aims to boost healthcare services for Saudi citizens

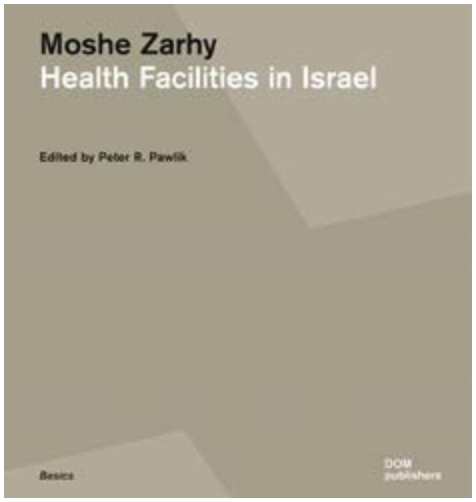
Saudi Arabia: CannonDesign and Optimah (a business unit of Tibbiyah Holding – Al Faisaliah Group's healthcare sector) – have agreed an arrangement to deliver innovative services aimed at addressing the need for quality healthcare in the Kingdom of Saudi Arabia. Services include strategic planning, masterplanning, architectural and engineering design, simulation modelling, and facilities optimisation.

The announcement comes two years after the Al Faisaliah Group (AFG) signed a partnership with leading Harvard teaching hospitals, – a move that proved integral in helping AFG create a subsidiary company dedicated to delivering integrated healthcare services for leading healthcare providers in the Kingdom and the Middle East.

Mohammed KA Al Faisal, president and CEO of Al Faisaliah Group Holding, said: "We expect that the co-operation of CannonDesign and Optimah will contribute to new levels of healthcare services for the people of Saudi Arabia."

Added Stephen Johnson, president of CannonDesign International: "Through our partnership with Optimah, CannonDesign will be able to best address the unique goals and challenges of our healthcare clients in the Kingdom, and provide the transformative solutions necessary to optimise clinical operations, facility design, and innovation in patient care."

(l-r) Dr Basheer Al-Ghuraydh, US-Saudi Arabian Business Council; Stephen Johnson, CannonDesign International; Mohammed KA Al Faisal, Al Faisaliah Group Holding; and Dr Salah Al-Mazroa, Ministry of Health, KSA



Reviewing an influential Israeli

Israel: *Health Facilities in Israel* is the title of a new book about world-renowned architect Moshe Zarhy. Born in 1923 in Jerusalem, Zarhy is part of a second generation of architects who have contributed decisively to shaping the face of contemporary Israel.

Through his functional, aesthetic and unadorned style he is viewed as a direct succession to the founding fathers of Israeli architecture, who, in the 1920s and 1930s, laid the foundation for the settlement of Palestine.

Decorated with numerous national and international distinctions, Zarhy has worked in many fields of architecture, but his specialist area is health facilities. It is in this field in which he has delivered some of his most groundbreaking projects, but the publication also offers insight into the other areas of his vast body of work.

Authored by Dr Peter R Pawlik, chairman of the Association of Healthcare Architects of the Society of German Architects AKG/BDA, *Health Facilities in Israel* features more than 380 pages and 250 images. It is available from DOM publishers at a price of €28. To place an order, visit www.planungsring.com

Surgical care takes to the seas

UK: Healthcare facilities consultancy MJ Medical is working with charitable organisation Mercy Ships Org on the design of a new hospital ship, which will provide free treatment for some of the world's poorest countries.

The 'Atlantic Mercy' hospital ship will be equipped to support surgical specialties for both adults and children, including general surgery, plastic surgery, ophthalmology, maxillofacial surgery, otolaryngology, orthopaedics, urology and gynaecology. The hospital vessel will also provide screening, pre-operative and post-operative outpatient care in support of the surgical services.

"MJ Medical has completed a review of our hospital design and will be assisting us in detailed planning of how to equip the hospital with medical equipment," remarked international chief medical officer of Mercy Ships Dr Peter Linz.

"MJ Medical will develop detailed elevation drawings of each room, and their state-of-the-art online room design and equipment management system, OSU, will be invaluable in being able to execute the project with the other key stakeholders spread across the globe. MJ Medical has vast experience in the design and equipping of hospitals in unique environments throughout the developing world and also has helped the Royal Navy in the equipping of the hospital ship RFA Argus."

Chairman of MJ Medical Brian Hobbs commented: "We will bring our expertise of designing and developing healthcare facilities throughout the world to ensure that this project becomes a world-leading ship-board healthcare facility."

Common culture drives partnership

USA: Huelat Parimucha Healing Design has formed a strategic partnership with Davis Partnership Architects to better serve its existing and new clientele.

Long known for its expertise in patient-centred healthcare projects, Huelat Parimucha Healing Design will now operate as Huelat Davis Healing Design with support from Davis Partnership Architects.

Each firm brings its own specific design skills and processes, creating a more dynamic and specialised architecture and design company. Davis Partnership Architects has consistently been one of the leading design firms in the Rocky Mountain West, both in size and volume of work (dollars). Meanwhile, Huelat Davis will remain a woman-owned small business and provide the same level of service customers have come to expect from the boutique architecture and design firm, but with the full support of Davis Partnership's resources and knowledge behind it.

"Our new partners in Alexandria, Virginia will provide both Davis Partnership and Huelat Davis expanded opportunities across the United States and offer our clients excellence in design and client service," said Gary Adams, principal of Davis Partnership Architects. "Each of our firm's abilities brings value to the table; we really complement each other."

Echoing his comments, Barbara Huelat, principal of Huelat Davis, added: "I knew our firms shared some commonalities, but after in-depth conversations about what drives us, our values and cultures, it was clear we were destined to form this partnership."

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Traditional meets the **modern**

Influenced by western notions of disease treatment but with it medical roots in health preservation, Design and Health China 2014 offers a fascinating opportunity to discuss and develop a new salutogenic vision for our changing world

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Brian Kowalchuk
Director of design, HDR Architecture, USA

In the last century, China has been increasingly exposed to western medical practice based on the pathogenic model of disease diagnosis and treatment. But its historic medical roots can be traced back more than 2,000 years to the methods and concepts applied in Traditional Chinese Medicine (TCM) – a system built on an holistic approach to health preservation that complements today's salutogenic ambition.

As the disease profile of global societies shifts away from a focus on communicable diseases to non-communicable and lifestyle diseases, TCM and its holistic approaches – which promote the need to correct imbalances and create harmony between mind, body and spirit through healthy living and natural remedies – are seeing a revival in interest. With rapid economic development resulting in ever-larger urban surroundings, the health status of the Chinese people is now integrally linked to the quality of the country's urban infrastructure and access to clean air, water and soil. By integrating salutogenic design methodologies that promote health and wellbeing with ecological design approaches, architects and developers have a vital role to play in helping China become a more healthy and productive nation.

China's ability to develop a strong scientific research base, support innovation and enhance productivity through the exploitation of new knowledge will be key to its prosperity. Organised by the International Academy for Design & Health and hosted in Beijing, Design and Health China 2014 will bring together interdisciplinary world experts to share their knowledge in how to create a new salutogenic vision for China.

For the full programme, details of the speakers, and to register, please visit www.designandhealth.com

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A fresh perspective

Society needs to adapt to rapid urbanisation by adopting a new understanding of health, says ***Alan Dilani***

A significant proportion of people live in cities today, and inevitably, urban living affects individual and population health. It is therefore important to understand how we can adapt our cities to support our health and prevent the onset of chronic "lifestyle" diseases.

From a scientific standpoint, there are various perspectives on what constitutes health. From a biomedical perspective, health is considered to be a condition 'without' diseases. The holistic viewpoint emphasises multiple dimensions of health, including physical, psychological, emotional, spiritual, and social.

There are also the research perspectives — the pathogenic versus salutogenic approaches. Pathogenic research investigates factors that cause diseases, with the focus on finding medical treatments. Salutogenic research, on the other hand, is based on identifying wellness factors that maintain and promote health, rather than investigating factors that cause disease. In this approach, which stems from the work of Aaron Antonovsky, 'salute' refers to health whereas 'genic' refers to origins. 'Salutogenic' therefore refers to the causes or origins of health. Together, the two research perspectives offer a deeper knowledge and understanding of health and disease.

A well-designed built environment can positively shape the social, psychological, and behavioural patterns of society, leading to improved wellbeing and better health. The interdisciplinary global network of the International Academy for Design & Health (IADH) was established with the mission to improve human health, wellbeing and quality of life through the application of research-based design. Today, IADH develops, promotes and disseminates scientific knowledge and works with governments, universities and public and private sector industries throughout the world on how to implement the salutogenic design approach to improve health in all types of infrastructure, from healthcare to education, custodial environments, public spaces, the workplace, and indeed our homes.

The Academy's 10th Design & Health World Congress in Toronto offers a collaborative, supportive environment for leading international experts and faculties to discuss the science of salutogenic design and the origins of health, building a new understanding of health based on Aaron Antonovsky's theory and it's application to the built environment. What makes people healthy? How do we improve the quality of the built environment in order to promote wellbeing through exposure of the brain to the correct balance of sensory stimuli in a way that creates positive emotions and experiences?

Nurturing this global interdisciplinary network is an important part of the Academy's role, but as well as fostering a culture of knowledge exchange, it is important, that we also critically review the approach of the healthcare sector to serving our society, and challenge its understanding of health, since the design quality of the built environment reflects the image of the healthcare provider and the ambition of governments to create a healthier society.

In partnership with the Ontario Ministry of Research & Innovation, the University of Toronto, OCAD University and the Canadian Urban Institute, this year's five-day congress will focus on how government and private investment can support the creation of healthy, sustainable infrastructure.

The world needs a new paradigm and the creation of a healthy global society is a vision we should all embrace. Exchanging knowledge to influence government policy, change commercial incentives and encourage positive changes in people's lifestyles through the design of the built environment is the path to a new future and a salutogenic society.

By applying an interdisciplinary approach, architects, designers, engineers, public health scientists, psychologists and economists can do more to alleviate the human condition by creating stimulating, enjoyable and sustainable environments that enhance human health, wellbeing and quality of life. Whether you are with us at the congress or reading this at home or in your workplace, we invite you to be a part of this mission and vision.

A well-designed built environment can positively shape society's social, psychological and behavioural patterns

Professor Alan Dilani, PhD is founder and chief executive officer of the International Academy for Design & Health

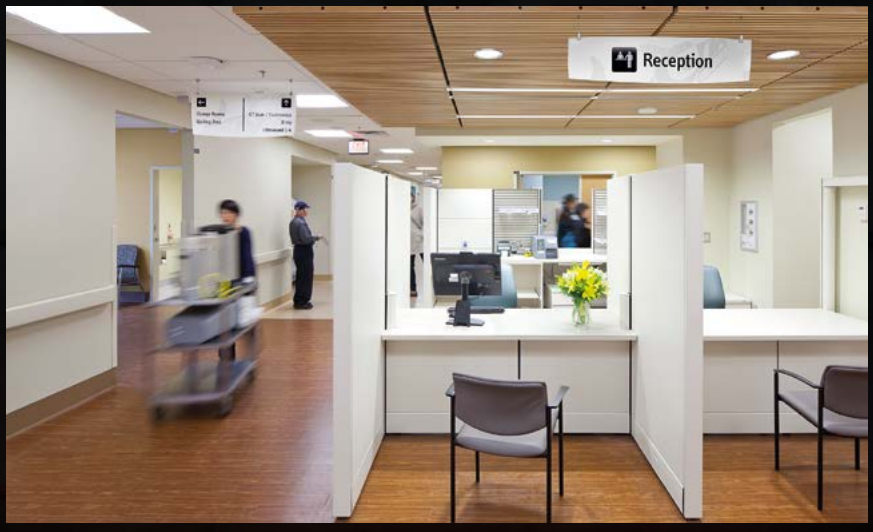
First Nation

Designed to be North America's first carbon-neutral hospital, St Mary's Hospital in Toronto also anticipates becoming the greenest hospital in Canada. The building's shape is inspired by the cedar bent-box, an important concept to the coastal First Nations; indeed, members of the local Sechelt Indian Band advised on the most meaningful elements of native tradition to incorporate in the design.

Salutogenic elements include: major artworks that tell stories and depict cultural symbols, such as the three totem poles that mark the main entrance; and a spectacular mural spanning the lobby area. Themes and symbols convey reassuring stories of a navigable life, with healing and after-life depicted as part of a natural process. Fenestration is designed to reflect the cultural significance of setting free the departing spirit, while acoustics support drumming rituals.

The expansion and renovation is targeting net carbon reduction via a geo-exchange system, a high-performance envelope, a 19kw photovoltaic array and passive design strategies, such as solar shading, user-controlled blinds and operable windows. As a result, the project is on target to achieve 40% energy savings when compared with other LEED Gold certified hospitals. A total of 125 boreholes also provide a zero-carbon energy source to heat and cool the building.

Photography: Andrew Latreille



St Mary's Hospital

Commissioning Authority: Vancouver Coastal Health

Architects: Farrow Partnership Architects and Perkins+Will

Contractor: Graham Construction & Engineering

Cost: CA$ 44m

Completed: October 2013

Innocent response

Children's hospitals have many of the same underlying concerns as their adult counterparts, but they must also create supportive space for children from zero to young adulthood, their families, and the staff who care for them. By ***Emily Brooks***

When my father was nine, he broke his arm. He was admitted to a children's ward for an X-ray and subsequently an operation, and was hospitalised for two weeks. During that time, neither was he allowed to get out of bed, nor was he allowed to see his parents; 'out of sight, out of mind' was the thinking. The combination of boredom, loneliness and a lack of control proved the perfect recipe for anguish; it crossed his mind that maybe his parents weren't coming back. And, quite apart from showing how radically the treatment for a broken arm has changed, it is also revealing that he can recount this tale, and relive its horror, as if it happened yesterday.

"Children are in the early stages of their emotional development, and health is highly composed of psychosocial factors, particularly emotional experience. The quality of the built environment has an impact on their emotional development," says Professor Alan Dilani, founder of the International Academy for Design & Health. "Children's hospitals must be highly sophisticated in their understanding of kids' exposure to pleasant experiences. Positive distraction, related to those factors that make them feel happy, is the most crucial design factor."

A benchmark in design

From a salutogenic design perspective, it makes sense that children's hospitals should have a different design agenda to their adult counterparts. If the key to managing stress is having a strong sense of coherence, through perceiving that life is understandable, manageable and meaningful, then it takes a different kind of environment to provide that cradle of support. Dilani still cites Melbourne's Royal Children's Hospital, with its 'building within a park' philosophy, light-filled internal street, inclusive design for children of all ages, and even its own

Seattle Children's Building Hope

Benjamin Benschneider

zoo, as the benchmark for a salutogenic children's facility, with no one coming close to its design quality since it opened in 2011. Its success, he says, is due to a multidisciplinary approach – architecture, medicine, public health, psychology, engineering, art and music, coming together with a common goal.

The Royal Children's Hospital's influence has nonetheless rippled out, the results of which will come to fruition over the next few years. In Australia, Billard Leece Partnership, one of the practices behind the Melbourne facility, is currently on site with the similarly ambitious, AU$1.2bn Perth Children's Hospital, due for completion next year.

In Helsinki, where a €165m project to build a new children's hospital is in the planning, associate professor of pediatrics Dr Pekka Lahdenne says his team visited the Royal Children's Hospitals in Melbourne and Brisbane in the course of their research, as well as Nemours Children's Hospital in Orlando, designed by Perkins+Will. As with all ambitious new children's hospitals, the focus of his efforts is on "the child/family perspective in all models of care: family centredness; parents staying with their child at all times and locations in the hospital; overnight stays for a parent with every child; dedicated spaces for families; and a play therapy area for young children and teens".

The contrast to 60 years ago could not be more marked: instead of being banished, families are seen as essential to aiding healing. At ZGF's recent expansion of Seattle Children's Hospital, a project called Building Hope (see case study, right), rooms not only have sleeping accommodation but also food storage, a fridge and prep area – especially useful in isolation rooms, where parents have to re-gown and resterilise every time they leave and return. ▶

Positive distraction, related to those factors that make children feel happy, is the most crucial design factor

Seattle Children's Building Hope: Cancer, Critical and Emergency Care Expansion, Seattle, Washington, USA

Founded at the turn of the 20th century, Seattle Children's has three functions – clinical care, research and philanthropy. This latest expansion tackles a need for extra beds for patients at the highest acuity level: cancer, critical and emergency care. The hospital's adoption of Lean principles – just-in-time delivery and the elimination of waste – was the major driver in the planning.

At Building Hope, "you don't have the deep cores – the things that primarily house the things that are used to deliver care, but which also reduce visibility within an inpatient unit," says senior interior designer Anita Rossen. Other than a small supply room in the centre of this thinner core, the area in the middle of the units is open, with columns and air ducts moved out to make the space as flexible as possible. Inpatient rooms are the same size, so that the hospital can upgrade to more ICU rooms in future. Rooms have a rooming-in facility and there is plenty of social space for families. A new branding scheme rolled out throughout the wider hospital was implemented, with a forest theme designated for this building, sophisticated enough to appeal to adults and children alike. The soothing visuals are complemented by a strong attention to deadening sound. Rossen describes the colour-change LED lighting in each room, which children can control, as having a "magical quality" that "activates the space".

Architect: ZGF
Client: Seattle Children's Hospital
Landscape Architects: Site Workshop
Artwork: Amy Ruppel, Lab Partners
Size: 30,700sqm
Cost: US$136m
Number of beds: 80 (capacity to expand up to 192)
Completed: 2013

The aquarium at the Royal Children's Hospital Melbourne provides positive distraction

In the Hague, the Netherlands, MVSA Architects has been contracted to build a new children's facility as part of Haga Hospital (see case study), to be finished next January. The firm's Roberto Meyer and Charlotte Griffioen cite the Royal Children's Hospital as an influence, particularly its sense of transparency; like the Melbourne facility, Haga Hospital will have an urban parkland setting that is as visible and accessible as possible.

Meyer says "the main thing was to make people feel comfortable," with Griffioen elaborating: "As you enter the hospital there are hostesses near the entrance who will greet you and show you the way – that's the first step to feeling comfortable. When you walk through there are open atriums, and all the places where you might have to get to can be seen in one view. We think that if people can comprehend the whole space, they will feel more at ease."

MVSA has applied its considerable experience in solving logistical problems in buildings with a lot of people movement, such as rail stations. This is the practice's first hospital – all of the firms invited to tender for the project were new to healthcare design, with the aim of stirring up some fresh thinking. Wide corridors and the large atriums will help make the spaces seem open. "We also learned, through our research, that it was very important to look at the hallways," says Griffioen. "An adult patient wants to look at the garden and be more private, but children like to see movement and see that they're not alone – to look at other children walking around."

One of the challenges of children's hospital design is how to satisfy all age groups – because while everyone agrees that positive distraction can improve patient experience, what makes a five-year-old feel safe and reassured is not what makes a 15-year-old feel the same. Technology can help solve this problem, with, for

example, touch-screens with games to suit all levels. At HDR's James and Connie Maynard Children's Hospital, part of North Carolina's Vidant Medical Center (see case study, p18), imaging rooms are turned into sensory environments controlled by the child, with colour-changing lights, surround sound, and a screen embedded in the ceiling with a choice of short animations, or they can bring their own shows to watch. "We believe that children are way more sophisticated than we give them credit for when it comes to their understanding and experience of a space," says Jim Henry, HDR design principal. "We don't have to play it down and do a cartoon version of things; we can make it highly sophisticated. A lot of children have chronic illnesses and they come back time after time with the same issues. The hospital needs to be able to grow with them."

One of the challenges of children's hospital design is how to satisfy all age groups

The atrium at Perth Children's Hospital offers opportunities for socialisation and family activity

Sail away

A more sophisticated visual approach is now the norm. The James and Connie Maynard Children's Hospital has an incredibly comprehensive nautical theme, from its sail-like exterior to the interior palette that reflects the North Carolina coastline. ZGF's Building Hope – which, unusually, serves patients aged zero to 21 – has a forest theme with etched-glass walls and colourful floor-to-ceiling, heavy-duty panels with illustrations along a forest theme. "We've taken out the crash rails and wall protection panels – the things that make a hospital look like a hospital – and printed the art on to this highly durable material that can take all that impact of carts, beds, people and strollers," says Anita Rossen, senior interior designer on the project. "There was a lot of work done with signage and wayfinding consultants to develop a more modern approach for the art – the idea that kids and young adults had grown up looking at a more digital world, so that would appeal to them more than the more painterly, storybook world we grew up with."

As healthcare becomes more proactive and less reactive, the involvement of parents in the health of their children is becoming ever more important. In Dublin, the New Children's Hospital, currently out to tender, is an ambitious project that sees the hospital as a single part of a continuum of care. "The family is seen as a key element instead of just an observer, which families have tended to be in the past. Not that this means that the hospital, in any sense, stands back from its role – it's about a much more coordinated, integrated and holistic view of children and their needs," says John Cole, who sits on the hospital's development board.

As with adult healthcare, the emphasis has shifted towards preventing hospitalisation in the first place: "The focus is on early intervention and better management outside hospital, and on getting the right care in the right place." The wider strategic plan is for New Children's Hospital to be tri-located with the existing St James's Hospital and a planned maternity hospital. ▶

Juliana Children's Hospital, Haga Hospital, The Hague, The Netherlands

Part of a wider phased plan for the redevelopment of one of the largest general hospitals in The Netherlands, the new Juliana Children's Hospital has been designed according to Planetree principles. It is MVSA's first healthcare project, and the practice used its expertise in designing complex transit hubs to devise a space that is easy to understand and navigate, and moves people around the building in an intuitive way. Atriums penetrate three interconnecting buildings, bringing light into the heart of the space, with glazing also used at the end of corridors to open up views into a new landscaped park beyond. A dramatic glazed pavilion in a garden will act as a facility for play or for children having psychological assessments. The all-single-bedded rooms have magnetic boards that allow them to be personalised by children, and all have a rooming-in facility so family members can stay over. The expectation is that length of stay will be reduced as a result of the salutogenic hospital environment.

Architect: MVSA Architects
Client: Volker Wessels
Landscape architects: Karres en Brands
Size: 38,000sqm
Cost: €98m
Number of beds: 210
Completed: 2015


HDR/Mark Herboth

James & Connie Maynard Children's Hospital, Greenville, North Carolina, USA

This new wing, plus the refurbishment of existing space, brings paediatric services, once scattered throughout the campus, into one place. The previous arrangement was limiting the provision of certain services, and also affected the hospital's ability to attract physicians. "Children were coming in the same door [as adults], and being triaged or prepped for procedures in the same space," says HDR's Jim Henry. "They had their own recovery areas, but diagnostic and treatment happened side by side with adults."

Fitting on to a tight site, the new building is a long bow-shape, with a light-filled 'ribbon' of a public concourse running along the front, visible from the outside thanks to its glazed frontage and acting as an ever-present wayfinding anchor. A sophisticated nautical theme for the hospital emerged (the facility is close to the Atlantic coastline), from the sail-like canopy outside, to the teeming sealife models suspended in the lobby, to the giant conch-shell welcome desk. Combining paediatric services into a single day unit has led to increased efficiency and new services, such as a special unit for immunosuppressed children. Ambient, colour-changing lighting plays a large role in setting the mood, including in rooms for procedures such as MRI, where children can also select what to watch on a ceiling screen.

Architect: HDR
Client: Vidant Health
Size: 8,000sqm
Beds: 120
Cost: US$30m
Completed: 2013

Staff are our intellectual capital, and these people need positive stimuli too

Cole says this makes sense given that some functions, such as renal and cardiac care, are so specialised now that it is not efficient (and sometimes not possible) to replicate the specialist staff and equipment needed in a children's hospital.

At the James and Connie Maynard Children's Hospital, greater efficiency is being achieved by, for example, consolidating several previously siloed departments into a single 10-bed paediatric day unit. New units that reflect changing models of care include a step-down nursery for newborns who have been in the NICU but aren't ready to be discharged. Lean thinking has informed every stage of Seattle Children's Building Hope: just-in-time delivery means less storage space is needed, and a narrower core, opening up central spaces and letting in daylight.

Staff stimuli

Alan Dilani points out that the child-centred approach must be layered with the understanding of how the environment can relieve staff stress levels, and hence reduce human error.

"Staff are our intellectual capital, and these people need positive stimuli too." he explains. "Sometimes people are too much focused on the same task, in the same four walls, all the time. They need variation, and positive distraction, in order to create a balance between the left and right side of

their brain, stimulating senses and emotions in relation to psychosocial factors and experiences such as design, culture and art." Superior hospitals will attract better staff and create better health outcomes. This is understood by Dr Rang Shawis, a consultant paediatric surgeon who is spearheading the construction of the Kurdistan Children's Hospital. Shawis formerly worked at Sheffield Children's Hospital and approached Make architects to design a scheme: a 140-bed facility with a radial plan than can be easily extended in future. The project is a response to the lack of specialist children's healthcare in the region.

"The current option for healthcare for children in Kurdistan is limited," says Shawis. "The fact there is no integrated primary, secondary and tertiary care available means there is a lack of specialised neonatal and childhood healthcare. Children receive treatment mainly in overcrowded hospitals with sometimes up to three of four children to a bed. The hospitals are under-staffed, ill-equipped and the buildings are usually not purpose-built to cater to children's emotional and physical needs."

Continues Shawis: "Building the hospital is just the beginning. The aim is to provide the quality of service currently not available in the region. Hospital managerial skills are not widely available in Kurdistan and Iraq currently as well as specialised nursing skills and other supporting services. One of the aims of the hospital is to invest in the local capacity by enhancing the skills available through training."

Seattle Children's Building Hope


The AU$1.2bn Perth Children's Hospital is scheduled for completion next year

It is sobering – and encouraging – to find such a project, and interesting that the same underlying concerns are present. John Cole sums up the perfect children's hospital: "It's about taking the clinical feel out, while making it clinically effective, but with a particular requirement to make children feel safe and secure in what are unfamiliar environments; making sure they can cope with their boredom and isolation, making sure there are opportunities for play and recreation, and making sure they don't feel threatened; and allowing socialisation and treating the child as part of a family.

"Taking all that, and making it compatible with the best quality clinical spaces, is really the key."

Emily Brooks is an architectural writer

Growing **pains**

Unprecedented urban migration has fed epic construction and expansion in China, so it is easy to assume that meticulous planning and environmental responsibility are low priorities. While the country is still playing catch-up in these areas, ***Andrew Sansom*** finds increasing evidence that it is gravitating towards such ideals

The calming interior of the DeHeng Clinic, Beijing

A report earlier this year by US news channel CNN likened China's urbanisation model to SimCity on steroids. The aim of the video game, explained the report, is to build a metropolis to budget while maintaining social cohesion and wellbeing among its citizens. The comparison is an astute one.

A few decades ago, 80% of China's population lived in the countryside. According to some estimates, by 2030, the country's cities will be home to almost one billion people, or about 70% of the population. But the rush to expand has also led to the hatching of veritable ghost cities in some places, while others suffocate under oppressive concrete landscapes, toxic skies and persistent gridlock.

In describing how the empire is travelling into unchartered waters, a Tang Dynasty official has lamented how China has 'no ancient wisdom, no followers'. Using this as the title of his latest book, US journalist and businessman James McGregor accepts the transformative power that China's economic surge has had on the lives of its people, but he believes the need to make its cities 'livable' is an all-together greater challenge if the 'Chinese dream' is to be sustainable. "The nation," he muses, "must consume more of what it makes. It must learn to innovate. It must unleash private enterprise."

Living in the city

A huge hurdle remains the status of China's migrant population, which is believed to comprise more than one-third of the urban total of 730 million. Reforms are needed to allow these workers to change their household registration, known as hukou, from rural to the city. This would entitle them to the same welfare benefits, including health insurance, which registered city dwellers enjoy.

While building new public hospitals in migration zones with hundreds – even thousands – of beds has been the prevailing strategy in China, the shortage of medical staff to keep up with demand is putting huge strains on service quality, resulting in more medical errors. Lim Lip Chuan from CPG Healthcare warns of the need to match delivery to the local demographic or risk problems: "Planners need to be creative in dealing with patients who may not be in tune with the latest technologies, processes, and basic facilities. This may, in turn, affect patient throughputs and infection control if not considered carefully."

One response to minimising human error is evident in the design of the Children's Hospital of Soochow University in Suzhou, Jiangsu. Slated for completion next year, and designed by HDR, in association with JH Design and Consulting, Inc (Shanghai) and Suzhou Planning and Design Research Institute Co, the

Gualv New City General Hospital, Guangzhou, Guangdong, China

Located in the heart of the newly developed area in Zeng Cheng city, this hospital aims to create a 'park in the city' by providing a sustainable healing environment. It will achieve this through the creation of natural spaces, and intimate and communal plazas.

The north side is on higher ground, affording the opportunity to gradually reduce the massing of the building and create natural gorges between functional divisions. To allow in adequate natural light and ventilation, the gorges act as 'breathing gills'.

High volume in traffic and complex circulation patterns are solved via different access points for patients and logistic/administrative staff. RTKL's aim was to break down the different components of the building into manageable experiences for the patient. To distinguish the podium from the tower, the east and west facades of the podium have three different height louvres to accentuate vertical elements.

Roof gardens are used to alleviate storm water drainage, while gardens and promenades help reduce heat gain and minimise the heat island effects on the building's roof and facade. During the summer rainy season, rainwater is harvested and natural ventilation is enhanced with open balconies and operable windows in each inpatient unit.

Architects: RTKL Associates, Guangdong Huafang (local partner)
Client: Guangdong Huafang Engineering Design Company
Size: 160,000sqm
Cost: RMB 960,000
Completed: Under design

The 'breathing gills' of the Gualv New City General Hospital

project seeks to create a place where physicians and nurses can make habitual movements through repetition and standardisation – allowing them to boost their response to a child's psycho-emotional needs without risking errors. Influenced by the Singaporean model, the design of the new hospital is inspired by the human body's natural way of growing and healing, creating a building shape that is flexible and efficient, and able to cater to wide-ranging patient-care activities, healthcare research and educational needs.

According to Philip Wong, AECOM's regional director for healthcare, Greater China, improvements in healthcare planning are imperative. "Most hospital design in China are driven by the two elements of short duration and low fees, so leaving very little room (or incentive) for thorough planning," he says. But he concedes that increasing expectations from China's growing middle class, the toll of caring for the ageing population and increasing prevalence of lifestyle diseases are leading the leadership to slowly relax its grip on market reins and allow the private sector to grow. "The government has taken a path to encourage greater participation of the private sector and wishes to see it take a greater share – up to about 20% – of the healthcare market." ▶

Most hospital design in China is driven by short duration and low fees, leaving very little room for thorough planning

First People's Hospital, Wenling

Then there is urban planning for public health. Space Syntax is a UK company that provides evidence-based consultancy on how cities work based on their structure, connectivity, and how they enable flows of movement and trade. Last year, it opened an office in Beijing and the company's CEO, Tim Stonor, believes that the efficient design of cities, particularly in China, can aid the integration of new immigrants to enhance the health and wellbeing of the population.

"The street network is a place of movement and a place of transaction. It's a machine for economic growth," he says. "There's a need to make cities as effectively connected as possible so that people on lower incomes have access to opportunity."

He laments the 20th century urban-planning obsession with fragmenting the city into "little parcels" and describes the traditional gated-community concept so endemic in the West as a naïve model, imported by architects who wrongly believe that cutting out strangers makes the street safer.

Redefining human scale

When one considers the sheer scale of China's new cities, it is easy to assume that notions of human scale simply do not feature in it urban planning, but Prof Stonor offers a modified interpretation, suggesting that architects have "over-localised" in the past.

"Human scale is also the very busy street, the bustling marketplace. It's much, much bigger," he explains. "It's the combination of the local and the global acting simultaneously on the individual. You have to scale up and scale down at the same time."

While the general view of China's healthcare model is dominated by huge inpatient hospitals, this recognition of small and

DeHeng Clinic, Beijing

In Chinese art, the term 'Four Gentlemen' refers to four plants: the orchid, the bamboo, the chrysanthemum and the plum blossom. It is also a theme evident throughout the design of the DeHeng Clinic in Beijing.

Embodying the principles of Oriental Zen to help patients remain calm, the design supports visitors in identifying with the healing power of nature – whether through materials, colour, natural light, planting or graphics. Avoiding excessive decoration and materials, the scheme features water-based paint, local laminated finishes and surfaces, and decorative images with green elements.

The design seeks to break away from traditional medical architecture dominated by cold and empty boxes. In its place is a warm, restorative environment featuring a bamboo garden and a bamboo-culture wall, along with plentiful artwork. Two of the main spaces – the front waiting room and the meditation room – are used for community education gatherings and meditation.

Softer curves are used extensively to help breed positive energy and give people a sense of care and comfort. Spaces have also been designed to support the streaming of video and audio playback devices.

Architects: Robarts Interiors & Architecture
Client: DeHeng Clinic
Size: 1230sqm
Cost: RMB 10m (including medical equipment)
Completed: 2013

A park in the city: Gualv New City General Hospital

big, and local and global working in unison may be starting to filter through. It is evident in the masterplanning of what promises to be the world's largest medical city – Beijing International Medical Center (BIMC) – which, when complete in the 2030s, will cover a space a quarter the size of New York City. Designed to be a completely pedestrian- and bicycle-friendly urban environment, the entire masterplan was designed to human scale. A ratio of building heights to street widths is used, in order to provide pedestrians with a sense of enclosure, while the hospitals at BIMC will be open and full of light, rising out of the surrounding parks and gardens.

Says HDR's director of design, Brian Kowalchuk, (the company is building the first hospital at BIMC – the 900-bed Beijing International Hospital): "We're seeing a decentralised approach, even as the scale of these new hospitals is growing larger than anything in the States. For example, in, say, Shanghai, it's impossible to satisfy the population's general medical needs with one mega-hospital, or even two or three – they probably need seven or eight to respond to the city's needs – so general care is becoming more accessible."

He continues: "Right now, China's a bit behind the US in terms of shifting their focus from inpatient to outpatient care – the average hospital stay is about twice as long in China – but this is ultimately the direction they're moving towards. This will create the need for smaller, more local outpatient hospitals."

Human scale is also the very busy street, the bustling marketplace

On the other hand, CPG Healthcare's Lim Lip Chuan says medical planning has some way to go before it arrives at this point. "Generally, the operational models in state institutions are staff-centric rather than being people or patient-centric. There is still a lack of consideration of the patient experience throughout the care spectrum within an acute facility."

He says that, owing to the country's shortage of professional medical planners, clinical flows usually fall under the remit of a Local Design Institute (LDI) designer, who often doesn't appreciate medical requirements.

Philip Wong adds that the public has bought into the 'bigger is better' concept, and, currently, there is little opposition, despite the problems that large facilities can create in terms of wayfinding and staff fatigue. While China's hospitals have huge ambulatory-care services as well as inpatient beds, home care is merely aspirational at this time. "China is more focused on property development at the moment rather than providing services within communities," he concludes. ▶

Green roofs and planted terraces contribute to the park-like atmosphere at the Shanghai New Hongqiao International Medical Center

Shanghai New Hongqiao International Medical Center, Shanghai

The Shanghai New Hongqiao International Medical Center will act as the central logistical, clinical and public support facility for the planned medical campus's five hospitals and additional specialty clinics. Plugging individual hospitals into a centralised facility is a new concept aimed at reducing costs for individual hospitals and providing access to cutting-edge technology, and this centre is believed to be the first of its kind in the world.

Alongside traditional support services, such as food, laundry and IT services, the shared facility will house diagnostic imaging suites, clinical laboratories, pathology laboratories, and pharmacy retail and storage. To maintain strict separation between materials, patients and the public, circulation patterns are layered vertically, with service and supply distribution occurring in lower-level tunnels, public activity limited to the main levels, and patient and staff activity occurring in raised sky bridges.

The facility is also planned as one of the world's most energy-efficient healthcare campuses. A double-skin façade with horizontal solar-shading devices provides high insulation, mitigates solar gain and decreases cooling loads. Green roofs and planted terraces also increase insulation, filter storm water run-off, and contribute to the overall park-like atmosphere.

Architects: Gresham, Smith and Partners (GS&P)
Client: Shanghai Minsheng Investment and Development, Co Ltd
Size: 947,805 sq ft
Cost: N/A
Completed: 2015

Other commentators see signs that an elderly-focused integrated approach is beginning to gain a foothold. Says Lim Lip Chuan: "Planners are trying to integrate geriatric facilities within the healthcare setting consideration for palliative care, counselling, and earmarking hospice facilities either within masterplan or future development for acquisition.

"Another important concept from western practice would be geriatric care management, which is an integrated approach to elderly care through the continuum care. We hope to advance this concept through integrated and holistic architectural planning design approach, where the hospital is not a standalone institution but one of many interdependent entities along entire spectrum of healthcare."

Space Syntax's work, which is very much in harmony with this concept, promises to be a catalyst for new ideas about preventive health and healthy living, but it is also about human connections and economic advancement. Tim Stonor feels strongly that by designing cities that are more pedestrian- and cycle-friendly, with access to green parks, not only are citizens given "richer opportunities to generate social networks" but opportunities will also be generated for commerce.

Shanghai New Hongqiao International Medical Center

There are signs of this playing out in healthcare, with China's rising middle class not just demanding higher standards of treatment and more personalised care but also showing greater interest in living healthier lives. Says Lim Lip Chuan: "People are more health conscious, and thereby a new market sector has integrated early detection and screening into acute hospitals. Strong emphasis in health-screening promotion has been infused."

People are more health conscious, so a new market has integrated early detection and screening into acute hospitals

Ways of the West

While China's rise to prominence on the world stage has helped reinforce a confidence in its own culture and traditional approach to medical practice, it is also heavily influenced by Western medical techniques. "Of course, both sides are coming at it from different angles," remarks Brian Kowalchuk. "In the West, you typically try alternative medicine after Western medicine has failed you. In China, they co-exist a little more naturally. It's not unusual to have traditional medicine and Western medicine practitioners in the same hospital, for example, or to see a Western pharmacy and a Chinese pharmacy side by side."

Lim Lip Chuan concurs: "We see non-western treatment models as complementary to the overall spectrum of care, especially in rehabilitation and pain management." Indeed, this will be evident in the Hainan Cancer Research Hospital, in Haikou, scheduled for completion next year. A centre of healing and research, the hospital incorporates a combination of Eastern and Western sensibility in every design aspect – from programming to the user experience. An open-air courtyard garden provides a natural environment, while various Chinese and aromatherapy plants known for their healing qualities, and distinctive vegetation studied for their medicinal applications, complement the surroundings. Said to be the first major Chinese hospital to achieve LEED Gold certification, the design employs both local building strategies and Western climate expertise in a comprehensive approach to green design and user comfort.

AECOM

Lichen flourishes in clean air. Just like good health, good healthcare design starts with getting the basics right. AECOM sees health and healing in the round. Please contact John.Hicks@aecom.com

The concept of the circle features in the design of the First People's Hospital, Wenling

Mission on emissons

Of course, the issue of sustainability is a delicate area for China's leadership. Less than ten years ago, China's carbon emissions were running at a similar level to those of the US. Within the next year, however, the former's carbon emissions will be double that of the States. China's government is emphasising that its new growth model will be kind to the environment, and President Xi Jinping has stepped up efforts in this regard: it has just announced an absolute cap on emissions from 2016, while the number of new vehicles licensed to use its roads is to be nearly halved. Brian Kowalchuk agrees that there is a genuine appetite to tackle pollution.

"It's true, there's no voluntary sustainable design programme in China (like LEED in the US or BREEAM in the UK)," he says. "But in the past ten years, the Chinese government has enacted mandates – not guidelines, *mandates* – for reducing energy consumption and air pollution. When we're conducting energy reviews of the buildings we're modelling, we're not hoping to score a plaque at the end; we're following a code so we can get the building constructed. These mandates are very energy-focused, but we're seeing quite a bit of interest from some clients in sustainable products and finishes as well."

First People's Hospital, Wenling

International architecture practice dwp was chosen to create the interior design for the new First People's Hospital, in Wenling, China. This new facility, it says, aims to be the new focus and reference for the developing medical field in China. The design scope included the lobby design and two standard patient-room types.

The design theme for the First People's Hospital is the interpretation of the energy behind a droplet of water and the geometry generated by the falling drop. Bringing together the idea of water and the concept of a circle – one of the most important elements in Chinese culture – dwp has created a new experience, which it believes is very different from that akin to traditional Chinese hospitals.

The result is a combination of natural elements, such as stone, water, trees and, in terms of medical technology, advanced solutions, in order to generate a comfortable ambience to stimulate recovery and wellbeing for patients from all over China.

Architects: Institute of Architectural Design and Research
Interior design: DWP
Client: First People's Hospital, Wenling
Cost: Undisclosed
Size: 140,000sqm
Number of beds: 2400
Completion: 2015

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The Children's Hospital of Soochow University, Suzhou

An ideology in transition

While the pace of change in China, and the wealth it has brought to so many of its citizens, has helped reinforce the legitimacy of the communist model, it is also imposing unrelenting pressure on the country's leaders – many of whom still hold on to traditional views of political power and strength – to loosen control in order to meet changing expectations and stay relevant to its younger population.

This experience also holds sway in healthcare, as Kowalchuk points out: "It's interesting, the old guard in China still views architecture in very traditional Communist terms: architecture communicates dominance, power, and the collective. But we're talking to healthcare CEOs in their 30s and 40s, who have grown up in the new China, and communism means something completely different to them. These decision-makers want architecture that communicates quality, beauty and comfort, and is tailored to their organisation, not the government."

If he would like to see the country hold on to one aspect from its Communist traditions, then that might be its conviction to get things done. Says Kowalchuk: "When they decide what they want to do, they can dedicate funds and resources to it right away – and it gets done! That's how they get their five-year plans done in five years instead of 15 years. I'm not saying it's all a bed of roses, but it's undeniable that the rate of change and development we've been witnessing would be impossible without that absolute consensus."

And Lim Lip Chuan believes China's integration with the international community will inevitably increase pressure to conform to international norms. "The transition into the 21st century for China will be one that aspires towards obtaining a high living standard and human dignity," he explains. "This affects structure, management and operations, but also its architectural expression and approach.

"Where hospitals used to be utilitarian, staff-centric and method-driven, now they must be patient-centric, efficient and process-driven."

China's transition into the 21st century will be one that aspires towards high living standards and human dignity

Andrew Sansom is associate editor of World Health Design

All needs considered

UK: IBI Group has been announced as preferred bidder with Balfour Beatty to design a £47m acute mental-health and community development in Irvine, North Ayrshire, Scotland.

"The building layout creates a series of spaces – from the more private areas of the wards, through to sociable shared therapy clusters, and on to the more public area within the entrance, which faces the wider site and community," says Martha McSweeney, lead architect.

The design adopts a holistic view of wellbeing that considers psychological, emotional, physical and physiological needs. All inpatient areas are on the ground floor, with easy access to the outside. Landscaping is integral to the design, with private gardens on the wards, and more sociable spaces, such as the cafe terrace, and the wider site beyond. A woodland walk allows individuals to pursue longer journeys within the community.

Located near the coast, the new facility is on a 6.5ha site and comprises outpatient and inpatient facilities with 206 single en-suite beds. There are 90 older-adult beds for rehabilitation, continuing care and mental health wards, and 116 adult mental health beds with facilities for acute, rehabilitation, addictions, forensics, and intensive psychiatric care.

Secure and stigma-free

UK: In 2010, Surrey & Borders NHS Foundation Trust identified the need for a new long-term home that would provide 24-hour support for seven adults with Autistic Spectrum Disorder. Medical Architecture was selected to develop a tailored setting for the service and a number of design options were tested on a woodland site in a quiet corner of the existing Oakland's Hospital.

Planning the new Oakwood autism unit resolves two apparently conflicting objectives: providing a stigma-free and recognisable civic form while the remainder of the hospital site is redeveloped for private housing; and, at the same time, creating an environment that is private and secure for its vulnerable residents. As vertical timber cladding wraps around the external facade, the interior spaces open on to a light but secure courtyard, providing natural daylight and views into soft landscaping.

Varied ceiling heights enhance the sense of personal space and delineate privacy. Wide thresholds and curved walls soften the experience of joining the interpersonal realm. Seating overlooking the courtyard garden moderates the features of a therapeutic environment. Each detail is calibrated to the needs of users without losing sight of the aim: to provide a building that can adapt as residents change.

Lifting the spirits

UK: Designed by world-renowned architects Foster + Partners, a new Maggie's Centre has been granted planning permission and will be built in the grounds of The Christie, which specialises in cancer treatment and research, in Manchester.

Set in a peaceful garden and arranged over a single storey, the natural timber structure focuses around a wide, central spine with the roof rising in the centre to create a mezzanine level illuminated with natural light. Exposed lightweight beams and timber lattice support the roof, while also defining different spaces. An integrated glass house extends from the south of the building, providing a space for people to enjoy the therapeutic qualities of nature, while the interior palette combines warm, natural wood and tactile fabrics.

"I believe in the power of architecture to lift the spirits and help in the process of therapy," comments Lord Foster. "Within the centre, there is a variety of spaces – visitors can gather around a big kitchen table, find a peaceful place to think, or they can work with their hands in the greenhouse."

The surrounding gardens have been designed by landscape designer Dan Pearson, combining a rich mix of spaces, from the working glass house to bright clusters of flowers and tranquil water features.

Flood recovery

UK: Cockermouth's local residents have started to benefit from their brand new community hospital and health centre in the heart of Cumbria, England, signalling a new start for a recovering region.

In November 2009, the rivers Derwent and Cocker burst their banks and flooded Cockermouth. Following the flood, the GP surgeries were decanted into portable buildings on the local cottage hospital site. "As the extent of the damage was assessed, NHS Cumbria took the opportunity to review its health provision, deciding to create a new 'joined-up' service," said Justin Harris, architect and studio director at IBI Nightingale. The strategy inspired the new-build Cockermouth Community Hospital and Health Centre, delivered via the Express LIFT framework.

Responding directly to the local architectural vernacular, the new building is accessible and therapeutic. Situated close to the town centre, users benefit from views over the Cumbrian countryside and historic Cockermouth Castle.

Designed in collaboration with eLIFT Cumbria and Head Tenant Community Health Partnerships, the new building houses GP and dental practices, together with imaging and inpatient facilities. The layout promotes collaborative working between departments, through the use of flexible, multi-functional spaces. The building has achieved a BREEAM Excellent rating, says IBI Nightingale.

Ocean of opportunity

USA: WHR Architects has joined Ocean Medical Center (OMC) for the opening of the new Hirair and Anna Hovnanian Emergency Care Center in Brick, New Jersey. The firm designed the 140,000 sq ft emergency department as part of a new hospital building, which forms the first phase of a facility masterplan for the OMC campus.

Charles Griffin, principal-in-charge and senior project manager said: "The hospital recognised that they had a real opportunity to change the face of emergency care in their community. As a result, the new emergency department is not only more efficient but it's also more tranquil, private and less stressful."

The project involves expansion of the emergency department and its relocation to the new four-storey facility. The department occupies the first floor, with shelled space for future diagnostic programmes on level two and a shelled space for a 36-bed nursing floor on level three. A new materials management loading-dock infrastructure space was created at basement level, while three additional bed floors can accommodate 108 new private patient rooms in the future.

Said Bhargav Goswami, the project's medical planner: "We worked with OMC staff on several studies aimed at improving efficiencies, as well patient and staff safety and satisfaction."

Prefab clout

UK: Planning permission has been granted for The Forum, a £120m mixed-use medical and education facility on the Cambridge Biomedical Campus, designed by architects NBBJ.

The building's design uses Laing O'Rourke's 'Design for Manufacture and Assembly' system, which will see the entire structure, mechanical and electrical system and finishes fabricated in a factory and assembled on site, providing a high-quality finish, cutting carbon wastage, and reducing the construction programme.

Including a post-graduate medical education unit and 900-delegate conference centre, The Forum will bring together medical professionals, researchers and academics from around the world to focus on the development of life-changing treatments.

The scheme has been privately funded but allows Cambridge University Hospitals NHS Foundation Trust (CUHT) to retain freehold ownership. Forum Cambridge LLP – a joint venture between John Laing and CUHT – will operate the new building, which will contain a Ramsay Health Care UK 90-bed private hospital and a Crowne Plaza hotel.

The lower public areas of The Forum are open in appearance, while the private upper areas are more restrained. The result is a subtle, modernist façade wrapping around the building. The stone aggregate façade resembles local Cambridge stone, contrasting with the lightweight glass and neighbouring steel buildings.

Foundation for research

UAE: GHD, IBI Nightingale and Al Jalila Foundation have unveiled the concept design for Al Jalila Foundation Research Centre in Dubai. This will be the UAE's first standalone medical research centre and will focus on five regional health challenges: diabetes, obesity, cardiovascular diseases, cancer and mental health. The 10-storey building is to be co-located with a new academic health science centre within Dubai Healthcare City. It will have three floors of research laboratories, as well as clinic spaces, administration and spaces for other partner organisations.

IBI Nightingale has been assisting Dr Abdulkareem Sultan Al Olama, CEO of Al Jalila Foundation, and his team to establish the vision for the project, and will soon undertake a fast-track programme of design development as part of a multi-disciplinary team headed by GHD.

Tony Burley, project director at IBI Nightingale, said: "The curved form and elegant external treatment of the new medical research centre are intended to give a focus to the heart of the Dubai Healthcare City masterplan and complement the massing that will complete the campus." Dr Abdulkareem Sultan Al Olama said he hopes the research centre will "provide a solid foundation for cutting-edge medical findings that will address the region's most pressing health challenges".

Outwards and upwards

Netherlands: Based in the Dutch town of Utrecht, Sint Antonio Hospital Utrecht specialises in oncology. Designed by de Jong Gortemaker Algra architects and engineers on a modular grid of 7.2m^2 – a layout that enables flexibility in the floor plan, with the building able to be extended both backwards and upwards.

An objective was to efficiently organise the flow of people and goods. The compact plan provides short walking distances for staff and patients, green patios affording daylight and easy orientation, beautiful waiting lounges, and a colour palette that accentuates the warm surroundings.

Comprising six storeys, the new hospital features research and treatment services, public functions, and staff facilities on the first three levels. Here also sits the emergency theatre, GP areas, the imaging department, day therapy, the endoscopy department and operating rooms. Wards lie on the upper two floors, with a technical level on the fourth level. The main public space is on the first floor along the main axis, which serves as a public boulevard, and the traverse axis. Numerous narrow side streets run from the boulevard to the outpatient squares – open spaces featuring different care and cure specialisms, and various waiting areas.

Faithful response

Canada: The Southdown Institute in Ontario, Canada, offers residential and outpatient psychological treatment and spiritual guidance to clergy and those providing ministerial services. The organisation required a consolidated 30,000ft^2 building on a new 6.38 acre site which, because it is part of an important water shed, will establish a natural reserve in an area that is experiencing suburban growth.

Project designers, Montogomery Sisam Architects has provided a building that presents a modest, residential scale on arrival. The primary two-storey volumes are concealed by the chapel and a stand of white pine trees. Locating the building around a central courtyard has the effect of establishing a focal point, with all major communal spaces accessed around this element. The exterior siding is painted charcoal grey to allow the lush green landscape to dominate, while this dark exterior also contrasts with the bright stained-glass windows in the chapel.

In contrast to the communal spaces, 22 private bedrooms on the second floor provide the chance for privacy and reflection. Consultation and treatment rooms are provided in a discreet wing on the same floor, enabling therapists to address the specific needs of each individual patient.

Ergonomic to a T

A division of Humanscale – a firm that designs ergonomic tools for the workplace – Humanscale Healthcare provides ergonomic work tools that support healthcare-specific technology, bringing an important perspective on human factors to the market.

The proliferation of electronic medical records and technology-based treatments means that today's caregivers are using computers more than ever before. The company's TouchPoint line of mobile technology carts addresses many of the challenges present in today's healthcare environment. The T7, for example, is said to have earned four industry awards, including the Red Dot award for product design. It combines Auto Fit technology, which enables the cart to adjust easily to the caregiver's entered height, with Power Track steering, which is said to give the T7 impressive manoeuvrability.

All controls on the T7 are within shoulder width of the caregiver, providing body-friendly support for the user. It also has two different tilting monitor-arm options, both of which accommodate a vast range of individuals. Owing to its low centre of gravity, the T7 has good balance and stability for smoother and safer use. Simple in both form and function, the T7 has a completely encased wire system, which mitigates both clutter and infection-control concerns, says the company.

All sit down

Created by the Global Group Center, the Primacare seating range includes patient and dining chairs, guest and lounge seating, recliners and sleeping chairs, tandem seating, and tables. All components can assist in building myriad configurations, or for product modification and reconfigurations.

The range was conceived in partnership with healthcare providers, ergonomists and infection-control professionals. Molded, highly resilient Ultracell bio-foam is said to ensure proper support of the body, especially when seated for long periods of time. The shapely arm support provides comfort while seated and offers a grip extension to assist the user getting in and out of the chair safely. The seat and back attachment uses no material viewed as problematic for infection-control requirements and cushion replacement, while the chair's wood and metal-frame options are said to meet industry safety standards to ensure stability.

According to the company, the product is ISO 14001 registered and all components are repairable and replaceable on site, reducing downtime and ensuring minimal impact to landfill sites. The range is also reported to be GreenGuard compliant, ensuring products have met rigorous and comprehensive standards for low emissions of volatile organic compounds (VOCs) into indoor air.

How does your garden grow?

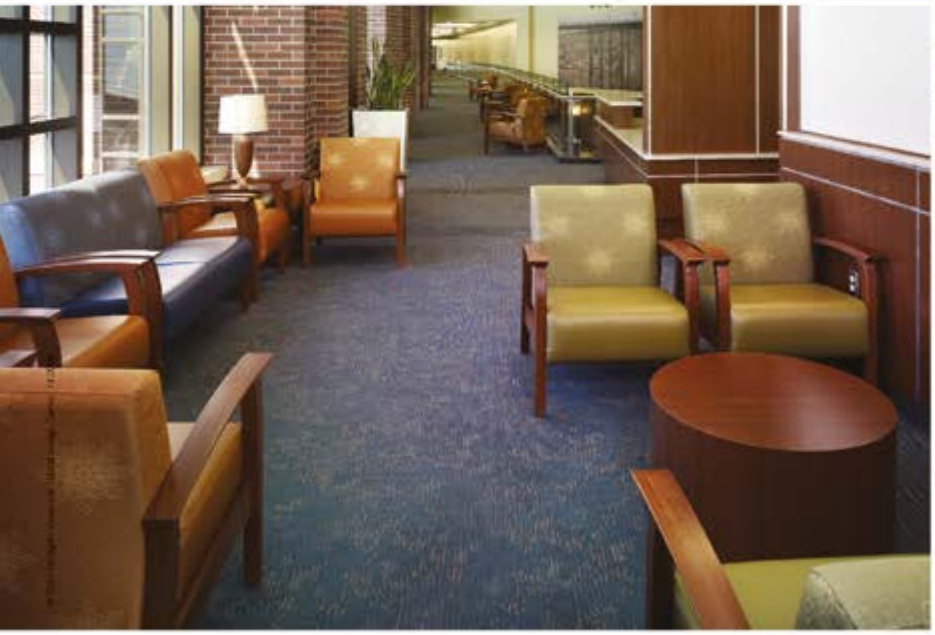
People who endure regular pain are finding some relief by using an innovative map that helps them create a 'garden' of their suffering. Called the 'Pain Garden', the map helps patients understand the overall impact of chronic persistent pain on their wellbeing and aids them in describing it to doctors, friends and relatives.

Created by Professor of Rehabilitation at Teesside University Denis Martin and digital business Animmersion, the Pain Garden is supported by Arthritis Research UK and allows people to link up the multi-dimensional aspects of the impact of pain on their lives. By answering questions relating to emotion, sensory experience and wellbeing, a digital garden, accessed via a website, is grown, which thrives or wilts as a patient's health and wellbeing alters.

"In creating the garden different questions target different areas of wellbeing that exist within the garden," says Animmersion managing director Dominic Lusardi. "If you answer positively then that part of the garden will be flourishing. Likewise, if you're feeling unwell on a certain area, that part of the garden may be wilting – such as the 'anger tree'. This garden means a patient's experience of pain becomes something visual that those going through a similar experience can identify with."

thinkglobalcare

To help suffering humanity back to health and life is the mission, values and vision of St. Luke's Magic Valley Medical Center's new state-of-the-art facility in Twin Falls, Idaho. To adhere to their vision, the facility provides the most comfortable rehabilitation setting for patients and their visiting families. GLOBALcare is a partner in providing quality, cost effective and user-centric furniture solutions to healthcare facilities across Canada and the United States.



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INSIGHT: Glocalisation

A special report on HDR's global approach to architecture with a local touch

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Design with **social conscience**


Doug Wignall, HDR president

Architects have a social responsibility to ensure that the buildings they design "also improve settings and the world around us," muses Doug Wignall. "We need to make the world a better place."

It's a statement that encapsulates how HDR's president is following in the footsteps of the company's founder, H H Henningson, whose mantra, "There is always time enough for kindness," continues to be heard. Indeed, Wignall exudes passion for design's potential to transform lives. "In the case of hospitals, these facilities are iconic projects in whatever venue or setting. People's lives, in the way they interact with them, are changed in very fundamental ways – sometimes good and sometimes bad, and we need to recognise and understand that."

This social conscience is deeply embedded in HDR's global strategy, too, which is focused on creating a sustainable base in each territory in which it works, often with acquisitions. "When deciding on a company in which to invest, essentially we are looking for three factors: strong growth; a strong and stable banking system [in the acquired firm's country]; and a high level of ethical practice. We don't just open offices and export work back to the US," says Wignall.

Likewise, with a 70:30 split in terms of its US-based and non US-based workforce, HDR doesn't export architects from the States into the businesses it acquires. "One of the other things that earmarks our global strategy," explains Wignall, "is that we like to be able to maintain staff. As architects, we sell intellectual property, and that intellectual property originates from human beings, and the more you invest in them the better your products are going to be."

The only way to truly grow a practice is through its local leaders

The philosophy is both inter-dependent and wholly democratic. Comparing the strategy to the image of acorns growing from a single tree, he explains: "We look for high quality, well-led and well-run firms. The only way to truly grow a practice is through its local leaders, as they attract further leaders."

HDR's overseas expansion began in the decade before the global financial crisis hit, as the company recognised the power of the communications revolution and the need to remain relevant in a fast-changing world. Wignall believes these changes are a force for good. "I think what we are seeing is somewhat of a homogenisation happening globally," he says. "And I think that's a good thing, as the best ideas, wherever they originate, are spread quickly around the planet for the benefit of mankind."

While there's no doubt that the economic downturn also prompted HDR to accelerate its growth model, Wignall is adamant that the company's "superior design capabilities" have been a key driver in the success of this strategy. He puts many of these capabilities down to the nature of the market in the US, which he says is fiercely competitive and therefore encourages design practices to develop "very impressive résumés".

But its recent expansion is also characterised by a strong emphasis on understanding the cultural tenure in other countries – one of the biggest challenges of global expansion. Wignall stresses the need to knit together global practices so that they operate in line with a common set of values, but he also cautions against changing deeply embedded practices in a native territory or risk losing relevance. He highlights HDR's recent rebranding exercise, in which it sought to present an image more identifiable worldwide, especially in places like China, by appreciating that country's cultural emphasis on the interpretation of symbols.

Likewise, when delivering projects, the need to understand the different cultural nuances in practice lies at the heart of HDR's glocalisation strategy. Says Wignall: "There are always principles you can take from one country and apply in another, but they're never going to be identical."

The eye for detail HDR directs on understanding the local environments of the myriad countries in which it operates sits at the heart of its overseas outlook. Together with its focus on building long-term sustainability in such markets, while also supporting local leadership, HDR is well placed to continue to serve its broadening and diverse client base in a world that is changing at an unrelenting pace.

HDR Timeline ▶ **1917**: HDR is founded in Omaha, Nebraska, USA, designing water/wastewater systems and electric plants ▶

Guiding principles

During the past few decades, societal and political changes have dramatically changed the scope and meaning of what healthcare is all about, ***writes Hank Adams, HDR's director of healthcare***. Today, the word "health" encompasses not only wellness but also wellbeing, self-sufficiency, and overall quality of life at both an individual and community level. This change in attitude has, in turn, led to striking changes in the design of environments where healthcare is delivered. Our approach to healthcare design must continue to evolve to accommodate change. But when you consider how different our world is (diverse systems of government, cultural normalcies, beliefs, and healthcare systems) and the range of issues within each nation (differences among indigenous peoples, first-generation citizens, and ethnic groups), execution of this approach is far from straightforward.

It was more than 10 years ago when HDR began seriously exploring opportunities outside of the United States. Before that, we had designed the occasional international project, but we knew that to become players in the global arena we first needed to

expand beyond our borders and become global ourselves. We did this mainly through acquisitions – Mill & Ross Architects and G+G Partnership Architects in Canada; CUH2A with offices in the US, London, UK, and Dubai; TMK Architekten in Germany; and Rice Daubney in Australia. We also opened offices in Abu Dhabi, Beijing and Shanghai.

A "glocal" philosophy

We have learned that to truly understand healthcare design on a global level, we needed to follow a "glocal" philosophy: a global perspective that keeps us linked to the latest technology, trends and information, with local offices with local talent to keep us connected to the real-time needs and concerns of clients, the nuances between global cultures, and the differences in healthcare systems and their facility needs. While there is no universal formula for global healthcare design, there is a set of design considerations – distilled down to the three themes of **context, community, and care** – that guide the way we design healthcare buildings around the world.

As healthcare architects, it is easy to assume that we know what is best based on widely-accepted research and standards. We must always remember, however, that a standardised way to design healthcare buildings globally does not exist, and each country, region and group of people has its own specific healthcare needs. The key is to weave our recognised best practices and research with local context, community and care needs, creating facilities that combine the best ideas from around the world with the best of what makes each part of the world so special.

About HDR

HDR is an architecture, engineering and consulting firm with nearly 9,000 employees in more than 200 offices worldwide. The firm's architecture group designs facilities for public- and private-sector healthcare, science and technology, corporate, commercial, retail, justice, civic and academic clients.

This broad focus has helped the company deliver facility types that blur the lines between markets, such as correctional health facilities (civic + healthcare) translational health science facilities (science + healthcare), medical schools (healthcare + academic) and community-centric hospitals (healthcare + civic + retail). The firm's deep bench of expertise also includes product design and development, signage and wayfinding, technology consulting, equipment planning, and commissioning.

For more information, visit: hdrinc.com

▶ **1955**: With about 75 employees and $250,000 (US) in annual revenue, HDR expands its services to include architecture ▶

Investing in knowledge

Roger Stewart is in the business of global expansion. One of his primary focuses is identifying successful companies outside the US to join HDR's growing business.

Elaborating on these opportunities, he explains: "What we realised in the US in healthcare – where we have been number one according to many rankings for 10 or 12 years – was that if we wanted to continue to grow, we needed to go beyond the US. Secondly, we considered, 'well, what does it really mean to be a leading practice?' If you only stay in one country, you aren't really a leader.

"Thirdly, there was a simple practical business reason for more economic diversity. It seems funny to look back now but, at the time, some people thought we were crazy to look overseas when we had this huge market in the US that seemed infallible."

Consequently, when the financial crisis eventually hit, HDR wasn't as immediately impacted as were other firms. By this time, it had moved into the Canadian market, with the acquisition in 2007 of Mill & Ross Architects, in Ontario. Two years later it strengthened its Canadian presence by buying G+G Partnership Architects. HDR benefited from the buoyant PPP market in its northern neighbour, while, in the US, the slow passage on to the statute books of the Affordable Care Act meant the firm "avoided a lot of uncertainty".

HDR's successful expansion into Canada encouraged the firm to look further afield, and in 2008 it purchased CUH2A – a science and technology firm, with offices in the UK and the Middle East. This venture was another savvy move, as it foresaw the growing fusion of healthcare and science – a concept known as translational health sciences.

Roger Stewart, director of global development

If you only stay in one country, you aren't really a leader

Last year, another two companies joined HDR – TMK Architekten Ingenieure, in Germany, and Rice Daubney, in Australia. Looking to make real inroads in Europe, the first move into a non-English speaking country didn't come without its challenges, but what added to the appeal was the chance to understand a different healthcare model and challenge some of its own preconceptions about healthcare design.

Says Stewart: "Everything becomes an open question and causes you to get down to the fundamentals of the issue. I look forward to the time when you can look through a hospital and its departments, sit down with the client, and say, 'here's five different ways of looking at this problem: this is how the US does it, this is how the Canadians do it, this is how it's done in Australia, etc."

The purchase of Sydney-based design practice Rice Daubney certainly raised eyebrows given the slowdown of the Australian market. But it's further evidence that HDR is no ordinary business when it comes to acquisitions. "There is also a whole region of Australasia, reaching into places like Indonesia and Malaysia, where we think there's some potential," says Stewart.

A common thread

Strong health design businesses and elements linking health with science are a common thread to all of HDR's merges, which is helping expand its knowledge base in areas like design thinking. "Another thing there's a keen interest in," adds Stewart, "is the whole area of rethinking how health is delivered as budgets get tighter. How do you take a step back at a federal level, at a state level, and consider what are the different models of care?"

He continues: "CEOs and directors are looking at this at the moment more in terms of policy than bricks and mortar, but it's starting."

Through mergers, HDR continues to seek opportunities to add to its knowledge resource. It's a model that's well suited to a world in which faster communication and the spread of ideas can bring benefits to mankind like never before.

Recent acquisitions

2013: Rice Daubney
(One office in Sydney, Australia)

2013: TMK Architekten Ingenieure
(Seven offices in Germany)

2009: G+G Partnership Architects
(Two offices in Ontario, Canada)

2008: CUH2A
(Seven offices in the US, London and Dubai)

2007: Mill & Ross Architects
(Two offices in Ontario, Canada)

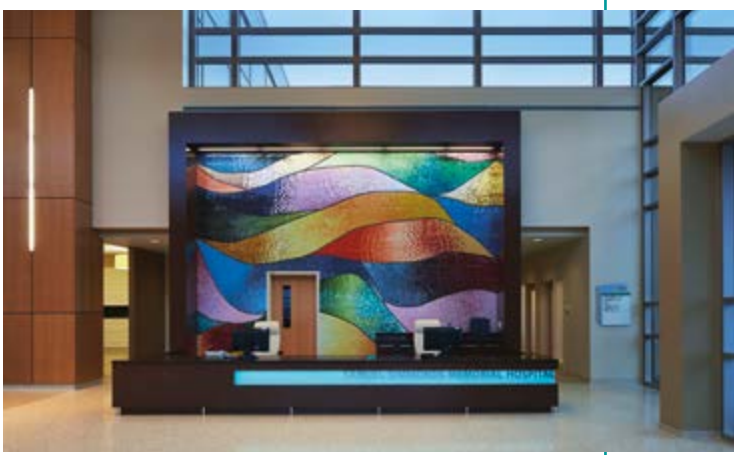
2006: Warner + Associates, Inc
(One office in Boston)

HDR Timeline ▶ **1960s**: HDR wins its first major medical facility commission – the new Nebraska Methodist Hospital, USA ▶

Glocalisation: Context

Considerate building design should relate to its surroundings. While there are subjective arguments for either creating something unique or tying design in with neighbouring architectural themes, there are also objective context issues to which all buildings should respond, such as climate, culture, economics, social issues and politics

Samuel Simmonds Hospital, Barrow, Alaska, USA



In the northern-most tip of the United States, in one of the harshest polar climates in the world, a context-driven approach was used to design the new Samuel Simmonds Hospital in Barrow, Alaska. The replacement hospital serves approximately 7,000 people – mostly of native Alaskan Inupiat ethnicity – spread across six villages.

The hospital is a partnership between The Arctic Slope Native Association (ASNA), a non-profit tribal health organisation; the Indian Health Service (IHS), the Federal Health Program for American Indians and Alaska Natives; and the Denali Commission, a federal agency providing critical infrastructure support for Alaska. Given the lack of roads connecting the North Slope to the rest of Alaska, these agencies were tasked with creating a local state-of-the-art health centre that could provide a full range of healthcare services and convince an otherwise reluctant population to seek regular care.

At the start of the project, the design team met with village communities to gain a deeper understanding of Inupiat cultural traditions and their expectations of healthcare. Discussions revolved around the Inupiats' love for their land, the importance of familial relationships, and the need to integrate traditional healing practices into the new hospital.

Although the hospital features modern décor and state-of-the-art equipment, the Inupiat community's influence is apparent. The interior design theme is inspired by the natural environment and local culture, featuring abstract mosaics of the Aurora Borealis (northern lights), expansive windows looking out on to the tundra, ample space to house families visiting their loved ones, and drum-shaped fixtures that appear to be wrapped in seal or walrus skin, reminiscent of umiak drums. The CT-scan machine gives instructions to elders in their native tongue, and the pharmacy is designed to allow pharmacists to bring medication out from behind the counter and hand it directly to the patient without having to turn their backs; in Inupiat culture, it is not acceptable to turn your back to someone. The hospital also weaves knowledge of traditional Inupiat healers into its practice, creating an environment where western and traditional medicine come together.

Because the abundant snow blows in horizontally, the building itself is constructed on stilts. This elevation prevents any building heat from transmitting into the ground and melting the permafrost, which would have a catastrophic impact on the building supports. All building materials, including the colourful metal rain-screen system, are durable enough to respond to the harsh Arctic environment. In addition, because of the hospital's remote location, all materials and equipment for the hospital had to be transported by plane or by a barge, which only travels to the region once a year.

To mitigate the effects of limited sunlight, the two-storey atrium lobby glows with translucent materials and the underside of the building is lit, making the hospital a literal beacon for the community.

Architect: RIM Architects and HDR
Client: The Arctic Slope Native Association (ASNA)
Size: 109,000 sq ft (10,126m²)
Number of beds: Eight inpatient rooms, two labour and delivery rooms, 14 outpatient exam rooms, 12-chair dental clinic
Cost: US$160m
Completed: 2013

▶ **1976**: HDR Wins its first major international healthcare project – the King Abdulaziz University Health Sciences Center in Jeddah, KSA ▶

King Faisal and Prince Mohammed Medical Cities, Saudi Arabia

As part of Saudi Arabia's mission to create world-class healthcare centres throughout its Kingdom, five regional medical cities are currently under way. HDR was commissioned to design two of these cities: the King Faisal Medical City in the province of Asir, serving the southern region provinces; and the Prince Mohammed Medical City in the province of Al-Jouf, serving provinces in the north. They are envisioned as one-stop destinations for comprehensive, co-ordinated care in their respective regions.

In both regions, the medical cities are being built close to the edge of the existing cities to help regenerate the regional areas and establish what Dr Zeyad Alsweidan, project executive at the Ministry of Health, calls "new anchors". He elaborates: "As the medical cities will include a sizable number of housing, amenities, and education facilities, they will help create a new city centre, which will eventually lead to the overall growth of the existing cities."

Featuring retail outlets, a hotel, a mosque and a housing development, both medical cities are near-identical in design. Dr Zeyad explains: "The overall brief for these two cities was to create strategic tertiary and quaternary medical-city complexes: one with a total bed capacity of 1350 beds, and one with 1000 beds. Both needed to include a 500-bed general hospital as well as five specialty hospitals – cardiology, neurology, oncology, rehabilitation and ophthalmology – integrated into one unique structure."

This standardised approach was adopted in order to achieve efficiencies and operational throughput, but local differences have also been accommodated. Says Dr Zeyad: "When you look at the solution we created, you begin to recognise that the internal workings of the facility are so straightforward and support the modality of care, so it made sense to have them nearly identical. Once you dig through the general design concept, you begin to see the subtleties of differences that are driven by the different site locations and approach, so they, in turn, become unique to serve their specific region."

Unsurprisingly, Saudia Arabia's desert climate and surroundings impact the form of the main hospital. Deriving its structure from the natural environment, the building is nestled in a "wadi" (valley) with

solid-stone sides protecting a "waha" (oasis) containing public areas, and a "jebel" (mountain) – a patient tower with all private rooms – above. The lined stone plinth houses the diagnostic and treatment block, its architecture inspired by the wind-etched rocks of the desert, while the crystalline forms of the cantilevered patient tower reference the surrounding mountains' beauty and durability. The material palette, too, is evocative of the local environment.

We wanted a design that met our local cultural needs

The design of the entire campus is based on Islamic geometry and, specifically, the eight-sided star derived from a square: a motif from the Abha region. Canopies based on the star pierce the exterior wall into the interior of the buildings. Folding down to the floor to become the backdrop for reception areas, they create intuitive wayfinding features. Centrally located gender-separated prayer rooms are also provided adjacent to waiting areas.

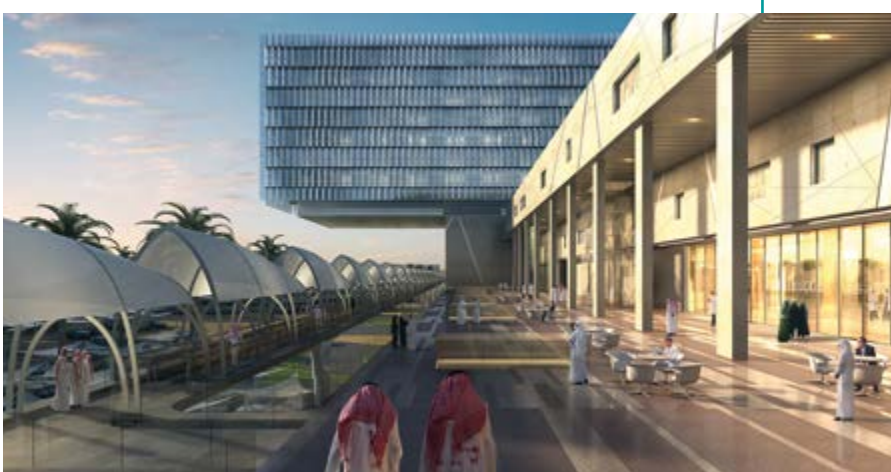
Also key to the design is a focus on the role of family. Dr Zeyad comments: "Family comfort is integral to the design, with generous spaces for family members to gather within public areas as well as spaces to accommodate them within patient rooms. Locating patient-room toilets outboard and limiting views to patient and treatment spaces respond to patients' and families' needs for privacy, as well as the general modesty of the culture. Screened areas are integrated into circulation and waiting areas in order to provide gender separation and privacy."

This emphasis on cultural sensitivity was a key factor in the choice of architects. "We naturally wanted to have evidence-based and data-driven design, but we also wanted a design that met our local cultural needs," says Dr Zeyad. "We believe that our solutions, specifically the design of our patient room, could be used in hospitals in the West."

He is also particularly impressed by HDR's use of innovative project delivery tools – not least an augmented-reality app, which uses the camera on a smartphone or tablet to superimpose a digital, 3D model of the project directly on to a site plan, to help users understand and explore the details of the model.

Continues Dr Zeyad: "Using GPS, the app can also be used on the construction site to see a full-scale model of the hospital as it will be built. This was a first in terms of experience for us in the Kingdom and it helped us understand the overall dynamic scale of the structure."

The use of technology to bridge gaps in human understanding is also evident in the hospital buildings themselves, which follow a modular approach allowing for optimisation of rooms and space, as well as infrastructure for telemedicine.



HDR Timeline ▶ **1983**: Bouygues SA, France's largest construction company, purchases HDR ▶

Glocalisation: Community

Community refers to a sense of fellowship with others as a result of sharing common attitudes, interests and goals. The role of community varies by culture, but in some parts of the world, architecture and design are being used either to create idyllic communities focused on and built around health and wellness or, at the other end of the spectrum, to bridge the health disparities that exist between different groups of people

Beijing International Medical Center (BIMC), Beijing, China

The Beijing International Medical Center (BIMC) in Beijing, China, is planned as a prototypical integrated healthcare community where health, research, wellness and everyday life come together in harmony. Upon completion, the BIMC will cover an area a quarter the size of New York City, making it the largest medical centre on Earth.

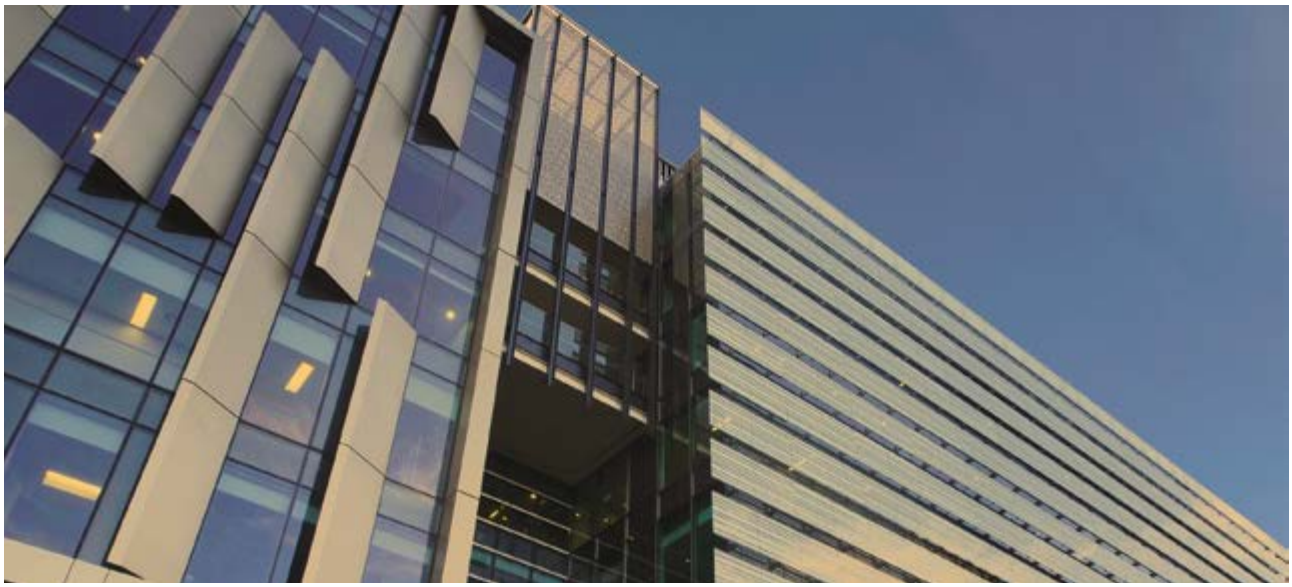
While BIMC is set to become a healthcare destination and tourism site, it will also be a community and home. The centre is designed for a 'whole-lifestyle' approach, including educational facilities from pre-school to university, along with senior living, wellness and rehabilitation components. The hospitals within the centre will be positioned along a thriving boulevard, which will connect all health-related entities to cultural and retail destinations, such as community centres, museums, supermarkets, malls and hotels. To traverse the site, visitors will use one of four transportation systems: a below-grade subway connecting to greater Beijing, a street-level campus transit system, an upper-storey personal rapid transit system, and an expansion of the existing bus system.

As a completely pedestrian- and bicycle-friendly urban environment, the entire masterplan was designed to human scale. The streets use a ratio of building heights to street widths that define the street and provide comfortable definition and a sense of enclosure for pedestrians.

While international in its outreach, BIMC will demonstrate its Chinese roots and act as a reflection of the country's culture. For example, although international health facilities will be found within the development, a traditional Chinese medicine centre is also being planned to include a hospital, traditional medicine research facilities, education facilities, rehabilitation, and senior living. In addition, all building entrances, and at least 90% of the patient rooms in the centre, will face south, in line with the principles of Feng Shui.

Unlike many medical centres that are buried in their own infrastructure within a congested urban core, the hospitals at BIMC will be open and full of light, rising out of parks and gardens that surround them. The most notable parks are the five elemental parks, themed according to traditional Chinese elements (water, wood, fire, earth and metal). The five parks will extend the natural landscapes of the Grand Canal and Chao Bai River into the interior development. This seamless blend of architecture and landscape creates a thriving environment that benefits the emotional and social wellbeing of all within the medical centre.

Development of BIMC will be staggered over 20 years, with the pace of growth matched closely with demand. In 2013, HDR was named as the design firm for the first hospital in the development – the 900-bed Beijing International Hospital.



Chris O'Brien Lifehouse, Sydney, Australia

Hearing they have been diagnosed with cancer is one of the hardest things anyone will ever have to hear. Anxiety about the potential length of treatment, whether it will be a success, the effect on family and friends, and, of course, learning to face your own mortality, are just part of the emotional turmoil cancer patients face. All this makes community support, human connectedness, and patient-centred care all the more important when treating cancer.

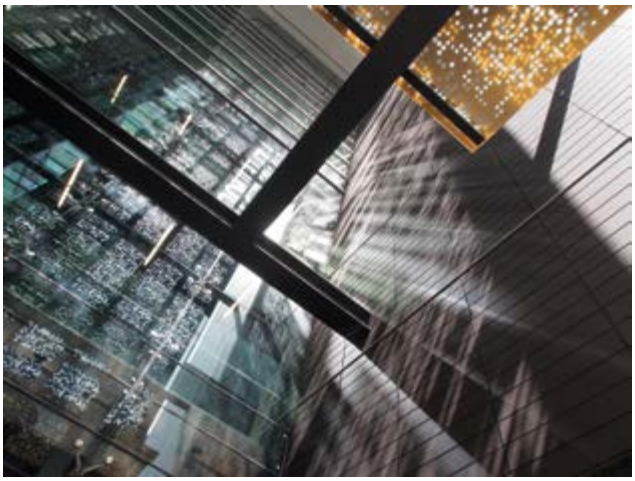
Set in Camperdown, an inner-city suburb of Sydney, stands the nine-storey, 43,500sqm Chris O'Brien Lifehouse. Named after the acclaimed late medical oncologist, and realising his vision to create an integrated cancer-care facility on the Royal Prince Alfred Hospital campus, the new facility aims to redefine the cancer-patient experience across a continuum of care, with broad-based holistic treatment services and a world-class clinical environment, linked with integrated research programmes.

This sense of community is fostered through the strategic reorganisation of cancer services on one site, delivered via a joined-up workforce. Describing its care model, the facility's chief clinical officer, Michael Boyer, explains: "It's all about having highly functional, multi-disciplinary teams, all members of which work here, and all co-located in one place, supporting the patient journey."

The central design element is the dramatic light-filled atrium, which extends vertically over ten levels through the heart of the facility. All public vertical circulation feeds through this space, which acts as a collaboration area for clinicians and researchers – a place where important conversations and interactions can occur in a relaxed manner.

The entire project has been delivered by Sydney-based practice Rice Daubney, acquired by HDR in 2013. Says Boyer: "There was an alignment of the same vision. They got what we meant about patient-centred care and focusing on the needs of the patient." Working very closely, three members of the hospital, along with the lead architect and project managers, undertook a study tour of cancer-care facilities in the US and Canada. "It was a good team-building exercise," comments Boyer. "We also worked with patient user groups on the concept design, right through to the detailed design," – an aspect that has aided the community feel, he adds, as the patients feel ownership of the design aspects.

HDR Timeline ▶ **1996**: HDR employees purchase the company from Bouygues, returning the firm to US ownership ▶



De-institutionalising the building has been crucial to the achievement of a sense of community, too, and it's this character of the building that gives Boyer most satisfaction. He remarks: "From a building design perspective, the aspect that I'm most proud about is the look and feel of it – it doesn't feel like a hospital." This has been achieved through a series of design elements aligned with what Boyer describes as "the big-picture priorities – easy navigation, access to light, warmth, and the colours of the design".

In terms of space, there is also a dedicated patient area with no access for clinicians. Called the Lifehouse LivingRoom, the space provides supportive services, education, and complementary therapy treatments that can be used in partnership with clinical care to help relieve stress, reduce pain and anxiety, and manage symptoms.

The architects, Boyer points out, brought a lot of evidence-based research to the table, particularly in respect of the salutogenic, healing benefits of light and transparency, and being able to enjoy greenery. Garden areas, for example, are incorporated into the light wells in the building, providing areas for patients and staff to interact, while the use of natural materials accentuates the warm finish. "There's probably more wood and more stone in this building than in your normal hospital," remarks Boyer. "The patient lounge and kitchen also have a feel to them that is very natural: wood materials, light, bean bags all around."

He continues: "The café is glass-fronted on to the street, so people passing by can see what is going on in that area. There's a connectedness with the street and the areas outside – more than you would find in an average hospital."

While the building's community feel – also evident in the hospital's arts programmes – is strong throughout, it has also strived for balance by instilling a sense of dignity and privacy in many areas. The chemotherapy bays, for example, are partially open but also feature individual cubicles so that patients who are feeling unwell from the treatment can find the privacy they need.

Speaking about the enhanced patient amenities, Boyer remarks: "We have all single rooms, which is partly for infection-control reasons. Some are designed with balconies, which some organisations avoid because of the risk of patients falling off them. But we feel that access to fresh air for patient healing is more important than that risk. They're all pretty calming rooms."

So far, feedback from patients and staff has been "overwhelmingly positive," says Boyer, who adds that once all the inpatient areas and operating theatres are open, a post-occupancy study will be carried out. The results of this will go a long way to confirming if the integration of cancer-treatment services and clinical support services, enhanced by a balanced approach to community connectedness and patient privacy, is delivering the standard of patient-centred care envisioned by this standout building.

HDR Timeline ▶ **1998**: HDR opens its first architecture office outside the US, in London, UK ▶

Glocalisation: Care

Although community and context have varying degrees of impact depending on where you are in the world, one consideration is important everywhere: an emphasis on patient-centred care. This addresses every aspect of a patient's encounter with a care provider, taking into consideration the overall human experience from the moment a patient arrives at a facility. Often called the 'patient experience', this is a co-ordinated service model that combines relationships, logistics and environment

Schwarzwald-Baar Kinikum, Villingen-Schwenningen, Germany

Every detail in the new 45,000sqm Schwarzwald-Baar Kinikum has been designed to create a space in which patients can heal and separate themselves from everyday distractions. The hospital consolidates healthcare services, once provided separately in the town districts of Villingen and Schwenningen, into an integrated, centrally located medical centre.

Prior to entering the building, patients benefit from the restorative power of nature. The building site is nestled in the countryside east of the famous Black Forest, surrounded by meadows. To complement this natural beauty, the hospital is structured horizontally to integrate with – rather than loom over – the natural landscape. It consists of a three-storey base building, housing examination and treatment rooms, and three patient-bed units, each three storeys high, built above the base and housing 750 beds. The low-rise nature of the building, which is common for healthcare buildings in Germany, reflects notions of human scale and preserves sightlines to the surroundings, including views of the Alps.

Each of the building masses is structured around landscaped courtyards that break up the complex, provide interior window views of verdant gardens, and ensure natural light pierces the interior spaces. On the exterior, coloured glass and expansive windows create a playful rhythm, emphasising the lightness of the building and offering sweeping views of the countryside.

The two-storey main lobby is the building's central element. It is illuminated by a skylight that provides nearly all lighting for the space, even when overcast. From the lobby, visitors access a main corridor that acts as a backbone to the hospital, spanning the length of the facility and connecting all units. A modern, minimalist design approach has been taken throughout the units – blonde woods, cubic forms, natural textiles, contemporary furniture, and a colour pallete that mirrors nature.

Architects: HDR TMK
Client: Schwarzwald-Baar-Klinikum Villingen-Schwenningen Gmbh
Size: 45,000sqm
Cost: €263m
Completed: 2013

Inspired by a growing body of research suggesting that art in healthcare environments can reduce stress and aid in the healing process, the hospital integrates contemporary art throughout the facility. Highlighted pieces include a steel-rod installation perched high atop the hospital's main entrance to signify the linear path of life, a 250-metre-long painted mural comprising abstract scenes, cartoon strips, and bold colour applications, and delicate neon 'light nodes' suspended from the atrium ceiling.

As Germany follows a universal multi-payer system, patients stay in either a single or multi-bed room. All rooms include windows that can be opened to welcome fresh air, personal entertainment systems, antimicrobial curtains, and expansive washrooms. The hospital is one of the most technologically advanced in Germany with pioneering diagnostic radiology, modern cardiac catheterisation labs, and a surgical centre with 15 operating rooms, including one that is hybrid.

▶ **2007**: HDR celebrates its 90th anniversary with 145 offices and 6,236 employees ▶

Humber River Hospital, Toronto, Canada

Currently serving more than 850,000 people in the northwest Toronto area, Humber River Hospital is expanding – but this is no ordinary facelift. The vision for the new facility, set to open in 2015, is a triptych of "lean, green and digital" – but the relationship between these elements is firmly rooted in present-day concerns of delivering better patient care, improving the working environment for staff, and running an operationally efficient facility.

"Humber River came together as part of a merger of three community hospitals in the late 1980s," says its COO Barb Collins. "But while having hospitals built under 1940s and 1970s building codes gives you opportunities for repair, they don't give you efficient buildings."

As part of its model of care, a decision was taken to co-locate all of its programmes into one acute-care site to create a "critical mass" and the ability to "specialise in more services". And once committed, the opportunity to initiate a game-changer in "digital" technology became as much a necessity – to enable the efficient functioning of a hospital double the size of the current facility – as any idealistic ambition.

"One digital innovation we're introducing to deliver us an operational cost-benefit is the use of robots to deliver supplies," says Collins. "The robots (known as automated guided vehicles) are able to receive messages, pick up carts, walk to the elevator, know what floor they have to travel to, deliver the supplies, and send a message to the relevant person so they know they have arrived."

Other highlights include separate pneumatic tube systems to deliver lab specimens, handle laundry and dispose of waste. "Through this technology, we will be 74% automated in the delivery of products and supplies, saving 165km of walking distance a day," says Collins. IT interoperability has also been built in to assist nurses in working more efficiently, she adds: "Devices will take the blood-pressure reading and oxygen rate, and record which nurse administered the procedure. They'll update the data on the

HDR Timeline ▶ **2008**: CUH2A joins HDR, enhancing the firm's expertise in academic, research and translational health science ▶

patient's chart, and if something abnormal is found, they will send a message to the nurse's hand-held device that something needs to be done."

Nurses will also be able to update charts via voice recognition technology, and use tracking systems to help them quickly find vital equipment, such as wheelchairs.

Inpatient rooms, says Collins, will benefit, too, from integrated bedside terminals, incorporating the patient's nurse-call system, the ability to order food, temperature control, and video conferencing with their care provider. It will also allow patients to control the chromatic glass windows, which are used in place of blinds and can be darkened to reduce sunlight glare.

This innovation, as well as aiding infection control, was suggested by HDR as a creative solution to help meet the hospital's "green" ambition, central to which is a "target of using 40% less energy than any other hospital in North America, according to the ASHRAE standard".

In fact, these solutions should be a slight improvement on this target. Innovations include: green roofs to manage storm water; reduced heat island effect; 100% fresh air inside the building; and improved views from inpatient rooms. Highly efficient plumbing fixtures, including low-flow toilets, faucets and showers have also been included and should decrease indoor water use by 35%.

Additional benefits in terms of patient care, staff respite and a sense of community are provided by the integration of pastoral gardens, patios and a piazza, while interior spaces have been designed to maximise the capture of daylight.

The "lean" element of the hospital's strategy included a focus on streamlining operations. "One of the things we were concerned about is that in doubling the size of the hospital, no one was giving us double the staff," explains Collins.

"In the new building, we are moving from 5% to 80% single rooms, each with three-piece bathrooms. We calculated that, currently, during a shift to deliver care for their patients, a nurse travels 5.4km. This would increase to 11.6km in the new building if we didn't fix some of the issues."

One such issue was patient visibility. "We looked at the location of the nursing stations so they aren't far away from the nursing room," continues Collins. "We modified the medication delivery programme so nurses don't have to go back and forth to the storage room.

"We've also standardised our patient rooms. Every room has a bathroom and if you have to walk past it to get to the patient then you are wasting time and you can't see the patient easily. So we've positioned the bathroom at the back of the room and moved the patient up towards the door, so nurses can get a better view."

Owing to a limited site, the hospital will feature an 'airport-style' Portals of Care concept that provides a lean, reorganisation of its ambulatory-care services. Outpatients to the new facility will enter the building from its south side, with easy access to ambulatory-care services on the first three floors. The concept assigns each clinic its own distinct space and entrance, with the clinics acting as individual neighbourhoods, preventing patients and visitors from walking through endless corridors to reach their destination.

Collins says the approach taken with HDR has been hugely collaborative, with the client bringing its own clinical data, staff and patient feedback and evidence-based design to the table, with the architects asked to come up with the creativity to meet the hospital's expectations. Promising to be an exemplar for future hospital design in North America and beyond, and planned with horizontal and vertical expansion in mind, the creative solutions to assist Humber River in delivering high-quality patient-centred care are unlikely to stop any time soon.

One digital innovation is the use of robots to deliver supplies

▶ **2010**: G+G Partnership Architects joins HDR with two offices in Ontario, Canada ▶

Enlightened thinking

French philosopher Michel Foucault once described the Enlightenment as an age that not only "discovered the liberties" but "also invented the disciplines". In the early 18th century, the "insane" were seen as a threat to enlightened thinking and held in asylums in dreadful conditions. While such views no longer have any place in contemporary medical wisdom, it is only now that new care-delivery models are being moulded that place patients at their heart rather than pushing them to the sidelines.

Hank Adams, vice-president and director of healthcare at HDR, puts it succinctly: "We're not just designing facilities anymore, but we're designing for new models of care that allow those facilities to operate efficiently for the benefit of patients."


Hank Adams, director of healthcare

To deliver on this promise, HDR has spent great time and cost in developing its healthcare planning service. "Our healthcare planning team has evolved in recent years to include many industry professionals who aren't architects," says Adams. "The team includes nurses, hospital administrators, Six Sigma 'black belts', and staff members in workplace strategy. They're helping us design workplaces in the healthcare system that support new models of collaboration and create workspaces that support better integration and co-ordination in organisations."

He continues: "We're also investing in parametric modelling, which is creating digital models that can be used for operational simulations and design studies, and for budgeting projects. This allows us to continually test different models and different scenarios thoroughly."

In line with this focus on patient outcomes, the need for client certainty on the payback of a new facility is now intense. It's a major factor, too, in HDR's approach to evidence-based design, as Adams explains: "What we do with the clients, as we're going through the design and planning work, is demonstrate to them the research available and help clients make informed decisions."

He highlights the firm's development of guideplates, which provide an evidence-based template for repetitive elements, such as patient rooms and operating theatres, which a project may follow closely or deviate from, where appropriate. These guideplates are supplemented with checklists, which allow clients to look through a set of categories – for example, on use of daylight and access to windows – and understand how such criteria feed into the design strategy. Once construction is complete, post-occupancy studies are often conducted in liaison with clients, who themselves are harvesting data to new levels in order to help them deliver care more efficiently. To keep ahead of the curve, HDR's planning team therefore comprises a group of innovation experts, whom Adams describes as "a forward-thinking group of people looking at the healthcare ecosystem, so more broadly than simply healthcare".

We present the research available and help clients make informed decisions

HDR's planning model appreciates, too, that healthcare silos are being dismantled to support more fluid care delivery, particularly evident in the merging of science, research and healthcare. Translational health sciences – as this combined discipline is known – is defined by Adams, in terms of HDR's role, as "trying to provide work environments and facilities and space to foster and facilitate better interaction, teaching, and a higher degree of knowledge transfer". Adams also suggests that the correlations between healthcare and research have made HDR more conscious of the potential problems when faced with blending such institutions. "Sometimes we run into challenges where the codes of healthcare and research are not necessarily in alignment," he says. "How we approach that is to have subject-matter experts who understand the healthcare aspect and experts who understand the research aspect, and have them work closely together. This allows us to identify challenges early on in planning and come up with creative solutions around them."

Understanding how a building can perform different functions has also helped HDR when masterplanning, particularly in Asia, where urban planning elements come into the equation. But even on these grand dimensions, the focus on community integration is a common part of the care model and subsequent design. "Even in the US, healthcare providers are recognising that hospitals should have a closer connection with the community, so we're seeing hospitals being built on developments where there may be a lot of mixed use," says Adams.

So, as we approach a new 'enlightened' era for healthcare, perhaps Foucault's observation about the impact of the 18th century's age of reason on liberty and incarceration could be reimagined for today: an age that not only "rediscovered the liberties" but also "integrated the disciplines".

HDR Timeline ▶ **2013**: TMK Architekten Ingenieure (Germany) and Rice Daubney (Australia) join HDR ▶

Historical healthcare fees

	Total	HC Domestic	HC International	Int't % of Total
2007	$160,000,000	$152,000,000	$8,000,000	5%
2008	$221,480,000	$139,532,400	$81,947,600	37%
2009	$306,361,400	$223,643,822	$82,717,578	27%
2010	$311,780,600	$236,953,256	$74,827,344	24%
2011	$323,004,700	$239,023,478	$83,981,222	26%
2012	$331,858,500	$265,486,800	$66,371,700	20%
2013	$316,800,000	$240,768,000	$76,032,000	24%
2014	$309,600,000	$185,760,000	$123,840,000	40%

57 Number of languages HDR employees speak

61 Number of countries HDR has worked in

11 Number of years Modern Healthcare magazine has ranked HDR the number-one healthcare design firm

12 Number of offices outside the US added in 2013

Historical employee counts (Healthcare)

	Healthcare Total	Healthcare outside of US
2014	574	172
2013	575	171
2012	415	54
2011	560	59
2010	546	73
2009	549	93
2008	506	21

205 OFFICES

Historical healthcare construction / Square footage volume

The following table shows the total construction cost value and total square footage of HDR's healthcare completed projects per year:

	Total Construction Cost Value	Total Square Footage
2013	$6,862,184,226	29,287,520 sq ft
2012	$6,430,371,422	26,246,414 sq ft
2011	$6,736,047,101	28,422,100 sq ft
2010	$6,556,333,333	27,633,854 sq ft
2009	$6,328,000,811	26,366,670 sq ft

▸ **2014**: The firm launches a refreshed brand identity, which reflects the company's core values and expanded global presence

Digital **Healthcare** Revolution

We designed Toronto's new Humber River Hospital to be the first fully digital hospital in North America. Designing technologically-advanced hospitals that deliver transformative care is why, for 11 years, we remain the world's number one healthcare design firm.
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Arrested development?

Faced with common worldwide problems of how to care for their ageing populations, southeast Asia's falling fertility rate is adding to concerns, while, as its recent healthcare boom draws to an end, Australia is facing a period of consolidation. ***Andrew Sansom*** reports

The National Heart Centre, Singapore

During the next few years, Asia, the world's most populous continent, will see its total fertility rate – the number of children a woman can expect to bear during her lifetime – drop to 2.1.[1] This figure is known as the replacement rate, because, if sustained, it results in long-term population balance.

But countries in southeast Asia have already seen fertility fall to 1.7, well below the rate of equilibrium. This is a worry as when fertility falls below the replacement rate, problems begin to emerge. One is that the core working-age population begins to decline at a time when more people are moving into old age; another is that a trend of very low fertility can become entrenched. Some countries in the region have tried to boost their populations by attracting workers from overseas. In 2000, foreigners constituted 29% of Singapore's total labour force – the highest proportion of foreign workers in Asia.[2] But increasing the working-age population in this way is a gamble, as overseas workers may be more willing to uproot and move on if circumstances change.

Improving access

Health reforms are under way across the region, with countries at various stages of development. Kerry Clifford, AECOM's vice-president architecture (healthcare) south and southeast Asia, comments: "In Indonesia, where healthcare spending is the lowest in southeast Asia, reforms are happening now to address the limited availability and access to healthcare. Thailand is also addressing public health by way of reform."

Indeed, Thailand's reforms are already paying dividends, according to research from the US-based Massachusetts Institute of Technology, which credits the country's programme of public-health funding for an increase in access to adequate healthcare for poor and rural communities, significantly reducing infant mortality, and removing disparities between rich and poor provinces.[3]

Praise for their efficiency has also been lavished on Hong Kong, which, according to Bloomberg, spends just 3.8% of GDP on healthcare per capita, and on Japan, notably for its provision of low-cost care for the elderly; it is even running trials to see if robots can be programmed to look after the aged. Coinciding with the 50th anniversary of Japan's universal health insurance scheme, an article published in *The Lancet* in 2011 stated that healthcare expenditure ▶

National Heart Centre, Singapore

Singapore's National Heart Centre promises to become a new centre of excellence for patients. Building on traditional hospital design, the 12-storey structure's patient-focused environment allows light to penetrate, while open spaces with green courtyards, sky gardens and landscape views help create a calm, healing-conducive environment.

This sense of openness carries through to the external finish, with the façade stripped back to reveal the gardens and courtyards and connect people better to the wider environment. The design team organised the complex and diverse range of clinical functions in a way that satisfies vital clinical needs, while minimising travel distances and creating efficient circulation routes.

The project forms part of Singapore's general-hospital redevelopment masterplan – the largest of its kind in the country – with the Broadway Malyan-designed 17-hectare healthcare city recently launched. When complete, in 2030, it will serve 30,000 people daily, double the current number who visit Tan Tock Seng Hospital.

Architects: Broadway Malyan
Local design consultants: Ong & Ong
Client: Ministry of Health
Cost: S$370m
Size: 37,000sqm
Completed: 2014

represented merely 8.3% of the nation's GDP. For other commentators, however, cost remains a deep concern. In a recent article, Koichi Kawabuchi, of Tokyo Medical and Dental University, pointed out: "According to the basic data regarding health insurance (December 2012), per-capita healthcare costs for the old-old (people aged 75 years or older) were 4.6 times that of the rest in 2010."[4]

Malaysia's healthcare costs are escalating, too. Dr Abd Rahim Mohamad, former director of Malaysia's Ministry of Health argues that current spending at 3-4% of GDP is insufficient to sustain high-quality care, and sees the 11th Malaysia Plan (2016-2020) as a potential watershed moment in how healthcare is paid for in the country.

"I believe that the way forward for Malaysia is to adopt the concept of sharing by the population for the population," he says. "Many countries already practice this concept of healthcare financing, where those in higher income brackets contribute to the social health insurance by paying premiums that would be shared by all, including those who are not capable of contributing. Social health insurance would be a guarantee to tackle catastrophic illnesses, like cancer, where the treatment cost would not be affordable by common people."

Many countries in the region are trying to follow in Singapore's footsteps – a country whose recent economic experience has attracted many an admiring glance.

Says Broadway Malyan's Devendra Bagga: "Singapore has built one of the best healthcare systems in the world, with outcomes that beat the highly-developed countries in most categories," he says. "Plus, the system

Singapore has built one of the best healthcare systems in the world, with outcomes that beat the highly-developed countries

is relatively low in cost compared with other nations, with an annual healthcare expense, including public and private expenditure, totalling 4.6% of GDP."

But he concedes that significant health challenges lie ahead – "mainly the rise of infectious diseases and non-communicable diseases within an ageing population, which will lead to increases in the number of people suffering from chronic, expensive-to-treat diseases and disabilities, further stretching healthcare systems".

Integrated care

In Malaysia, healthcare infrastructure for elderly patients is already deeply embedded in the system. "With primary healthcare supported by rural clinics, hospitals in all districts, and one major hospital in every state, Malaysia has got all the facilities it needs for the elderly population." Says Dr Mohamad: "In fact, in most rural areas there are clinics solely reserved for those in their golden years to seek treatment, called Klinik Warga Emas. The socio-cultural set-up in the country also still regards elders as the family's responsibility to take care of their well-being. So the number of patients in old folks' homes is not as high as in other countries."

Singapore is addressing elderly care through an integrated model, co-locating acute-care facilities with step-down community hospitals to make the journey seamless for patients. Says Clifford: "The Sengkang Integrated Hospital is a great example of this new approach, with a 'hub and spoke' campus plan that also caters, more efficiently, to the community around the facility for greater availability and access to healthcare services. The implementation of more hospice-care beds and long-term care facilities will make up a large portion of the increased bed capacities by 2030 in

Sengkang General and Community Hospitals, Singapore

The Sengkang General and Community Hospitals form a vital part of the masterplan in providing quality care for Singapore's northeast region. Slated for completion in 2018 and comprising a 1,000-bed general hospital and a 400-bed community hospital, this integrated hospital development will deliver holistic, multi-disciplinary and patient-centric care, as well as covering all major healthcare fields.

The facilities have been designed to provide patients with a more co-ordinated and comprehensive experience. Patients will be managed by a primary-care provider and supported by a multi-disciplinary team of physicians for better outcomes and transition of care when needed.

Sengkang General Hospital is designed in anticipation of an increased aged population, which is expected to double in the next 25 years. By combining acute care and transitional care (sub-acute and rehabilitation) on the same campus, it will be able to flex its service make-up and occupancy to meet demographic change.

Commissioning authority: SingHealth (Singapore Health Services)
Architect: DP Architects
Services: Hospital planning; medical logistics; medical equipment planning; interior design (clinical areas); and quantity surveying (by Davis Langdon KPK), all by AECOM
Size: Undisclosed
Cost: Undisclosed
Completed: 2018

the national government's healthcare plan, with the expectation that the population of care for the aged will increase by approximately 1 million between 2025 and 2030."

According to Clifford, delivering different types of care on the same site creates more opportunities to integrate the landscape and areas of respite and interaction within the healthcare setting. It is also efficient both as a 'step-down' approach from acute to community care, and 'step-up', speeding up admittance to emergency care and avoiding the bottlenecks so often seen in Western countries. Indeed, she believes the model is one that could be transferred to other countries. "The facilities have been planned to be engaging and intuitive for patients and families to access the outpatient clinics, regional hospital and community hospital, while giving each visitor a sense of dignity and individualised care," she explains.

Such innovation is becoming increasingly achievable owing to the emphasis on masterplanning, as Bagga explains: "In Singapore, the key focus is on providing great strength in masterplanning, healthcare and sustainability, to create visionary healthcare communities with an emphasis on: diverse mix of uses; active ground level frontages; flexible open spaces; reducing impact of vehicular traffic; minimising users' conflicts; and pedestrian-oriented design."

Sustainability, passive building design and operational efficiencies also feature prominently in the discourse around healthcare architecture in the country. Says Bagga: "Current healthcare developments in Singapore are moving towards adapting a sustainable design approach. To be successful, sustainability principles need to be adopted at the earliest stages of the design, and must be integral throughout the design process. The effect of building layout and design on energy efficiency must be considered from the first stages of the design process."

A sign of this growing awareness taking shape can be seen through AECOM's current work in drawing up mechanical, engineering and plumbing guidelines for Singapore's Ministry of Health Holdings. In terms of energy performance and operational efficiency, these guidelines, says Clifford, promise to "develop the design basis and act as a benchmark, performance-wise, for the infrastructure systems of hospitals".

Tseun Wan Adventist Hospital, Hong Kong

Asked to create the interiors for the Tseun Wan Adventist Hospital extension for 430 extra beds, dwp devised a set of interior-environment principles based on nature and nurture, and applied these to all spaces throughout the building. Using natural materials, coupled with visually comforting warm colour tones, dwp generated nurturing and welcoming interiors. Also essential was longevity of the design, which was achieved through a natural and neutral ambience to appear clean and fresh, as well as combining material resilience and quality.

The main lobby has multiple connecting travel axes, punctuated with visually strong rows of timber beams across its length, while clean bulkheads float underneath. A palette of off-white stones, warm timbers and neutral carpets, highlighted with champagne metal edges and soft shades, is expressed throughout. The patient-ward floor waiting areas and corridors also continue the neutral base before leading into a richer variety of themed patient rooms, using soft and natural green, blue and orange tones.

Architects: P&T Architects and Engineers
Interior design: dwp
Client: Seventh-Day Adventist Corporation (HK)
Size: 46,353sqm
Cost: HKD 3,256,000
Completed: 2015

Reforms to refurbishment

Meanwhile, in Australia, the recent spree in upgrading the country's healthcare estate is waning. Says Gunther De Graeve, managing director at the Destravis Group: "We had a boom in healthcare design, as a result of population growth and an ageing population. In Queensland, for example, the economy was growing at a rate of 8%. We're now at the back end of that curve, with lots of big projects nearing the end of completion, but with a few still around."

Sustainability principles need to be adopted at the earliest stages of the design

Nexus Health GP Super Clinic, Wallan, Victoria

While he senses there are "conversations in corridors" about doing more in the areas of health promotion and healthy lifestyles, he contends that these notions are largely aspirational. Politically, both nationally and at state level, the country has shifted right, and the next stage, he says, will be focused on "re-engineering the value of health services, which might mean we need to tweak some facilities".

Geoff Hardy, director – Australia and New Zealand, AECOM, agrees, pointing to reforms that will help drive this process: "The reason for this refurbishment phase is due to changes to healthcare funding to be introduced from July this year. An activity-based funding model will replace the current block-funding model as part of the National Healthcare Reform Agenda. Funding will transition to a per-patient basis with reimbursement around a national cost average, underlining the need for increased efficiencies and productivity from existing facilities."

The federal government hopes that activity-based funding will not only provide motivation for hospitals to treat patients more efficiently but also deliver incentives to ensure patients are treated in the most appropriate setting. But there are concerns, too, that the federal government has introduced a major disincentive to the system, by announcing a break from state-funded healthcare.

Werribee Mercy Sub-Acute and Community Rehabilitation Centre, Melbourne, Australia

The sub-acute building for the Werribee Mercy Hospital creates a new community presence and image, signalling the transition from single-storey community hospital to a facility that will more than double in size over the next two decades to service this area of western Melbourne.

Comprising a community rehabilitation centre on the ground floor and sub-acute rehabilitation ward with geriatric evaluation management unit above, the building's plan focuses on a large internal, amenable courtyard. The zinc-clad building forms a freeform 'donut'-like shape with two entrances addressing the landscaped courtyard, affording a sheltered arrival and drop-off under the continuous first-floor canopy for the main hospital and a separate entry for the rehabilitation centre. Passive observation is enabled across the courtyard, which embeds nature in the heart of the facility and provides external strolling and therapy space for waiting areas.

With vertical expansion planned, the building will ultimately connect to a new ambulatory-care building to the east.

Architects: Billard Leece Partnership
Client: Department of Health/Mercy Health
Size: 4,300sqm
Cost: $23m
Completed: 2014

Creating healthy places

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Gold Coast University Hospital, Brisbane

Australia's Gold Coast University Hospital (GCUH) was delivered by the GCUH Architecture consortium, comprising Silver Thomas Hanley, PDT and HASSELL. The nine-storey, 750-bed teaching facility comprises seven main buildings on the Griffith University campus at Southport, within extensive landscaped grounds.

The vision for the GCUH involved: replacement of the ageing, undersized existing hospital; provision of world-class patient care; improved access; and the creation of a healthcare environment integrated with research and training of health professionals. The scale of the facility is based on an optimum walking distance for reduced-mobility patients. This consideration resulted in a design that provided signage and rest stops along major corridor routes at 60m intervals.

The main hospital building is characterised by different building elements reflecting the specific functions within each area: clinical – large floor plate, multi-level box; administration and reception – front landmark entry element, with large internal void for wayfinding; and inpatient units – detached semi-circular ward towers, for nursing efficiency and pleasant views for patients.

Helping promote privacy and infection reduction, 75% of patient rooms are single bedrooms.

A co-payment of $7 will be introduced for visiting a GP or accessing out-of-hospital pathology and diagnostic imaging services, consigning previously free bulk-billed services to the past.

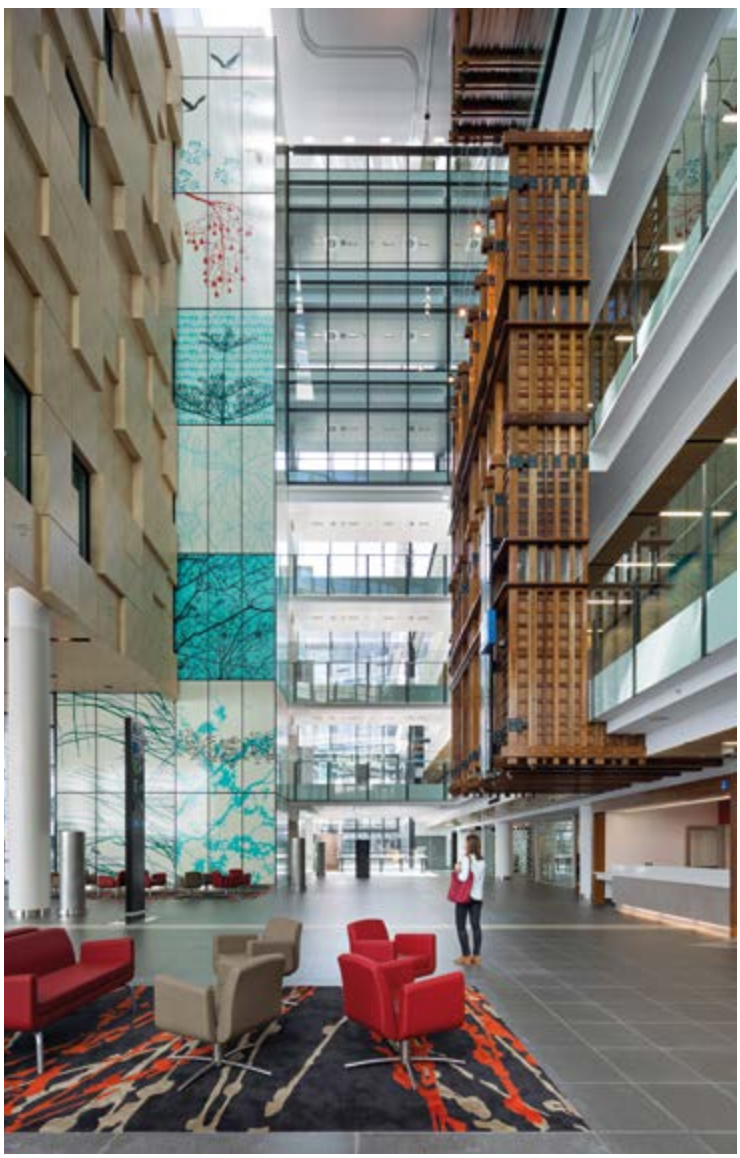
Ron Billard, director of Billard Leece Partnership (BLP), believes the measure sends out the wrong message on preventive health and could deter people from visiting their GP. Both he and the company's health director Mark Mitchell feel it could hurt the polyclinics that have sprung up around the country, because their main target audience – the bulk-buying patients – could be discouraged from seeking treatments.

Community focus

These polyclinics, says De Graeve, are an important element of the wider ideal of bringing high-quality healthcare to local communities. For example, BLP's Nexus Health GP Super Clinic is a primary-healthcare facility for the Wallan township, outside the northern fringes of Melbourne. Reflecting community-oriented values and providing an integrated care experience focused on illness prevention, the clinic is serviced by GPs, allied health professionals, visiting medical specialists, and ancillary health services.

In some ways, this type of facility reflects the continuation of the trend to design in flexibility to achieve inter-departmental collaboration and break down silos – something De Graeve describes as "the biggest change in the last ten years", though he feels that managing the cultural change for healthcare practitioners has some way to go.

Some hospitals have met resistance from staff, but Mitchell believes those that have gone down the barrier-breaking route are benefiting: "A lot of hospitals are taking the opportunity to address their cultures. So, for example, a design that means no one has an office can be a positive experience for new people coming in." He and Billard believe there is also more scope for flexibility in project



Architects: GCUH Architecture
Client: Department of Health (formerly Queensland Health)
Size: 175,000sqm
Cost: AU$1.76bn
Completed: 2013

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delivery, emphasising the growing importance of prefabricated construction in delivering facilities faster, while, at the same time, improving the quality of finish. The trick will be in ensuring that such methods deliver both the standardisation required to bring operational efficiencies while also the generic flexibility needed for a workplace that must respond seamlessly to patients' changing needs.

Linking up

Making the healthcare world smaller is also important for Australia, so it can bridge the gap between service delivery both structurally and geographically – reflected in the emergence of sub-acute facilities.

"Typically these might have 30-32 beds, each with a rehabilitation facility for inpatients and outpatients, along with therapy gardens," says Mitchell. "The sub-acute facilities used to be largely like houses – they didn't have high aspirations. But they're getting larger and they're keeping the quality of space as they're getting bigger."

There is growing interest, too, in video-conferencing so that rural residents can have weekly consultations with specialists via technology. Billard highlights the example of Mackay Hospital, which he describes as being keen on having such connections for its digital imaging services. "Every meeting room is also becoming a training room remotely," he says.

"Patient experience and outcomes can be enhanced with improved access to information and more efficient healthcare provision," adds Jack Kerlin, technical director at AECOM. "Many of these communities are remote and often disadvantaged. The ongoing roll-out of the country's national broadband network will enhance service levels and access to interactive consultations, which will help bridge the gap between urban and regional healthcare provision. To fully maximise the potential of ICT, smaller rural facilities will need to adopt the technology tools required to utilise the power of ICT, which will require significant levels of investment."

This service delivery model is pushing its way to the forefront of design in new rural-based facilities, which are of such a high standard in terms of their finish that they are starting to become a recruitment draw. Additionally, De Graeve detects a fusion between evidence-based design and evidence-based medicine. "We're taking in these principles as designers," he remarks. "It's starting to get a dialogue going between us and the clinicians and building a better interaction."

The ongoing roll-out of Australia's national broadband network will enhance service levels and access to interactive consultations

Werribee Mercy Sub-Acute and Community Rehabilitation Centre, Melbourne

DESIGN FOR HEALTH AND WELL-BEING

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Dedicated to the pursuit of academic medicine, Academia co-locates service laboratories with research and educational facilities within a single building. Developed by the Ministry of Health and SingHealth, Academia is located within Singapore's largest single complex for tertiary healthcare, Singapore General Hospital.

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Architects: CPG Consultants
Client: Ministry of Health
Size: 75,000sqm
Cost: S$300m
Completed: 2013

The steadfast elephant

But where there is a serious lack of joined-up thinking is on the issue of aged care, which, says De Graeve, remains "the elephant in the room". He laments: "We're not looking at the problem holistically. We've older people living in big houses and they're not downsizing. Assisted living is something we don't see much of in the country. Australians are not yet reacting to it, but we need to build these types of homes in existing communities."

Billard counters somewhat, saying: "We're certainly keeping a lot more people at home, compared with the situation 20 years ago. The average patient stay in a nursing home has definitely declined." But he concurs that not enough is being done to address aged care. "There hasn't been any major expansion in nursing homes," he says. "The market is not a lucrative one: the state governments are getting out of nursing homes; the federal government isn't interested. It's being left to the not-for-profit sector, so in the future there will be a big problem for nursing homes and a gap will need to be filled."

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Design & Health Scientific Review
The value of struggle

Dr John Zeisel is chair of the international advisory board of the International Academy for Design & Health and president of Hearthstone Alzheimer Care

What a struggle it is to carry out research on the impact of design on health! Is it really worth it? Maybe we should just leave well enough alone? Leave each of us to our simple professional silos – design to designers and research to researchers? What are some of the challenges we face and how do this month's articles exemplify them? We have to define the health or illness condition we want design to ameliorate. Do we define the challenging behaviours associated with dementia or do we describe the emotional strengths and abilities to focus – the salutogenic features music engages and inspires? Do we present the social impacts of design reflecting our own values like the "sprawl machines" with their "oft-dystopic manifestations" or do we leave the definition of design quality, such as access to daylight, to computer analysis? We have to define the outcomes we expect from salutogenic – health oriented – design. Is it community health which well-planned malls might influence, speedier recovery which increased daylight in hospital rooms is intended to achieve, or is it decreases in the 4 "A"s of agitation, anxiety, aggressive behaviour, and apathy (the latter measured as increases in alert/active behaviours)? We have to define appropriate research methodologies for each design-research effort, including what is an acceptable level of rigour. Are observations and open-ended interviews enough? What about historical analysis or computer generated alternatives as research methodologies? Or do we need control groups and data that can be quantified within acceptable significance limits? We have to define whether we are searching to optimise design outcomes – daylight in hospital bedrooms – or if we are looking for practical applications of such items as technology-based music programs that are only as good as the commitment staff have to implement them? Is what economist Herbert Simon refers to in his 1996 book *The Sciences of the Artificial* as the search for "satisficing" enough, or does the elusive "optimised" solution always have to be the goal? At a recent conference on Creativity and Aging, the first annual Leadership conference organised by the National Association of Creative Aging in Washington DC, a fellow professional asked me how I approached the methodological dilemmas presented when faced with research that didn't fit the mold of large scale double blind random controlled trials. I told her that all research was an approximation; that in the end even large scale studies only approximate what some people call "reality"; and that all we can do is do our best and trust that our approximation of impacts is as good as the next person's or hopefully better if we carry out our research carefully. It's not a piece of cake; it's not a walk in the park. But in the end the journey we are all on to figure out how the designed environment can promote health in individuals, communities, and societies is definitely worth it.

Design for dementia patients:
Assessing the impact of regular music sessions for people with dementia in mental health facilities

This study aims to examine the use of music in mental health wards for older people who present with the highest levels of need, including challenging behaviour

Alison Culverwell BSc, CPsychol, AFBPsP and Emily Pettifor

The potential that music has to enhance the wellbeing of those with physical and mental health problems is becoming increasingly apparent. Its use is recommended in policy documents, particularly for people with dementia whose behaviour becomes disturbed and challenging to others.[1]

Life expectancy continues to increase worldwide, with the older population (over 65 years) in the UK comprising 17% of the total population in 2012.[2] Enabling older people to lead healthy, active lives is a national priority.[3] One approach to promote health within the general population is through the use of arts such as music, dance and drama. These are also considered to be essential to health and healthcare environments.[4]

The older population is especially vulnerable to social isolation and a combination of mental and physical health problems. Arts programmes – in particular, singing – have been shown to generate benefits in terms of mood, wellbeing and social engagement.[5,6]

The rise in the number of people with dementia, linked to increased longevity, is of increasing concern to policymakers and health and social-care providers. These progressive conditions affect about one in 14 people over the age of 65, with more than 800,000 people in the UK estimated to have a form of dementia in 2012.[7] Dementia involves impairment in cognitive abilities including memory, attention, reasoning, communication and perception. Additional emotional and functional difficulties may develop, linked to difficulties in emotional regulation and in relation to the quality of the social and interpersonal environment. If physical, psychological and social needs remain unmet this may result in significant levels of distress and disturbed behaviour, especially if the individual is unable to communicate their distress verbally. Some individuals may become anxious, agitated, restless and even aggressive towards others.[8]

Equally, older people with persistent mental health conditions, such as schizophrenia and bi-polar disorder, may also experience varying degrees of cognitive impairment,[9] in addition to the psychiatric symptoms, and may endure difficulties living independently. Some people require a supported living environment (care home or nursing home) and a very small proportion require the additional resources of a mental-health inpatient facility. These are individuals who have a complex mix of co-morbid conditions, pose significant risks to themselves or others, and have unstable presentations. They often exhibit behaviour that challenges others and cannot safely be cared for in care homes. Those who meet the specific criteria for such state-funded 'continuing care' in England are the focus of this study.

The culture of care in these specialist health environments is guided by the principles of person-centred care[10] alongside good medical and nursing care. Efforts are made to personalise the care and create as homely an environment as possible within the constraints of a hospital environment. It is expected that the use of pharmacological treatments for behavioural disturbance is kept to a minimum, and that psycho-social approaches, including music, dancing and multi-sensory stimulation, are the primary interventions.[1,11]

The evidence base relating to engagement with music and music therapy for mental health problems is increasing. Health benefits have been demonstrated for several client groups: improved mental state and social functioning for people with schizophrenia,[12] symptom reduction for people with depression and anxiety,[13] and improved mood, attention and interaction for people living with dementia.[14,15] There has been some evidence that music and singing can help improve people's relationships, to encourage bonding and building of connections between care-givers and people with dementia.[16,17] An

Music sessions were delivered in the lounge areas, providing space for movement and dancing

increase in mutual engagement was found to last beyond the music session.[18]

In practice, however, it has proved difficult for ward staff to incorporate music into the ward routine, beyond putting on background music. Staff haven't felt confident or adequately skilled to facilitate singing or music sessions alone. It has typically required music therapists or musicians to actively engage people with dementia or enduring mental health problems in participatory music sessions. But reliance on specialist staff has a number of disadvantages. These include costs to employ staff with specialist skills, lack of mobility of musical equipment, and lack of flexibility in scheduling sessions. The potential for spontaneous musical sessions is limited and 'outsiders' will not know the patients as well as the regular ward staff.

Consequently, when the opportunity to trial the use of a piece of electronic equipment, the Silver Song Music Box, on continuing-care wards became available, it was taken up. It should be noted that these wards had a weekly music therapy group often incorporating singing, so there was already an appreciation among staff of the approach and the benefits for patients.

This study aimed to evaluate the introduction of participatory music sessions using the Silver Song Music Box. The feasibility, acceptability and impact of the equipment would be assessed and the perspectives of patients, staff and visiting relatives would be included. In addition, changes in reported incidents, including challenging behaviour, would be compared between the baseline and trial period.

Sessions encouraged bonding between participants

Method

Materials

The Silver Song Music Box is designed by Sing for Your Life, a UK charity. It is a simple-to-operate, portable electronic musical device. It links to a television and plays a series of pre-uploaded songs, with corresponding lyrics displayed on the screen. The songs are sorted into categories, such as musicals or hymns, and the speed and pitch can be altered to suit participants. Extra songs to suit participants' needs and preferences can also be uploaded via USB sticks for individualisation. Use of the device doesn't assume musical knowledge, although individuals must have skills to facilitate a group sensitively.

The Silver Song Music Box has been used in care homes and hospitals in Europe and Canada, but not in mental-health continuing-care wards for older people with such complex needs.

Participants

All patients on two NHS older-adult continuing-care wards (A and B) had the opportunity to participate in the music sessions. Each ward comprised 20 patients, aged from 64 to 100, with an average age of 81. All patients on ward A and the majority of those on ward B had a diagnosis of dementia, with the remainder on ward B having diagnoses of schizophrenia, personality disorder or bi-polar disorder. Patients in ward A were all male and also more physically capable than those in ward B, who were noticeably more frail and comprised equal numbers of men and women.

The staff who facilitated the groups were healthcare assistants and therapy assistants.

Procedure

The use of the Silver Song Music Box was demonstrated by the Sing for Your Life programme director. Staff were then given three weeks to try out the equipment before the trial officially started. They were encouraged to provide music sessions using the Silver Song Music Box whenever they could, ideally most days, especially in the periods when most incidents typically occurred. The music therapist supported staff during this period of familiarisation.

Throughout the three-month trial period staff provided the music sessions in the lounge areas, allowing adequate space for movement and dancing. Ward A encouraged patients to sit in a circle whereas ward B tended to space out or allow patients to remain where they were already sitting. Any patient, member of staff, or visiting relative was invited to join in for as long as they liked. The songs chosen were requests from patients or relatives, or suggested by staff. Record sheets were completed by staff after each session, allowing information about participants, the session and peoples' reactions to be collated.

A psychology student observed a number of the music sessions and undertook semi-structured interviews and distributed feedback questionnaires at the end of the trial period. This provided observational data and qualitative information about the experience of those involved, as well as views on the impact of the sessions.

Routinely collected incident data were analysed for all those patients who were present during the entire six-month research period.

	Ward A*	Ward B+
Number of music sessions	25	10
Number of patients who attended	19	13
Mean length of session	98 minutes (excluding parties)	43 minutes
Number of staff facilitators	5 (3 staff facilitated 94% of sessions)	9
* all men, all with a diagnosis of a dementia, most physically active		
+ men and women, most with a diagnosis of dementia, some physically frail		

Table 1: Details of the Silver Song Music Box sessions

Results

1. Feasibility

Some 35 record sheets were completed, which indicates that at least this number of sessions occurred across both wards. Detail about the sessions is provided in table 1.

Ward A held sessions approximately twice weekly, spread evenly across the trial period. Ward B held four sessions in one week but only held sessions in five of the 13 trial weeks. Sessions lasted, on average, 98 minutes on ward A (M = 90.33, SD = 43.17), while on ward B, the average was 43 minutes (M = 43.33, SD = 13.23).

On average, nine patients were involved in each session (M = 8.97, SD = 5.80). Individual patients attended between one and 22 sessions, with a mean attendance of seven sessions (M = 7.21, SD = 6.11). Patients did not necessarily remain for the whole session, coming and going freely. Relatives participated in at least 12 sessions, and, typically, two staff members were involved, sometimes supported by a volunteer.

Half the sessions occurred between 10am and 12 noon on ward A; times varied on ward B. In addition, it was noted that the Silver Song Music Box had been used at special ward events – for example, tea parties, Halloween and Christmas.

Staff commented that the Silver Song Music Box was easy to use and could be used in a very flexible way. Some were ambivalent initially, with concerns that it was "little more than a glorified karaoke machine", but they later changed their view. The simple visuals were thought to be helpful, as was the ability to add new songs linked to patients' preferences.

2. Impact on patients, staff and relatives

Twenty-seven staff members and nine relatives provided ratings, which were very positive in terms of the effect of the music sessions on the patients' quality of life, the staff's experience of working on the ward, and their ability to provide person-centred care. Visiting relatives rated these sessions highly in improving their relationship with their loved one, both in terms of the immediate interactions and in cementing longer-term bonds.

Item of information	Data value (mean)*
Effect on patients' quality of life	4.88
Effect on the staff's working life and the relatives' visits to the ward	4.88
Effect on relationship with the patient (relatives only)	4.67
Effects on provision of care (staff only)	4.82
Overall experience of the music sessions	4.88
*Scale range 1 - 5	
1 = very negative/bad effect	
3 = no effect/neutral	
5 = very positive effect/very good	

Table 2: Effects of music sessions: ratings by staff and relatives

The qualitative comments from all the questionnaires, session record sheets, and semi-structured interviews were subject to inductive thematic analysis in accordance with specific guidelines.[19] Following this, comments were examined and sorted into categories corresponding to significant themes. These were then reviewed by both an outside coder and stakeholder to check for consistent categorisation, refining as appropriate.[20]

The following emerged as key themes, in order of frequency:

a. Social interaction

The greatest number of thematic comments related to the opportunity that music sessions provided for social interaction. Relatives and staff commented on how the "bringing together" of staff, patients and relatives was, in itself, a very "good" and "positive" thing, and how "it breaks down barriers between all involved". Sessions allowed for more inclusion, especially for those with very limited verbal abilities: "it makes a change… everyone joining in together" and "he can't read the words but he still sings" were some of the comments. Many of those who commented remarked on how the music stimulated patients to be more aware of each other and communicate better, eg "a squeeze of the hand", singing along when usually not able to speak, dancing together, and clapping with each other. One patient commented about another's singing, "he did a good job". One relative described how the music acted as "a conveyor of feelings", allowing deeper personal connections.

b. Mood

Extensive comments were provided about how the music sessions improved the mood of all people involved – patients, staff and relatives.

For patients, these mood effects fell into two broad categories: calming those who were agitated or anxious; or uplifting mood. Observations of sessions corroborated these reports. Comments such as "he always appears to be enjoying himself in the music", "laughing", "smiling", "mood enhanced", "cheerful mood", or "settled" and "calming" were common. A few reports highlighted emotional discomfort or changeable moods throughout the session, but it was not possible to identify whether these were in direct response to

	Measure	Baseline	Trial	% Change
Ward A	Total number of incidents	437	232	-47%
	'Challenging patient behaviour' incidents	267	120	-55%
	Staff injury incidents	85	33	-61%
Ward B	Total number of incidents	110	142	+29%
	'Challenging patient behaviour' incidents	43	46	+7%
	Staff injury incidents	23	29	+26%

Table 3: Changes in reported incident rates

the music or how the patient was feeling more generally at that time.

Ten staff members provided spontaneous comments on how the sessions uplifted their own mood, allowing them to relax and have fun. Many commented on the satisfaction of seeing their patients happier and that this had a knock-on effect – for example, "if you see them happy, then it's sort of infectious", and "it raises the feel-good factor for all involved".

Seven comments about how the sessions enhanced relatives' mood were also made. These reflected relatives seeing their loved one happier, being able to communicate and make emotional contact with them, or because it relieved the boredom experienced when they visited but were unable to communicate.

c. Patients' behaviour

Changes in patients' behaviour during and subsequent to the music sessions fell into three categories: more alert/active; less agitation/anxiety; and less disturbed/aggressive behaviour.

Patients were reported as being "much more animated" and physically active during the sessions – for example, conducting, dancing, tapping, waving, vocalising, singing, watching others, being less drowsy. "One patient, in particular, who is very withdrawn, becomes much more animated" was another comment.

Other specific comments included "lower aggression", "less challenging manner", "less verbal and physical abuse", and "he's the one who wanders in and out; he's a lot more talkative and the aggression levels have really fallen". Of particular note was a comment made about two patients who typically clashed on the ward, resulting in numerous incidents of physical and verbal abuse: "We've noticed that they've both come to the music group and they've got on… they don't clash in the group."

For other patients the music sessions brought a reduction in anxiety: "The biggest problem is that he was quite anxious. He kept getting up and he was scared and nervous. Yet, in the music sessions he's calm."

d. Improvement in care

Staff reported that the music sessions had enabled them to gain more knowledge of their patients and to see the potential of patients. This included biographical information, preferences and their abilities – i.e. information that could enhance person-centred care. This led to changes in care plans and practices – eg one staff member noted that the patient would exercise by dancing but would not participate in an exercise group. Another commented that it had "changed the way we care".

e. Memory stimulation

This category includes more than 30 references to how the sessions brought back or stimulated personal memories for patients and relatives. Some patients surprised staff and relatives by remembering songs in their entirety, and even for those unable to sing, staff noted, "he recognises the sounds", and "there's a lot of recognition". Some patients even continued to sing for the rest of the day. The sessions also stimulated some other music-related memories, eg one patient mentioned, "I used to play something with keys."

For relatives these sessions could be very moving, too, sparking recollections such as "all the songs I associate with times gone by, when we were married," and "we used to have parties into the early hours and we finished by doing the hokey kokey," referencing an earlier group dance.

f. Ward atmosphere

Staff and relatives commented on how the sessions brought a "general excitement" and "a lovely warm and friendly feeling". Changes in the ward environment beyond the music sessions were often mentioned, citing it as being more relaxed, calm and having a more positive feel.

3. Impact on reported incidents

Table 3 provides a breakdown of the reported incidents for only those patients who were resident on the wards for the full six months of the trial period. This comprised 15 on ward A and 16 on ward B. Total incidents include falls and suspected falls, accidents/collisions and security issues, in addition to aggressive or challenging behaviour towards staff or other residents.

A marked reduction in all kinds of incidents was found on ward A, with the 55% reduction in the number of challenging behaviour towards other patients registering a statistically significant drop, $t = 4.39$, $p<0.001$ (one tailed).

Further analysis revealed that the five patients who accounted for the highest number of challenging behaviour incidents at baseline on ward A showed very noticeable reductions (see table 4).

The overall number of incidents on ward B was a quarter that of ward A. The number

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of incidents of challenging behaviour remained steady while incidents towards staff increased, as did the total. Overall levels, however, were still significantly lower than on ward A. At an individual level there were no dramatic changes in incidents in either direction.

Patient	Baseline	Trial	% Change
1	41	5	-88%
2	32	2	-94%
3	28	11	-61%
4	21	9	-57%
5	21	9	-57%
Total	143	36	-75%

Table 4: Changes in incidents for the five patients presenting most challenging behaviour incidents on ward A

Discussion

The summary conclusion of this pilot study is that, with the aid of the Silver Song Music Box, it is feasible for ward staff to incorporate music sessions into the ward schedule, and that these sessions can potentially bring multiple benefits for patients, staff and relatives.

Overwhelmingly positive responses were received from both wards concerning the benefits the music sessions had brought to the wards. All parties valued the sessions highly, noting the positive impact for patients in terms of social interaction, mood, levels of alertness, and in stimulating memories. Staff felt their delivery of person-centred care was enriched by what they learned about their patients in the music sessions, and a change in the overall ward environment was noted. This related to a calmer and more positive atmosphere.

There were reports of the ease with which the Silver Song Music Box could be used and its applicability to a very broad range of patients. The sessions were very socially inclusive and of particular value in engaging patients who had high levels of physical and cognitive impairment. Such individuals could participate meaningfully in many ways – even those who had very limited or no verbal language. There were very few observations that could be construed as patients having "adverse reactions", eg becoming upset or agitated in the session. The sessions were in open spaces with individuals free to come and go as they pleased. This enabled patients who were physically mobile to engage and disengage as they wished. Indeed, care does need to be taken to ensure that those who are not mobile are given the option to leave and move to a place where they can't overhear the sessions.

It was noticable that one ward (ward A) embedded the sessions within the ward schedule more regularly than the other ward. On ward A, a small core staff team become responsible for delivering the sessions and they developed a structure and degree of confidence. They also identified a regular time of the day for when the sessions should run, and they stuck to this typically, if not rigidly. These factors may have led to the greater delivery of music sessions. Equally, it may be that these sessions had greater clinical applicability to this more active patient group of men with dementia and associated behavioural, physical and emotional problems.

The noteworthy finding that there was a significant reduction in the number of incidents of challenging behaviour on ward A, where music sessions were delivered reguarly and for a substantial period of time (about 90 minutes), was striking. While this change cannot be directly attributed to the music sessions, there were no other obvious changes to the ward regime, prescribing patterns, or any major differences in individual patients' care plans during this period.

Hence, it would seem reasonable to propose that the music sessions may have played a part. This finding is consistent with previous studies.[21,22] It is also theoretically consistent in that increased opportunities for our psychological needs to be met is linked to the reduction for unmet needs to be communicated behaviourally, often in ways that others find challenging.[10]

Providing interactions that are inclusive, fun, caring and responsive, celebrate peoples' abilities, and provide opportunities for self expression and occupation are all components of an enriched social environment.[23] In such environments the likelihood of emotional distress and disturbing behaviour are reduced.[24]

How do we account for the absence of this reduction of incidents on ward B – and, indeed, an increase? This may be due to a number of factors. The baseline level of incidents was only a quarter of that on ward A so there was less potential for a reduction. There were differences, too, in the patients, who were less physically active or mobile and did not all have a dementia. We do not know anything about the rates of deterioration patients have experienced, or staff changes. The music sessions

Lyrics are displayed on a screen, allowing participants to sing along

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occurred less frequently, were shorter, were reported to be less structured, and patients were not necessarily facing each other. It may also be the case that music has no effect on disturbed behaviour and the positive changes on ward A were due to some other factor.

The above observations illustrate that this pilot study was unable to control many potentially important variables. So, given these methodological limitations, caution needs to be exercised in interpreting the findings. In terms of the impact of music sessions on behavioural disturbance, they are, at best, seen as "of interest" and "encouraging" at this stage. The other positive benefits, however, were more robust and support the value of changing ward practice to incorporate opportunities for engaging in music – in particular, singing – within the standard ward schedule.

A robust research study does seem warranted to address the potential that regular music sessions may have on disturbed behaviour. This would complement the growing move away from reliance on pharmacological treatments for people with dementia who are distressed or whose behaviour is disturbed, commonly referred to as BPSD (behavioural and psychological symptoms in dementia). Indeed, it would be a very positive approach to risk reduction for staff and patients.

The value of these sessions for relatives should also not be overlooked. Too often they had found visiting relatives in these care environments a distressing or unrewarding experience. Faced with difficulties in communicating with their loved ones, and limited points of contact with staff, their visits often decrease, with resultant losses for all parties.

The feedback from relatives in this study was overwhelmingly positive with evidence that they found participating in the music sessions life-enhancing and felt more engaged with staff. They also found them an enjoyable way to spend time with their loved one, often providing a glimmer of previous times and moments of emotional connection. The comment that barriers between people were broken down in the sessions is particularly important; fostering more equal relationships is central to delivering good person-centred care.

Similarly, the benefits for ward staff in enhancing their work experience and enriching the care they could provide should not be underestimated. These are practically and emotionally challenging environments in which to work and recruitment of suitable staff can be difficult.[25] Staff working in these environments typically gain job satisfaction directly from performing their caring roles[26] and by seeing the positive benefits for their patients. It was clear from staff feedback that the music sessions contributed to these benefits and also directly lifted staff's mood.

A final note

It is not suggested that these music sessions could replace the contribution of trained music and art therapists who have a particular role in supporting and augmenting 'social music'. Indeed, it should be noted that the ward music therapist continued to provide group and individual music therapy sessions on these wards one day a week throughout the course of the pilot study. He also provided professional support and informal training for ward colleagues. It is unclear whether such promising results would have been achieved without his assistance. There was some initial wariness and anxiety from staff, so without the provision of support any pre-conceived ideas could impede the delivery of music sessions.

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Urban health:

Comparing Canadian and American shopping malls: Lessons for health-promoting sprawl mitigation

This comparative study of two shopping malls in North America examines the impact of sprawl on public health, with the aim of identifying a number of lessons for future healthy urban design

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Back in 2002, Smart Growth America released a widely cited report, *Measuring sprawl and its impact*.[1] In an update to that report, the same organisation has released *Measuring sprawl 2014*,[2] which features a ranking of the most sprawling US cities. In total, 221 metropolitan areas and 994 counties were examined, with each area and county assigned a numerical rank (higher being better) on a 'sprawl index' on four principal factors: density; mix of land uses; relative strength of 'activity centres' and downtown cores; and the configuration and interconnectedness of street networks.

This latter report made use of an expanded methodology to document development patterns in the intervening years. Once again, sprawl was found to correlate with a higher rate of obesity, traffic fatalities, ozone pollution, vehicle miles travelled, and the pervasiveness of physically inactive lifestyles. Sprawl was also linked to having fewer transportation options and higher combined costs of housing and transportation.[2] The World Health Organization (WHO), conscious of these trends, now advocates sustainable, health-promoting redevelopment and smart-growth strategies.[3] Residents of compact metro areas live longer, healthier lives, with lower BMI (Body Mass Index) levels, and experience fewer NCDs (non-communicable diseases), including lower rates of diabetes. An average American in a more compact county has a life expectancy three years longer than a counterpart in a less compact county.[4] These findings are based on correlations, not causative effects, and yet render a remarkably consistent narrative. Not only can communities limit the proliferation of unmitigated sprawl through specific public policy, the benefits of compactness are real and life-affirmative.

The most recent enclosed shopping mall built in the US opened in 2006; by 2025 it is predicted that half of all enclosed malls in the country will no longer be used in their current retail capacity.[5] This trend is playing out, to a certain extent, in Canada as well. The harmful effects of sprawl are becoming apparent in communities of all sizes, from Toronto, the nation's largest metropolitan area, to booming oil towns to the north, such as Fort McMurray. A national organisation, the Council for Canadian Urbanism, was recently formed to focus on the consequences of sprawl in relation to its numerous deleterious effects on human and environmental health.[6]

Societal consequences of the automobile continue to be felt in both countries but, as it turns out, for a number of reasons, it can be insightful to compare and contrast the phenomenon of sprawl between Canada and the United States. For one, Canadian urbanisation patterns tend to emulate European planning precedent, often, to a much greater extent. This has resulted in public policy over the past 40 years resulting in higher population densities,

Infrastructure
Public Health in the Everyday Milieu (A1)
Competing Discourses (A2)
Sprawl and the Medically Underserved (A3)
Food Deserts and Sprawl (A4)
Children, the Aged, and Sprawl (A5)
Reverse Infrastructural Decline (A6)
Landtrusting (A7)
Cyburbia (A8)
Smart Grids (A9)
Subterranean Utilities (A10)
TOADS and Sprawl (A11)
LULUs and Sprawl (A12)
Cell Tower Epidemic (A13)
Greenfielding (A14)
Redfielding (A15)
Water and Sprawl (A16)
Water Typologies (A17)
Transform Water Edges (A18)
Recycle Stormwater (A19)
Brownfields as Energy Farms (A20)
Sidewalks and Sprawl (A21)
Pedestrians (A22)
Street Furniture (A23)
Bike Culture (A24)
Social Media Parks (A25)
Light Rail/Intermodal Transit (A26)
Celebrate Public Health Achievements (A27)

Ecological Architecture
Modernism and Public Health (B1)
Ruins and Selective Entropy (B2)
Reprise and the Community Center (B3)
Nomadic Healthcare (B4)
Modular Infill Buildings (B5)
Civic Space at the Heart (B6)
Walkability (B7)
Architectural Legibility (B8)
Bridging (B9)
Multigenerationality (B10)
Echo Housing (B11)
Heliotropic Tectonics (B12)
Historic Preservation (B13)
Vertical Intervention (B14)
McMansion Epidemic (B15)
Ungate Communities (B16)
Fluid Facades (B17)
Light Manufacturing Interwoven (B18)
Electrocharging Stations (B19)
Indigenous Public Health Traditions (B20)

Mall Transfusion
Demise of the Megachain (C1)
Small Box/Big Box Dialectics (C2)
Deconstruction Strategies (C3)
Transparency (C4)
Deconstruct Parking (C5)
Terracing (C6)
Spacesharing (C7)
Edge Sites as Coral Reefs (C8)
Soft Surfaces (C9)
Fast Food Restaurants (C10)
Sitesharing (C11)
Landmarks and Anomalies (C12)
Vertical Gardens (C13)
Roofscaping (C14)

Suburban Agrarianism
Suburban Farmers' Markets (D1)
Microfarming (D2)
Agrarian Stoa (D3)
Infill Agrarianism (D4)
Suburban Composting (D5)
Cisterning (D6)
Horticultural Education (D7)

Implementation
Transfusion Zone Diagnostics (E1)
LEED and Sprawl Mitigation (E2)
Geomap Resourcing (E3)
Stakeholder Engagement (E4)
Gaming and Simulation (E5)
Foster Innovation (E6)
Incremental Transfusion (E7)

Figure 1: Design Considerations 1-75

Historic New Orleans Collection

Figure 2: Gentilly Shopping Centre, New Orleans, 1949

manifesting in the form of vertical versus strictly horizontal development, combined with a generally greater belief in public mass transit compared with the US. That said, the goal of the present discussion is twofold: first, to examine an American and a Canadian suburban shopping mall from the standpoint of each one's current existing (or non-existing) health-promoting physical attributes; and, second, to apply a baseline set of design considerations to each in order to identify if lessons can be gleaned from comparative analysis.

The research methodology was qualitative and immersive. Literature on the subject was reviewed with a subsequent content analysis, as well as field documentation of a total of six mall/district case studies (two of which are reported below), including their history, interviews and focus groups with mall users, nearby residents and merchants, and subsequent recommendations for their improvement from the perspective of promoting users' greater degree of outdoor physical activity, and hence, healthier lifestyles. This work was inspired, in part, by work carried out at the US Centers for Disease Control and Prevention.[7] This earlier work (which included the New Orleans case study reported on p61) provides the basis for the comparative assessment (below).

As for interdependencies between built form and health, the term sprawl machine is used here to denote a condition whereby the proliferation of sprawl is, in fact, a systemic phenomenon – self-perpetuating as it spreads across landscapes in seemingly random spatial manifestations.[8] Sprawl machines have consumed rural landscapes for many decades but, more recently, have begun to appear within urban neighbourhoods experiencing gentrification across North America. These aggregations are semi-coordinated, having initially risen up along roadways and at interstate interchanges, and adjacent to or in place of older shopping malls in diverse contexts, consisting of a usual cast of characters: fast-food franchises, hotels, big-box retailers of every stripe, eg Pet Smart, Wal-Mart, cineplexes, electronics stores, and Starbucks drive-thru's – all loosely dispersed amid the asphalt surroundings.

The research methodology consisted of a review of the history of suburbanisation from the late 19th century to the present, with a focus on the role of the automobile in sprawls' ontology, as well as an examination of the recent globalisation of sprawl machines based on case studies in China, India and the Middle East. This was followed by the creation of a compendium of 75 planning and design considerations, grouped into five thematic categories: infrastructure (A1-A27); ecological architecture (B1-B20); mall transfusion (C1-C14); suburban agrarianism (D1-D7); and implementation (E1-E7). This lexicon was developed from the aforementioned literature review, and from fieldwork carried out by this author at shopping malls and their district contexts in Chicago, Atlanta, Charleston, South Carolina, and post-Hurricane Katrina New Orleans (figure 1).

Design considerations A1-A27 address: the role of public health in the everyday environment (A1); the need to sort out competing theoretical discourses, eg the debate between landscape urbanism and new urbanism viewpoints (A2); the plight of the medically underserved within sprawl developments, eg the chronic problem of food desertification in inner-urban neighbourhoods (A3-A4); the effects of sprawl on children and adolescents (A5); and the need to reinvest in deteriorating civic and physical infrastructure to foster healthful outdoor activity (A6). Additional design considerations in this category focused on: sprawl reclamation strategies, such as converting excess pavement to green space (A7-A8, A14-A15); smart power grids and utility systems (A9-A10); the unaesthetic impact of intrusive landmarks (A12-A13); water and its extensive affordances (A16-A19); brownfield conversion strategies (A20); amenities for pedestrians and cyclists (A21-A25); the importance of light rail and intermodal transit networks (A26); and the display of public health achievements in the medium of built form as symbols of higher health status attainment (A27).

Design considerations B1-B20 centre on: reappraising the role of architecture within sprawl machines – namely, modernism – and its oft-dystopic manifestations in post-WWII suburbia; the demise of the enclosed retail mall; and the repurposing of dead malls (B1-B3). Additional considerations focus on: transportable prefabricated health centres as infill development within diffuse land parcels, to add density and to help meet the unmet needs of the medically underserved (B4-B7); design strategies to address the banal aesthetics of big-box retail outlets (B8); pedestrian/cycling bridges over traffic clogged arteries as a means to foster health-promoting physical activity (B9); infill housing strategies (B10-B11); clean-energy grids (B12); preservation and repurposing of historic buildings and places (B13); and

the virtues of density versus singular horizontal development (B14).

Further issues addressed in this thematic category centre on: the McMansion epidemic (the proliferation of oversized luxury houses seen as incongruous to their neighbourhood, or large generic, mass-produced houses) and the attendant gentrification of neighbourhoods vis-à-vis the tear-down phenomenon and the trend towards gated suburban enclaves (B15-B16); transparent spaces and connections to the outdoors in relation to outdoor health-promoting activities (B17); rewriting zoning laws to promote health and light manufacturing relative to health (B18); electro-charging stations (B19); and the rediscovery of health-affirming places to swim, walk and cycle (B20).

A third category of design considerations consists of: strategies to cope with the decline of many big box and mega-chains in an age of expanding online shopping (C1-C3); the unmasking or dissection of massive windowless big boxes and enclosed malls (C4); and reclaiming massive expanses of pavement through a mixture of their demolition and adaptive use (C5).

A fourth category addresses: the rise of suburban agriculture and design strategies that allow traditions such as these to flourish amid the once asphalt surroundings, including farmers' markets; microfarming; livestock areas; the reprise of the ancient stoa as fresh food market; composting and cisterns; and places for horticultural education (D1-D7).

A fifth category of design considerations focuses on strategies to transfuse and reinvigorate dead and dying shopping malls and adjacent sprawl development by means of: reinvented zoning laws; LEED certification and similar green-build protocols; innovative apps with recent geomapping software; the engagement of stakeholders via gaming

Figure 3: Gentilly district residential typology

and simulation techniques in order to foster health-promoting innovations; and, finally, coherent redevelopment strategies that facilitate a suburban shopping mall and its associated district's higher 'health promotion quotient' (E1-E7).

Case studies: New Orleans and Toronto

This baseline set of criteria was then applied in an identical manner to two suburban malls: one located in the Gentilly section of New Orleans, Louisiana, in the US (hence referred to as Gentilly Commons); and a second mall located in Toronto, Ontario, in Canada, in an area north of downtown (hence referred to as East York Town Centre). In each case study, a profile of its urban fabric – tissue samples – were recorded/documented based on: 15-year demographic trends; patterns of decay/renewal; land uses; housing; local commercial services; pervious and impervious surfaces; walking catchment areas; cycling amenities; figure-ground relationships; landscape, water elements and parks; primary and secondary roads; sidewalks; bike lanes; public transit; and the presence or absence of healthcare facilities.

Four of the 20 base maps created of each case-study mall or district are presented. The New Orleans 'catalyst site' base map depicts a mall, the first section of which opened in 1949 in a part of the city midway between the Vieux Carre' and Lake Pontchartrain, with subsequent additions in the 1950s and early 60s (figure 2). Its housing types were documented: housing close to the mall comprised modest, one and two-level, post-WWII, single-family, wood-frame dwellings (figure 3). Two cemeteries and two distinct residential neighbourhoods were close to the mall, which itself is a collection of nondescript one-level 'strip centre' retail storefronts with, at the present time, no clear organisation or focal point, and where most glass storefronts directly face the blank backsides of other retail structures.

Next, the 75 design considerations were applied in a transfusion (reinvigoration) of this tired, dying open-air mall and its immediate district – a neighbourhood that sustained seven feet of toxic floodwater in Katrina's aftermath. The aim was to create a pedestrian-scaled town centre – Gentilly Commons. The current vehicular epicentre would be retained as such and, additionally, the transfused mall and district would consist of: a community wellness health centre and a Romanesque spa/pool; an urban farm co-operative; outdoor sports amphitheatre; community performing arts venue; retail arcade; fresh foods market; and indoor sports recreation centre. Various design considerations are indicated in red in an annotated axonometric perspective (figure 4). The indoor recreation centre, outdoor spa/pool, and outpatient primary-care clinic are anchored by a full-service grocery store, the roof of which functions as a curvilinear public green with bike and pedestrian paths. Three of the original six strip mall structures are retained and re-adapted within a six-step redevelopment plan, reconstituting the mall and the newly created public green as a new civic centre.

Learning from East York Town Centre: the virtues of density and compactness

The history of the East York Town Centre, in Toronto, is strikingly dissimilar from that of the Gentilly district. Located six miles north of downtown, East York's eastern edge sits adjacent to the Don Mills Valley Parkway. It, too, is a post-WWII community, developed from the mid-1960s. Ebenezer Howard's Garden City had heavily influenced the nearby Newtown suburb of Don Mills, developed between 1952-1965.[9] The borough of East York town planning council was established at that time, guided by federal housing policy, resulting in the construction of numerous high-rise housing blocks in the immediate vicinity adjacent to this once open-air mall (since enclosed and expanded). Its housing blocks, up to 30 storeys in height, continue to be replicated to the present day across the Greater Toronto Area (GTA). The district adjoins a green belt along its southern and eastern edges, and an industrial belt to the west. The urban tissue analysis for East York yields a spatial narrative of abundant open green space, compactness, mixed land uses, verticality, ample opportunities for walking and cycling, and public transit options via Overlea Boulevard.

A dense land-use pattern affords ample access to nature. Residential and commercial zones appear to overlap at times, fostering pedestrian and cycling activity (figure 5).

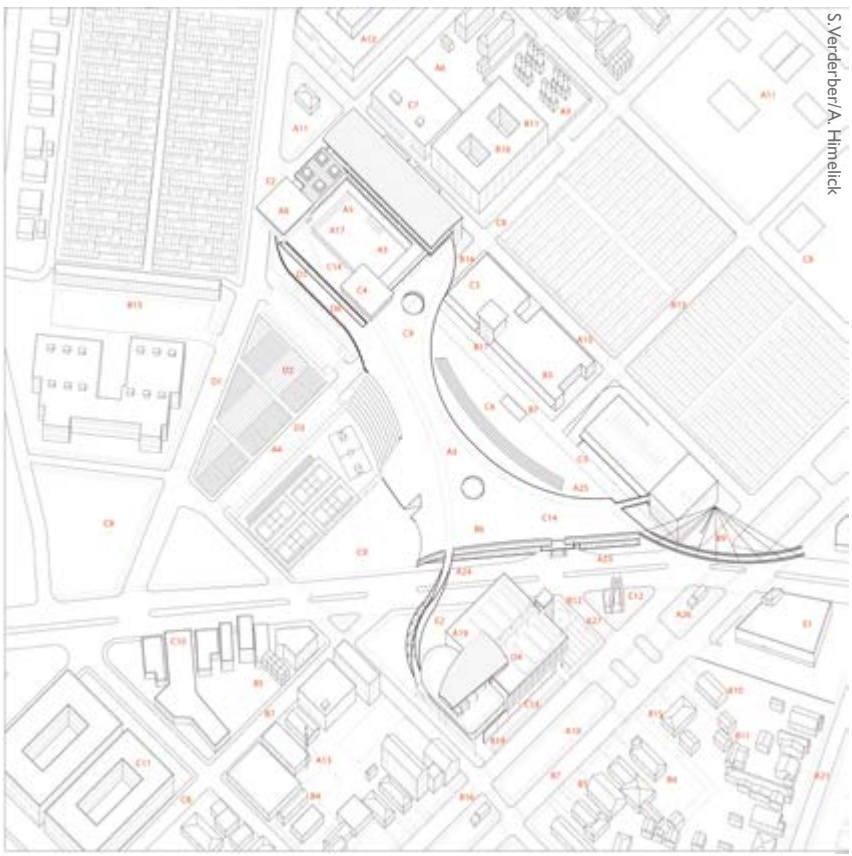

Figure 4: Axonometric – Gentilly Commons

S. Verderber/T. Boll

Figure 5: East York Commercial/Residential Typology

S. Verderber/T. Boll

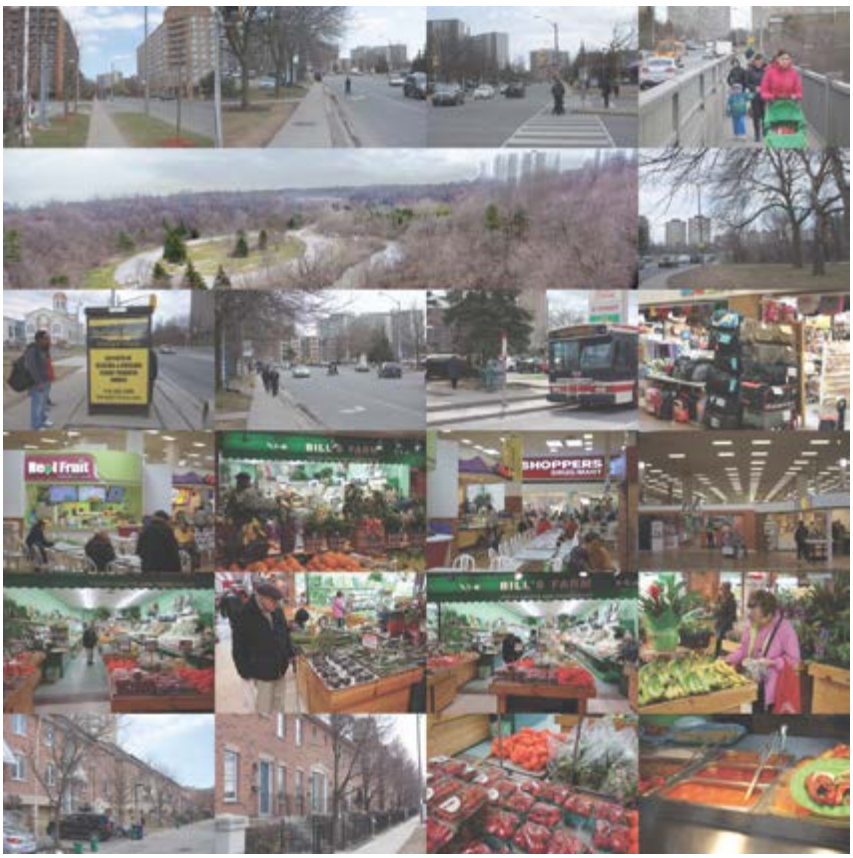

Figure 6: East York health-promotion typology

Health-promoting outdoor amenities are abundant, compared with the far more autonomous condition within the New Orleans mall/district – as East York houses numerous fresh food markets and places to gather and socialise. Here, the mall is closely connected to its context, eg an extensive sidewalk network, bike lanes, clearly marked pedestrian crossings, and opportunities to commune with nature, including a dramatic bridge that spans the Don River. There is much less need for expansive parking. Instead, tree-shaded green spaces with places to stop and sit are to be found throughout (figure 6).

An axonometric perspective of East York illustrates the close proximity between green spaces, mid-rise/high-rise housing clusters, and the mall. Unlike the extensive health-enhancing redevelopment deemed necessary in the US case study, here, instead, minor remediation is called for. When the design considerations 1-75 are overlaid relative to the interior and exterior conditions, this tendency is confirmed. Therefore, comparatively minor interventions are proposed with the aim of greater interconnectivity, centred on the mall and its adjoining parcels.

Here, four farming co-op parcels are created in what are, presently, paved parking areas. A fifth parcel within the mall parking lot becomes a wellness centre/outdoor pool with retractable roof, thereby promoting its all-weather use, with an adjoining primary-care clinic. The mall's roof would be transformed into a solar farm with additional co-op agriculture. A curvilinear walkway/bikeway would connect the ground plane, rising upward to traverse the roofscape and extending to a bridge crossing the district's main vehicular intersection, to link zones least connected at present (figure 7).

From a health-promotional perspective, East York Town Centre reveals a number of significant lessons:

- 45 years of provincial and municipal public policy has resulted in population density and land-use patterns that, in general, promote healthful, active lifestyles within the district;
- the provision of sidewalks, bike lanes, nature buffer zones, and bus transit routes provides conduits by which physical activity outdoors is fostered and sustained, and which necessitate fewer auto trips; and

- the mall itself functions as a source of fresh food options, in a compact indoor farmers' market-like setting, augmented in the immediate environs of the mall by a network of public open green spaces.

In short, East York is far more pedestrian-scaled, connected to nature, and its residential and commercial environs are more adroitly calibrated, when compared with its New Orleans counterpart. The question arises: is this an isolated condition or indicative of shopping mall districts across Canada? A definitive answer to this question eludes the scope of the present discussion, although in two other malls subjected to this same methodological strategy (Gerrard Square, located in Toronto's East End, and Pickering Town Centre, situated 25 miles west of downtown), similar general patterns were found to exist (compactness, pedestrian/bike/bus transit options, mixed-land uses, planned densification). By contrast, at present most suburban American malls sorely lack these health-promoting attributes.

Summary

This comparative analysis of two suburban malls and their surroundings, in two different nations, reveals that the US can learn much from Canada. The Canadian mall expresses virtues too often absent from its American counterpart – perhaps because US malls have seldom, if ever, been conceived within a masterplanned 'district' planning aperture.

Beyond the US and Canada, sprawl's international demographic, economic, health-related and socio-cultural consequences are profound and far-reaching. Unmitigated sprawl is increasingly linked, globally, with unhealthy lifestyles and a diminished quality of urban life.[10] Its unhealthful consequences do, indeed, warrant reappraisal because auto-dependency, anti-pedestrianism and 'placelessness' are increasingly linked with sprawl machines. Deleterious outcomes include chronic heart disease, hypertension, mental-health disorders, eg depression, as well as diabetes and obesity.[11]

Public-health policies, in consort with the built environment, have only recently begun to coherently attack these problems. Health-promoting, ecologically sustainable planning and design precepts, policies, and practices can overcome the diffuse, placeless conditions epitomised by sprawl machines. Interdisciplinary teams consisting of architects, designers, landscape architects and urbanists, engineers, and public policymakers must work more closely with healthcare-provider organisations.[12] As such, mall district transfusion represents a bona-fide contribution to the evidence–based discourse on health and the built environment – to aid in the remediation of 'diseased' and frayed tissue within diffuse, low-density sprawl developments.

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Figure 7: Axonometric – East York Town Centre

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Salutogenic design:
Enhancement of daylighting and external view as means for achieving a salutogenic hospital

This paper reports on research that used the latest parametric design optimisation techniques to identify the most effective patient-room configurations, with a focus on the achievement of proper light distribution, while maximising external view

Ahmed Sherif, Hanan Sabry, Rasha Arafa and Ayman Wagdy

A key factor in the salutogenic approach[1] to design is access to daylight, as it plays an important role in reducing depression, decreasing fatigue, improving alertness, and modulating circadian rhythms.[2] In hospitals, daylighting passing through windows coupled with external view could contribute significantly to a patient's healing process, in addition to reducing pain and length of stay.[3] Patient-room layouts and their associated external walls and windows can contribute to patient health by improving visual comfort and access to external view.

Many publications have addressed the salutogenic effect of the physical environment. Beute, for example, presented an overview on the influence of daylight and nature on health, stress, and executive functioning and self-regulation.[4] The daylighting effect in healthcare facilities has also been analysed in several publications,[5] with recommendations that natural light improvement could help reduce stress and fatigue, while improving care delivery, patient safety and overall healthcare quality.[6,7] The positive correlation between lighting, human health and performance in a patient room in Boston, USA has also been studied,[8] with research using daylight autonomy (DA) to simulate the hospital room orientation. The research found that modest amounts of glazing could provide a high degree of circadian stimulus in certain orientations. In a study on Malaysian hospitals, a review was conducted on the effect of daylighting on healing the patients, besides reducing the artificial-lighting energy consumption.[9]

In another publication, records on recovery after cholecystectomy, of patients in a suburban Pennsylvania hospital between 1972 and 1981, were examined to determine whether assignment to a room having a window view of a natural setting might have restorative influences. Twenty-three surgical patients assigned to rooms with windows looking out on a natural scene had shorter post-operative hospital stays, received fewer negative evaluative comments in nurses' notes, and took fewer potent analgesics than 23 matched patients in similar rooms with windows facing a brick wall.[7]

Several studies quantitatively addressed the daylighting performance of hospital spaces. Window sizes and shading system configurations were examined for a typical hospital intensive-care unit space to help fulfil adequate daylighting, avoid glare and maximise external view.[10] Daylighting performance was also simulated for a typical hospital intensive-care unit space in Cairo, Egypt, where several window configurations were simulated in the four main orientations.[11]

In another study, optimisation of window opening in a hospital patient room was conducted, with the aim of providing daylighting and external view, while minimising energy consumption. Parametric computer simulation was used to determine the optimum window design in the form of window width, sill and lintel height, and shading device depth.[12] The influence of room shape on the daylighting performance of patient rooms has been investigated in several other studies. A patient-room layout with outboard bathroom proved to be most successful in providing daylighting in the south orientation, supporting the possibility of having large windows that offer better external view. In contrast, the patient-room layout with an inboard bathroom resulted in a much smaller range of acceptable window configurations.[13]

A new tool has also been proposed to help architects find the optimum daylighting solution for various types of buildings. The tool searches for the optimal dimensions of window openings to ensure maximum daylighting provision inside the space. This parametric workflow method could achieve precise and relatively efficient solutions automatically, eliminating the need for exporting or importing 3D modeling information from different software programmes.[14] Another optimisation tool has been developed to test the external and internal reflectors and ceiling geometry for a deep side-lit space. In Cairo, this tool has used validated daylight simulation with a genetic optimisation algorithm.[15]

The above literature review demonstrates the need for developing a method that could help in the achievement of a salutogenic hospital by improving the design of inpatient rooms in respect of daylighting and exposure to external view. A limited

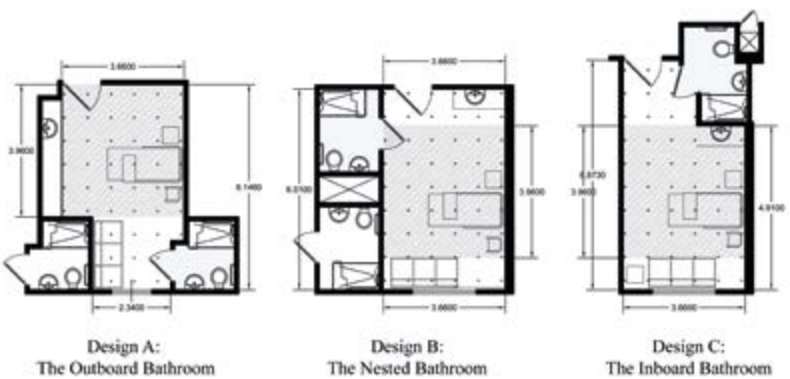

Figure 1: The three designs of patient room (WRR = 35%)

Indoor Space Parameters		
Floor level		Second Floor (+6.00 m)
Room space area for the three designs		22 m²
Internal Surfaces Materials		
Walls	Reflectance	50% (Medium Colored Internal-walls Off-White)
Ceiling	Reflectance	80.0% (White Colored Ceiling)
Floor	Reflectance	20.0% (generic floor)
Window Parameters		
Glazing		Double glazing clear (VT=80 %)

Table 1: Parameters of the tested patient-room space

number of publications has investigated the satisfaction of daylighting performance and external view in hospital patient rooms in a quantitative way, especially in desert locations. Configuration of the external walls of these rooms, their windows and shading systems could pave the way for their use in helping deliver salutogenic hospitals.

Objectives

The main goal of this research was the enhancement of daylighting and external view of hospital patient rooms as a means for achieving a salutogenic hospital. In order to achieve this goal, an objective was defined to identify best external wall/window configurations that suit common patient-room layout designs, by fulfilling daylighting adequacy and maximisation of external view. Investigation focused on the use of the parametric optimisation process to determine the "optimum" window size and shading system that suit the three more common patient-room layout designs, under the desert, clear sky of Cairo, Egypt.

Methodology

The methodology adopted in this paper was divided into two consecutive stages. Stage one concentrated on optimising the daylighting performance of each design configuration; stage two examined the potential of external view exposure from the patient bed for the cases that achieved adequate daylighting performance in the first stage.

Three common patient-room design configurations were selected for investigation: a room with an outboard bathroom (design A), a room with a nested bathroom (design B), and a room with an inboard bathroom (design C). The three designs have a similar net floor area (22m²). The layout, dimensions and parameters of the room layouts are illustrated in figure 1 and table 1.

The rooms were assumed to be located on the second floor of a hospital building. Simulations were conducted using the climatic data of Cairo (30°6'N, 31°24'E, alt.75 m), which enjoys a desert, clear sky all year round. No external obstruction was assumed. The external ground surface was assumed to have a reflectance of 20%.

Two integrated types of variables, which represent window configurations, were used in the optimisation process. The influence of the first variable – changing the window size – was tested by examining 17 window-to-wall ratios (WWR) for each design. The WWR values ranged from 10% to 90%, at 5% increments. The associated window shapes and positions along the external wall are illustrated in figure 2. The second variable was the shading system. Three sun breakers were positioned equidistantly on the outside surface of the window, and the effect of changing the parameters of these sun breakers was examined for each of the room layout designs. Three parameters were as follows:

- Cut-off angle (Θ): A range of cut-off angles was used as a cutting surface that forms the rotation angle and length of the sun breaker. Angles ranged from 10° to 50° (figure 3). The values were selected to represent the sun zenith angles, and could almost represent the 12 months of the year.[16]
- Length (L): The length of the sun breakers was changed from 0.1m to 1.5m, so as to be confined along an imaginary line aligned with the sun zenith angles defined above.
- Reflectivity (ρ): Three different values of reflectivity were chosen (35%; 50%; 80%); each value represents the property of three different materials.

Methodology of stage one: daylight availability analysis

The aim of this stage was to identify the window configurations that maximise daylighting performance conducted for each of the patient-room layouts (designs A, B and C) via an optimisation process. Simulation was conducted in the four main orientations (north, south, east, and west). Grasshopper, which is a plug-in for Rhinoceros[17] and a parametric modelling tool, was used to automate the daylighting simulation process. DIVA (Design Iterate Validate Adapt), an environmental analysis plug-in for the Rhinoceros 3D Nurbs modelling programme,[18] was used to perform the daylight analysis via integration with Radiance and DAYSIM. Together with

Ambient bounces	Ambient divisions	Ambient sampling	Ambient accuracy	Ambient resolution	Direct threshold
6	1000	20	0.1	300	0

Table 2: Radiance simulation parameters

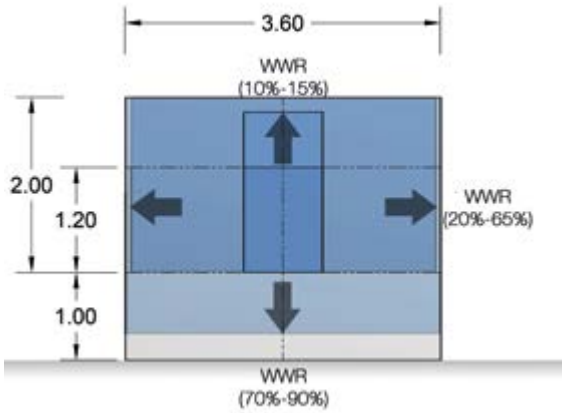

Figure 2: The increasing logic of the window over three stages

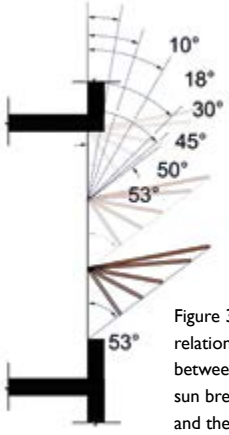

Figure 3: The relationship between the sun breakers and the sun's cut-off angles

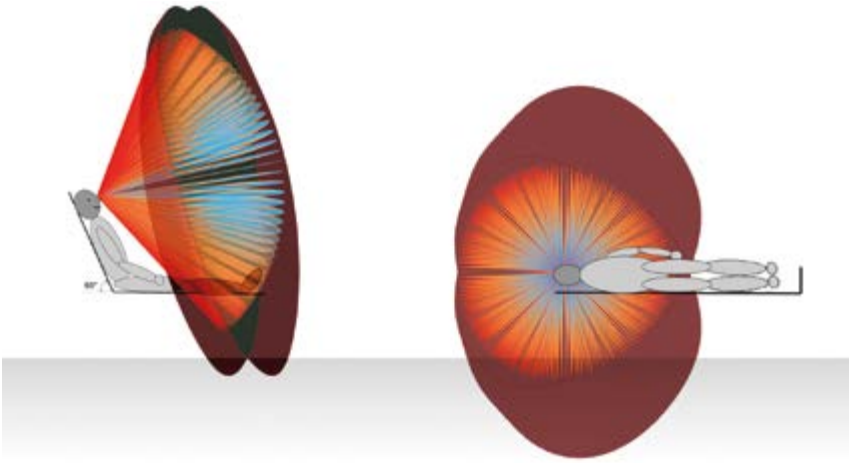

Figure 4: The visual field and the weighted rays for Fowler's Position and Left Lateral Recumbent Position

Galapagos, the process was fully automated inside Grasshopper.[14] Experimentation was conducted for a year-round performance using the Dynamic Daylight Performance Metrics (DDPM). Simulation parameters are presented in table 2.

The occupied time of the simulations was assumed to be from 06.30 am to 10.30 pm. The patient-bed level plane (0.9m height) was used as a reference plane on which daylighting performance was simulated. The spacing of the analysis grid was set to 0.7m x 0.7m, including four points on the bed level (figure 1). Accordingly, in each of the three tested patient-room designs – A, B and C – the reference plane contained 46, 54 and 53 measuring points, respectively. The recommended illuminance value used in the tested patient-room space is 300 Lx.[19] Three daylight-availability evaluation levels were used in this stage: "daylit", "partially daylit", and "over-lit" areas.[20] The daylit areas are those areas that received sufficient daylight at least half of the year-round occupied time. The partially daylit areas are those that did not receive sufficient daylight at least half of the year-round occupied time. The over-lit areas are those that received an oversupply of daylight, where 10 times the target illuminance was reached for at least 5% of the year-round occupied time.

The selection criteria adopted were as follows: first, ≥50% of the patient room space should be daylit; second, 100% of the patient-bed plane should be daylit. The accepted cases were sorted according to the size of the daylit area of the patient-room space. The case that achieved the highest daylit area in the room space was identified as the optimum solution for window configuration for each orientation in each patient-room design.

Methodology of stage two: external view factor

The effect of window size and position on the exposure to external view was demonstrated by quantitatively calculating the rays of vision of the patient eye. This test was performed for the cases that achieved successful daylighting performance.

The patient was assumed to be lying in bed in two positions (figure 4). The first position was the "Fowler's Position", which is at a 65° angle. Thus, the centre of vision was assumed to be tilted 15° towards the external wall direction and looking upwards at a 10° angle. The second position was the "Left Lateral Recumbent Position", where the patient was assumed to be lying on his left side over the bed and looking towards the window. An external view factor (EVF) was calculated to evaluate the external view exposure by counting the number of rays that passed through the window opening between shading devices. The rays that were close to the 3D binocular zone of vision were given higher weight in comparison with the rays that were at the periphery of the cone of vision.

Stage one results and discussion

In each orientation, an optimum window configuration was identified for each of the different patient-room layouts, as described above. The optimum window configurations associated with the different patient-room layout designs were compared in respect of window size and sun breakers' parameters and daylighting performance, and these are illustrated in tables 3-6. The following is a discussion of the results.

South orientation

The optimised solutions for each of the three tested patient-room layouts are illustrated in table 3. The WRRs associated with the optimised window configurations were 70%, 50% and 65% for cases A, B and C, respectively. The top and bottom sun breakers of the optimised solutions of cases

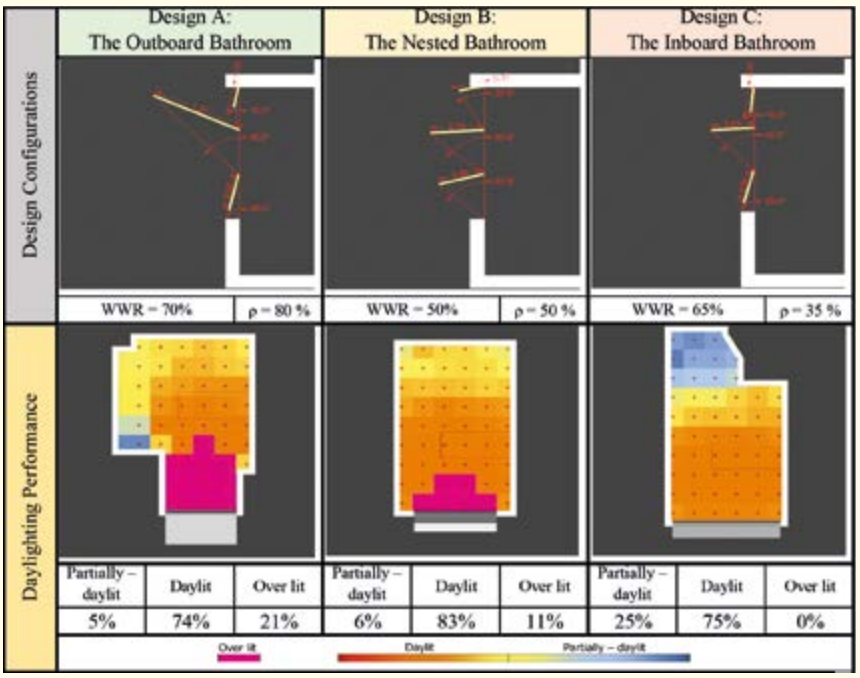

Table 3: Daylight performance of south orientation for the three designs

A and C had the same tilt angle (Θ1 = 10°, Θ2 = 45°) and almost the same length. In case A, however, the middle sun breaker was longer with a higher surface reflectivity (L2 = 1.37m, ρ = 80%). In comparison, the middle sun breaker of case C was shorter with less surface reflectivity (L = 0.89m, ρ = 35%). In case B, the middle and bottom sun breakers were almost extended horizontally with the same tilt angle (Θ = 50°), while the top one was the shortest (L1 = 0.37m) with a narrow tilt angle (Θ1 = 30°). The surface reflectivity in this case was ρ = 50%.

Results of the optimised solutions showed that the nested-bathroom design (design B) achieved the best daylighting performance (83% daylit area), with only 6% partially daylit and 11% over-lit areas. The outboard bathroom (design A) and the inboard bathroom (design C) also achieved efficient performance; 75% of the area was daylit. The over-lit area (21%), however, dominated almost the rest of the space near the window in the case of design A, while in the case of design C, the area adjacent to the bathroom on the opposite side of the window was partially daylit (25%) with no over-lit area.

North orientation

Optimised solutions for each of the patient-room layouts are illustrated in table 4. In the case of design A (the outboard bathroom), a large window with a highly reflected surface for the sun breakers (WWR = 85%, ρ = 80%) achieved the best performance. There were differences in the sun breakers' length and tilt angle (L1 = 0.57m, Θ1 = 30°; L2 = 0.27m, Θ2 = 18°; and L3 = 1.2 m, Θ3 = 53°). In the nested bathroom (design B) the sun breakers' parameters (Θ1 = 30°, Θ2 and Θ3 = 50°; L1 = 0.37m, L2 = 0.78m and L3 = 0.66m; ρ = 50%) were similar to those on the south orientation, except the window size was larger (WWR = 70%).

On the other hand, in the case of the inboard bathroom (design C: WWR = 75%), the sun breakers with a low reflectivity value (ρ = 35%) had a relatively long, extended position (L1 = 1.1m, L2 = 0.79m and L3 = 0.92m). Both the top and bottom sun breakers were sharing the same tilt angle (Θ = 50°), however the middle one had the lower tilt angle (Θ2 = 30°).

Concerning daylighting performance, the results showed that design B – similar to the south orientation – achieved the best daylighting performance (96% daylit area) with only 4% over-lit. Design C also achieved efficient performance, with 89% of the space area daylit and a small area near the entrance of the space 11% partially daylit. Design A (the outboard bathroom) achieved the least impressive performance; the daylit area, in this layout, occupied just 61% of the space.

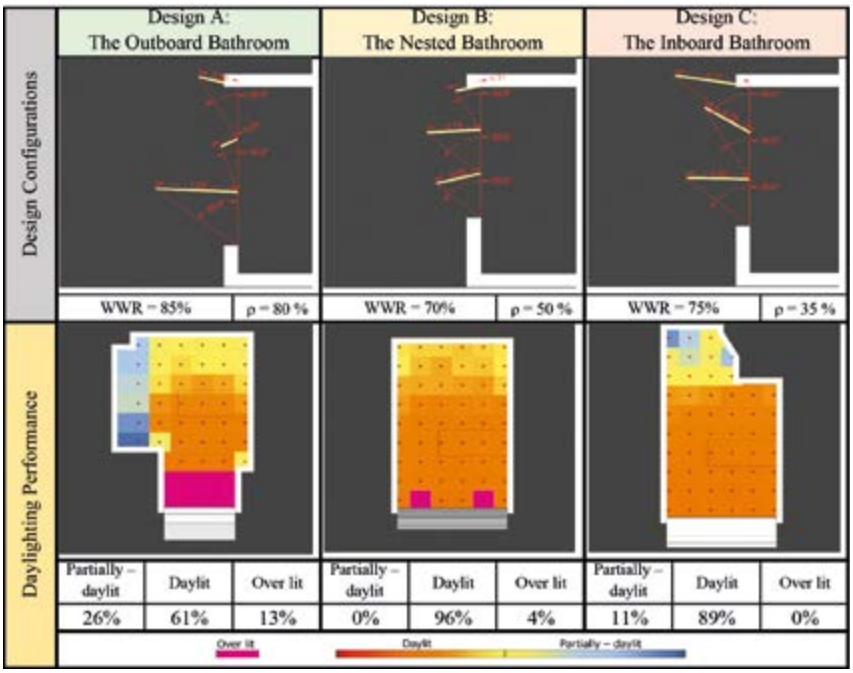

Table 4: Daylight performance of north orientation for the three designs

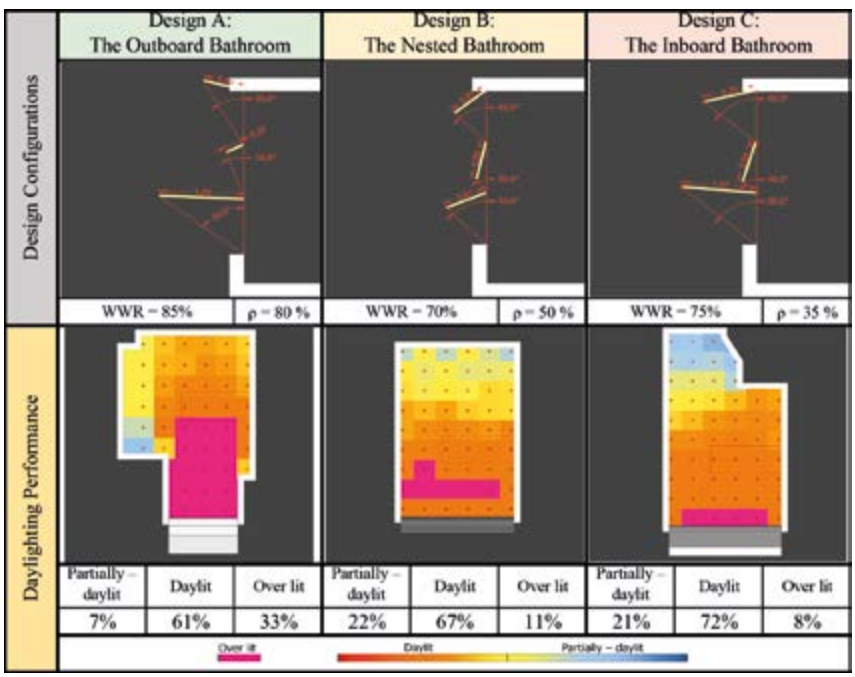

Table 5: Daylight performance of west orientation for the three designs

West orientation

The optimised window configurations for each of the tested patient-room layouts are illustrated in table 5. In this orientation, the solutions were affected by the lower angle of the sun and resulted in different window configurations for the three patient-room designs. For the outboard bathroom (design A) a WWR of 85% was selected. This design's sun breaker parameters were similar to those of the same design in the north orientation (L1 = 0.59m, L2 = 0.27m and L3 = 1.2m) with the same tilt angle (Θ1 = 30°, Θ2 = 18°

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and Θ3 = 53°) and reflectivity (ρ = 80%). In the nested bathroom (design B: WWR = 70%), however, the sun breakers had almost the same lengths (L1 = 0.57m, L2 = 0.59m and L3 = 0.61m) with a reflectivity value of ρ = 50%, though the middle sun breaker was partially closed. In design C (WWR = 75%) the sun breakers with the low reflectivity value (ρ = 35%) differentiated in lengths (L1 = 0.76m, L2 = 0.64m and L3 = 1.07m), but both top and bottom sun breakers shared the same tilt angle (Θ = 50°). The middle sun breaker was partially closed, similar to design B (Θ2 = 45°).

Concerning daylighting performance, the results showed that designs B and C achieved the best performance (72% - 67% daylit area). However, the area opposite the window was partially daylit in both designs (21%). These were followed by design A with 61% daylit area; almost a third of the area near the window was over-lit (33%).

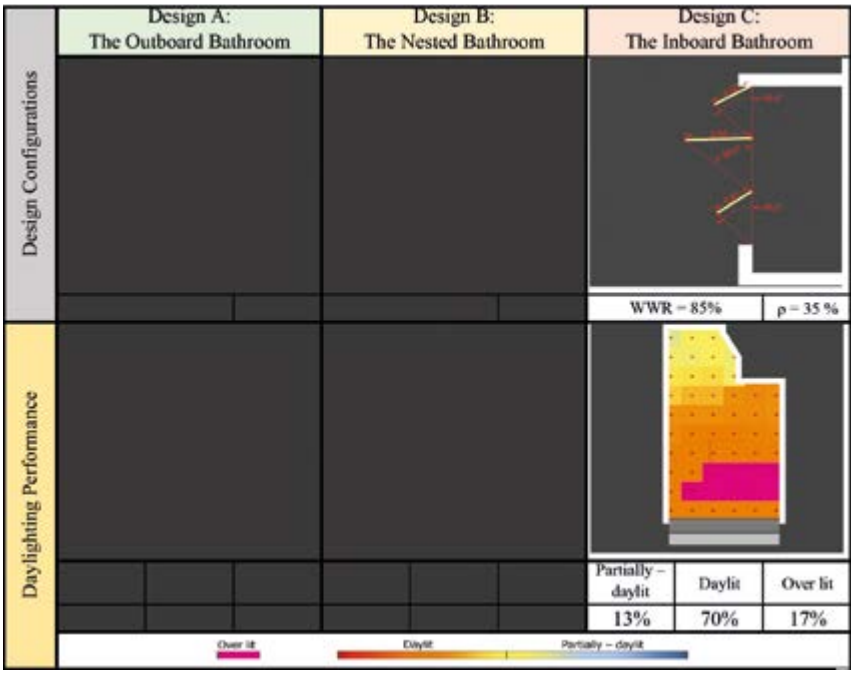

Table 6: Daylight performance of east orientation for design C; designs A and B failed to satisfy the criteria

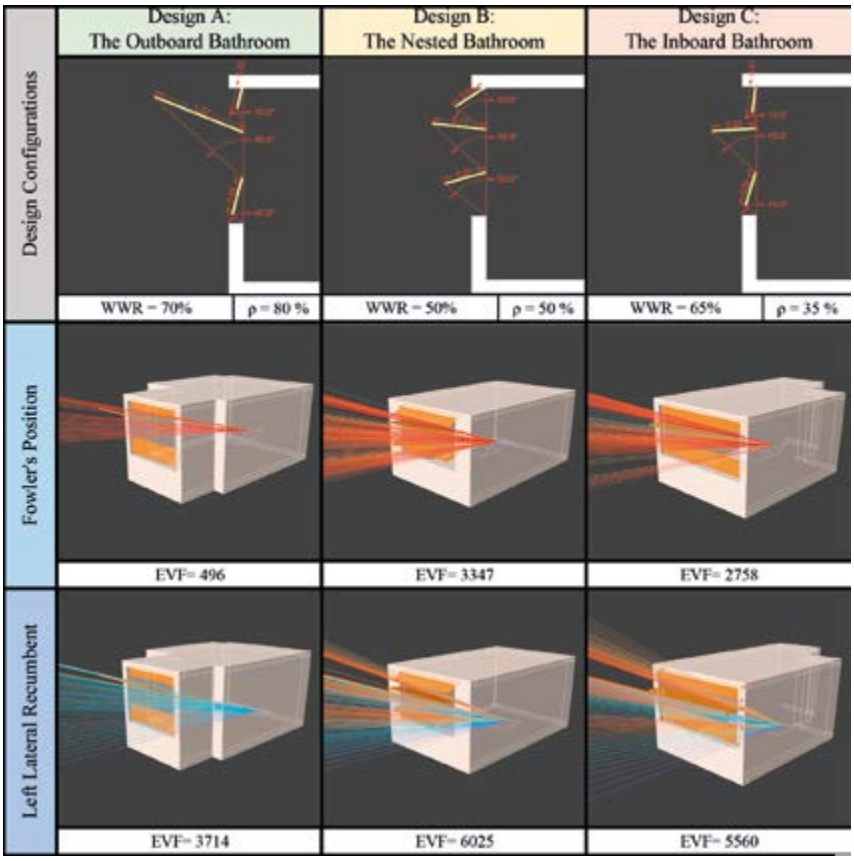

Table 7: View results of south orientation for the three designs

East orientation

The optimised window configuration results for this orientation varied. Only the inboard bathroom (design C) achieved an acceptable performance, hence it was the only case illustrated in table 6. A large window of 85% WWR with a low reflected surface of sun breaker was efficient. Both top and bottom sun breakers were parallel and had the same length and tilt angle (L = 0.62m, Θ = 45°). The middle sun breaker was almost extended horizontally (L2 = 0.98m, Θ2 = 45°). Designs A and B failed to satisfy the acceptance criteria in the patient-room space and the bed plane at the same time.

In daylighting performance, 70% of the space was daylit and the rest of the space was shared between the over-lit area (17%) near the window and the partially daylit space at the room entrance (13%).

Stage two results and discussion

The external view factor (EVF) was calculated for each of the optimised solutions identified above. The effect of the WWR, sun-breaker position and tilt angle on the EVF became obvious with the variety of EVF produced. These were compared, as illustrated in tables 7-10, and the following is a discussion of the results.

South orientation

The EVF results for each of the tested patient-room layouts are illustrated in table 7. In design A, which has a relatively small external wall size owing to presence of the bathroom on the external façade, the EVF was only 496 rays when the patient was in Fowler's position, and 3714 rays when the patient was in the left lateral recumbent position. In design B, the large window and wide sun-breaker configuration allowed for the highest external view rays, where the EVF reached 3347 and 6025 rays for the two positions, respectively. Design C had a lower

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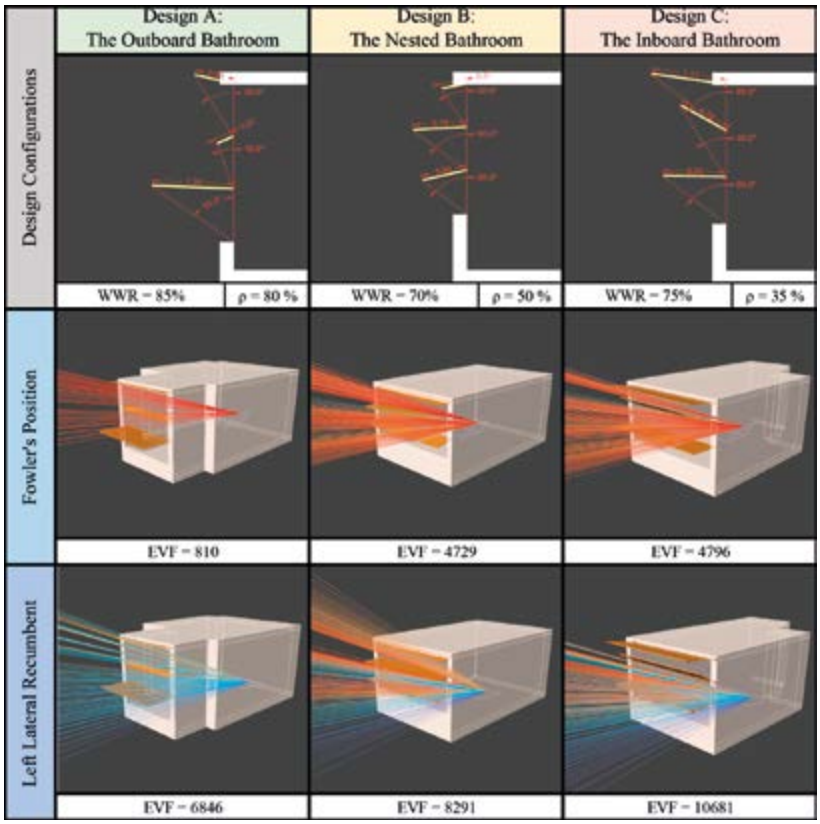


Table 8: View results of north orientation for the three designs

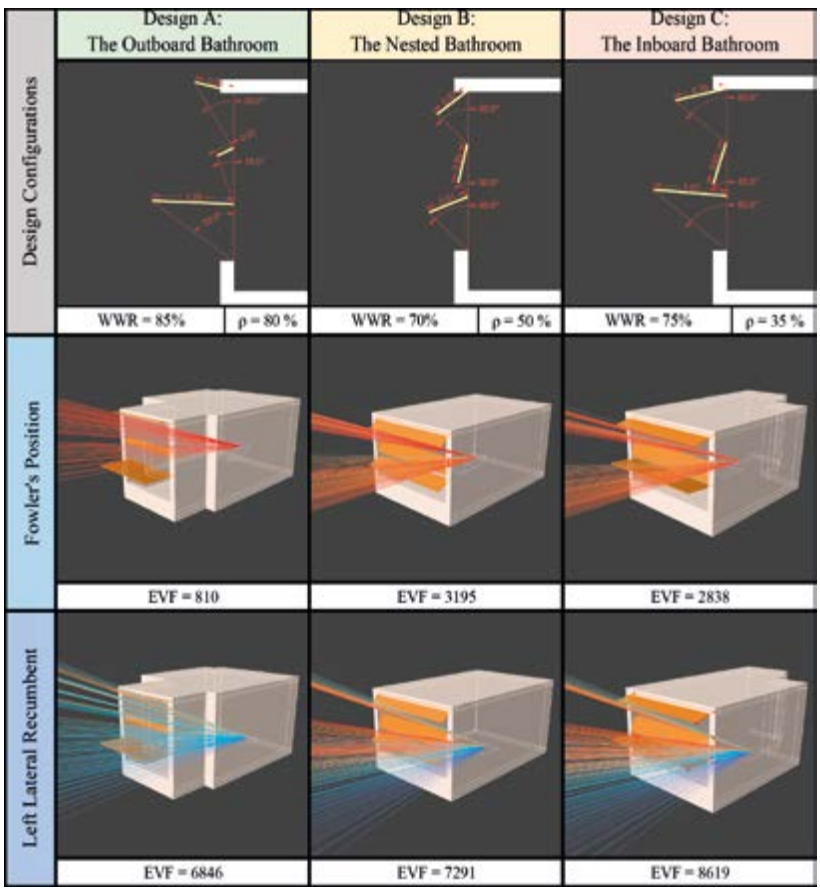


Table 9: View results of west orientation for the three designs

number of rays, with its EVF values relatively lower than those of design B – 2758 and 5560 rays, respectively. Still, the resultant external-view exposure of design C is much better than that of design A.

North orientation

EVF results for each of the tested patient-room layouts are shown in table 8. The developed configurations of sun breakers, as described above in the daylight performance section, were more suited to the south configuration. The EVF in design A was 810 and 6846 rays for Fowler's and left lateral recumbent positions, respectively. In contrast, design B had relatively higher values, where EVF reached 4729 and 8291 rays for the two positions, respectively. In this orientation, design C achieved the highest EVF among all the tested cases in the four orientations, where the EVF reached 4796 and 10861 rays for the two respective positions.

West orientation

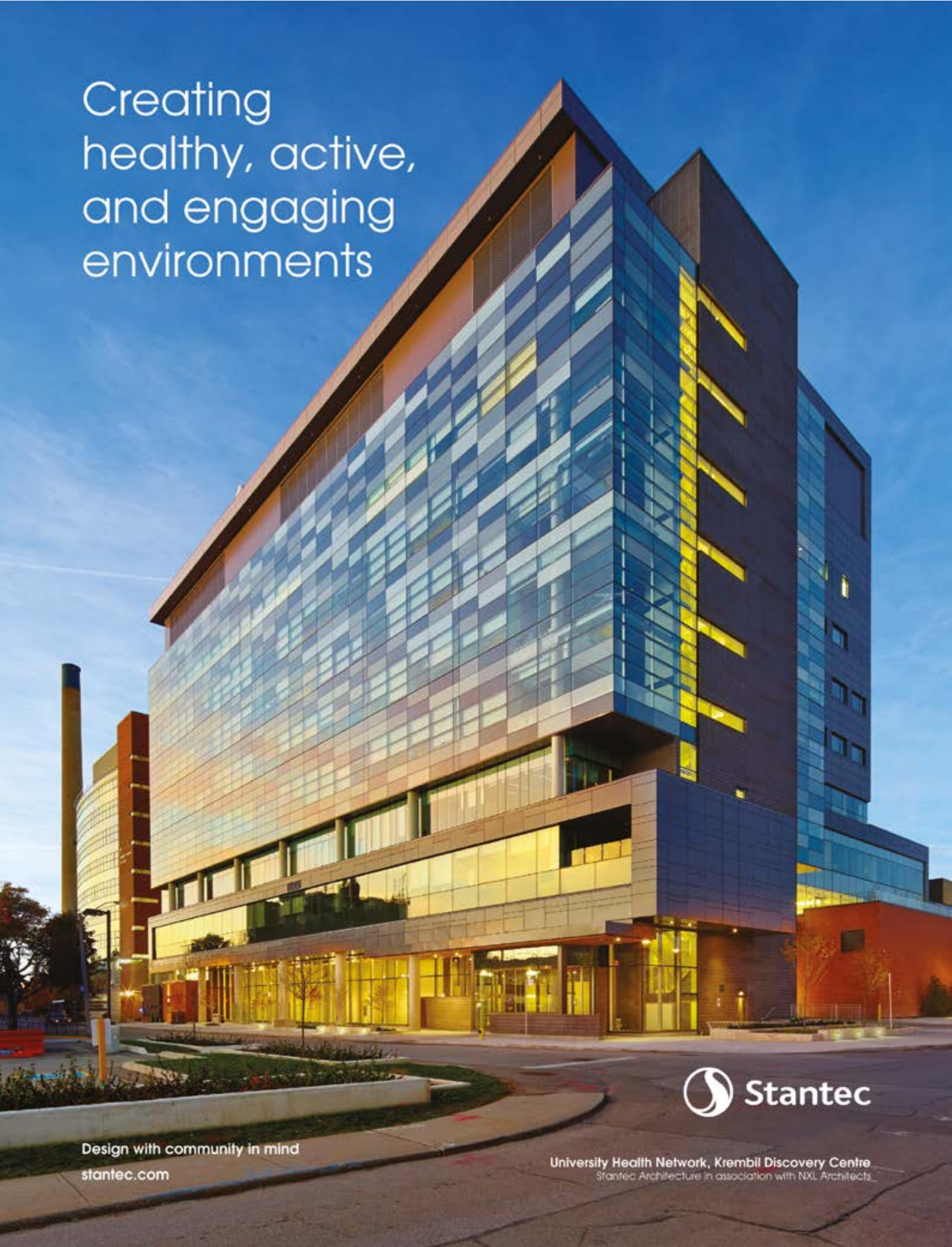
EVF results for each of the tested patient-room layouts are shown in table 9. The numbers of view rays in design A were found to be equal to those of the north direction, where the EVF was 810 and 6846 rays for the two positions, respectively. Design B came in second place, with an EVF of 3195 and 7291 rays for the two respective positions. Design C achieved the best EVF, especially in the left lateral recumbent position where the EVF reached 8619 rays.

East orientation

EVF results for the tested patient-room layouts are shown in table 10. The EVF study of the east orientation was limited to the cases that provided acceptable performance in the first stage of this research. Accordingly, the inboard bathroom design C was only tested for external view, as designs A and B didn't pass the daylight performance test. The EVF was 4099 and 8374 rays for the two respective positions, which was similar to the results of the west orientation.

Conclusion

The main goal of this research was the enhancement of daylighting and external view as means for achieving a salutogenic hospital. In order to achieve this goal, an objective was defined to identify best window configurations that suit the three common patient-room layouts by fulfilling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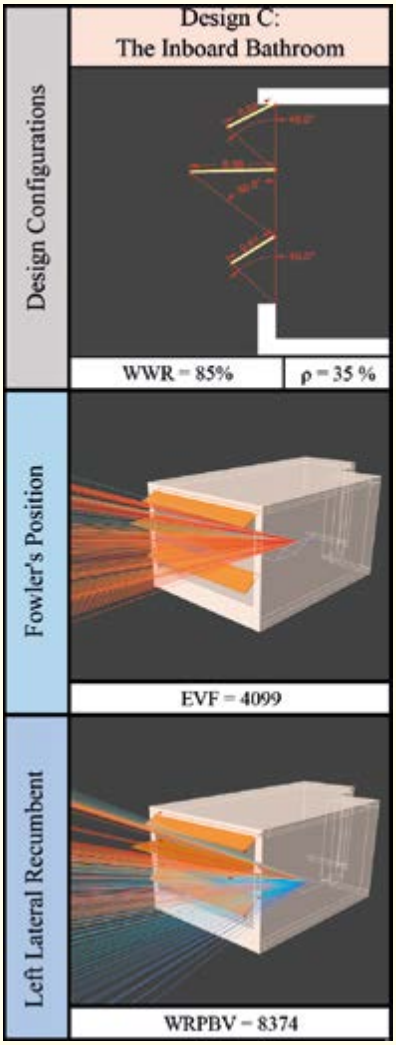

Table 10: View results of east orientation for design C; designs A and B failed the stage-one test

daylighting adequacy and maximisation of external view.

In relation to daylighting, the nested bathroom patient-room design, which was oriented towards either north or south, proved to be most successful among all the alternatives. It was calculated that 96% and 83% of the room space was daylit owing to the success of the optimised external wall configuration in these two directions, respectively. The second best performance was achieved by the inboard-bathroom patient-room design when located facing the north direction. In this case, the optimised external wall design assured that 89% of the patient-room space was daylit. In all cases, the patient-bed surface was 100% daylit. The lowest performer in regards to daylighting was the outboard patient-room design, which provided a maximum of 61% daylit area in the north and east orientations. Its best performance was in the south orientation where 75% of the patient-room space was daylit.

As regard to exposure to external view, the optimisation process helped arrive at excellent performance. The highest exposure was achieved by the inboard bathroom patient-room design, which faced north, where the EVF reached 10861 rays. The optimised solution of this design also achieved an excellent performance in the east and west orientations, where the EVF reached 8374 and 8619 rays, respectively. Optimisation of the external wall design of the nested-bathroom patient-room design also helped achieve reasonable results. The EVF reached 6025, 8291 and 7291 rays in the south, north and east directions, respectively.

Overall, it seems that orienting the patient rooms towards the north direction helps arrive to external wall solutions that improve daylighting performance and exposure to external view. Moreover, the use of a patient room with an outboard bathroom design is questionable. The performance of the optimised external wall solutions of this design was much lower than that of the other two designs in respect of daylighting and exposure to external view.

Finally, the results of this research demonstrate that the objective of arriving at a salutogenic hospital can be attained by adopting parametric optimisation design tools. The suggested external wall configurations enhanced daylighting and provided an excellent exposure to external view in each of the tested patient-room layout configurations.

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Our Storeys: Art and Poetry in Healthcare

Sue Ridge and John Davies
Pighog Publishing: £12.99
Pages: 166pp
ISBN: 978-1-906309-34-3

Our Storeys is a celebration and superb record of the collaborative art and poetry project commissioned by Bouygues UK for North Middlesex University Hospital and funded by an Arts and Business Award, won by First Aid Art in 2008.

Our Storeys was developed by Sue Ridge and John Davies (aka Shedman), from stories, poems and texts collected from NMUH staff, patients and visitors and the local community. This material was gathered in interviews held in the *Our Storeys* shed, which was located at the hospital over summer 2009. The artwork was completed and installed in September 2011. Sue's design integrates the poems and other texts with relevant photographs and images.

Phase 1 of the venture was the poetry wall, located on the lift lobby walls in the four-storey entrance atrium, using digitally printed wallpaper. Phase 2 was a series of five photo-text images for hospital waiting areas with specially written sonnets by John, alongside poems from the poetry wall by other poets, amplified by Sue's photographic images.

Together with the poems, images, etc of the wall displays, the book comprises a helpful introduction by Sue, with illuminating, sometimes fascinating, essays and interviews. The contributors are particularly aware of the importance of the hospital community, the local community, the shared history and solidarity; it is a project boosted by outside help, but its soul very much belonging to the local space. Sue and John write on *Art and Public Engagement in the Hospital Environment*. They are also interviewed: Sue in the 'studio'; John, appropriately, 'in the Shed'. Architect Sue Francis writes on *The Architecture of Caring Places*.

In her essay, *Weaving Art into the heart of a Building*, environmental psychologist Veronica Simpson investigates the techniques used to create the blend of poetry and art, and how these creative decisions enable the viewer to lift meaning from the walls. Veronica deeply appreciates the words: *'the voices that emerge from the poems and captions, and short biographical notes that make the art at the heart of this new hospital feel really personal and touching.'* In *The Art of Poetry: Chasing the Hospital Community with Words*, Wendy French wonders how the poems create a sense of place and belonging for both patients and visitors alike.

Sue Ridge and John Davies (aka Shedman)

The book makes the 'social wallpaper' portable, and allows more time to absorb the mapping. This also reflects the critical importance of context and the relationship between the hospital and its local community, with the narrative of *Our Storeys* producing visions of the 1840 workhouse, the union infirmary of 1910, the location for *'Emergency Ward 10'* and all the changes up to today's multicultural society – *'147 languages. 147 ways of saying thank you'* – as stepping stones across the stream of local history and social change. Make that 148 languages as patients and doctors locate through the language of the body: *'That's where I had my eyes seen to.' 'That's where I had the hip op.' 'Oh, yes: you were the leg in ward F.'* (My daughter was born in 1975 in the then new maternity block.)

We follow the latitudes and longitudes of *Our Storeys* and keep returning to what John Davies reminds us is at the core of

the project, its poetry. John's own poetry, much of it informatively project-specific, illuminates the book throughout. Andrew Motion's *Kwangju* is a tender meditation on time, and you can almost hear the hum and buzz in Carol Ann Duffy's *Virgil's Bees*. John O'Donaghue's amusing *codeporne* makes us pause to enjoy the language puzzle. Maurice Riordan's *Charm,* from Old English, captures nature, customs and time with such economy. *Life Monitor*, by Ciaran O'Driscoll, is a beautifully restrained celebration of life. There are also fine poems by Leslie Forbes, Sarah Wardle, Eva Saltzman, Lloyd Jones and Mario Petrucci. Shades from the past include Hardy, Keats, Bob Cobbing and Michael Donaghy. But I keep returning to the third laureate, Michael Rosen, and his *These are the hands,* written in 2008 to celebrate the 60th anniversary of the NHS. His hands cup life's alpha and omega. They '*touch us first . . . touch us last.*'

As with everything in this uplifting venture, the poems are an absolute tonic.

The poems create a sense of place and belonging for both patients and staff alike

Tim Cunningham is an Irish poet whose published works include: Don Marcelino's Daughter (Peterloo Poets, 2001), Unequal Thirds (Peterloo Poets, 2006) and Kyrie (Revival Press, 2008) and Siege (Revival Press, 2012). His fifth collection, Almost Memories (Revival Press) will be published in September 2014. In 2012, Tim was awarded the Kavenagh Fellowship. Visit www.timcunninghampoetry.co.uk

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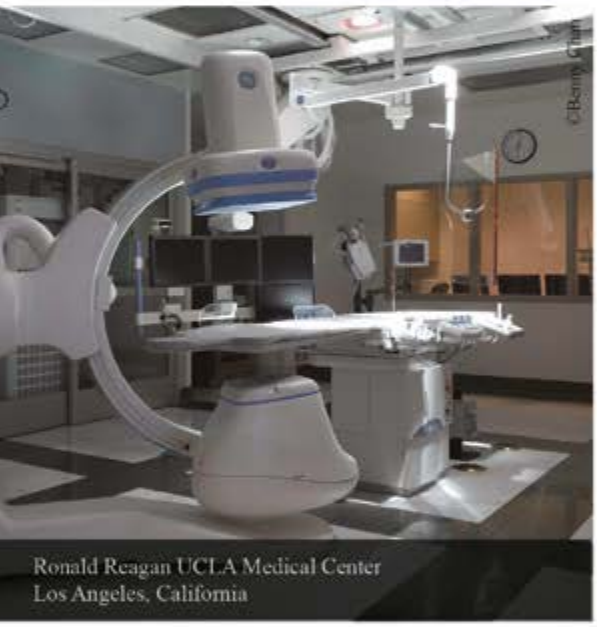

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