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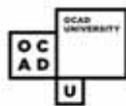
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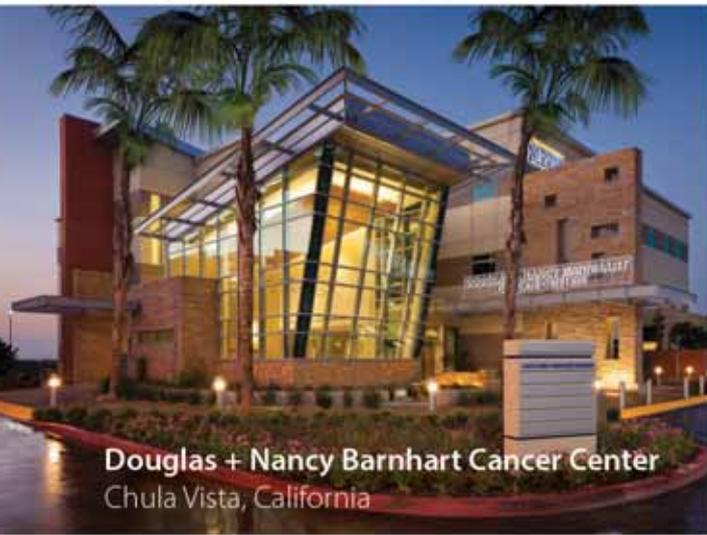
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Nigel Crisp

A WHD report on the Turning the World Upside Down Mental Health Challenge, which awards impactful projects in low-middle income countries



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Kelvin Steel

The views of different stakeholders are sought in this review of the impact of five different procurement models on health projects in Australia



Phil Smith

This collaborative research study uses participatory models to investigate the design of livable, affordable and sustainable housing for senior living



Ruzica Bozovic Stamenovic

A review of a new book, *Affordable excellence: The Singapore healthcare story*, charting a success story built on the foundations of a clear political vision



Cover Image

The Heydar Aliyev Center in Baku, Azerbaijan, designed by Zaha Hadid Architects, see pp 16-17



Sustaining a legacy

This year the Republic of South Africa will celebrate 20 years of democracy since the fall of the brutal apartheid regime that divided a nation. In December, the icon of Nelson Mandela, who brought reconciliation and hope for the future, sadly passed away. In our Standpoint feature (p15) Dr Alan Dilani, founder and ceo of the International Academy for Design & Health, reflects on the salutogenic qualities of Mandela's leadership. But the question remains, 'What comes after Mandela?' Speculation persists that South Africa will disintegrate into chaos and disorder without Mandela's glue to hold the rainbow nation together. With economic growth slowing to less than 2% and youth employment at 58% the fears are not without substance. However, there is also much to celebrate and evidence within civil society that suggests that a new narrative is evolving, inspired by Mandela's legacy. In a special feature we report on three charities, all of whom are working in South Africa to bring about positive change and integration between and within disadvantaged communities by utilising the power of design and innovation (pp 30-39). In our report on Design & Health Middle East 2013 (pp 9-11), Dr Aaron Motsoaledi, Minister for Health, South Africa recognises infrastructure as the critical enabler of capacity as South Africa builds a system of universal healthcare coverage. The third sector will be an important player.

Marc Sansom
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Crescent Gardens at Hamad Bin Khalifa Medical City: Prioritising people and patients

Less than 100 years ago, the Arab States of the Persian Gulf relied on the marine trade, sea-faring and the pearl industry. Today, all of the Gulf States derive significant revenues from oil and gas, which has formed the foundation for rapid economic development and investment in massive infrastructure projects.

In 2011, the economic growth rate of the countries of the Gulf Cooperation Council (GCC) was projected to reach 7.8%, with their external current accounts' surplus increasing from \$136 billion to \$304 billion on the back of rising oil prices. The success of the GCC states has been helped, in particular, by high levels of integration with the global economy, exemplified not only by the creation of business-friendly environments for investors but also, more recently, by the international outlook of their own significant sovereign wealth funds, which have sought to invest in lucrative markets in the West.

The success of international Gulf airlines, such as Qatar Airways, Emirates and Etihad, and investments in the global sports and entertainment industry, with the purchase through state-owned enterprises of prominent brands such as Manchester City Football Club and Paris St Germain, are testament to this trend. The global investment outlook is also an example of a move towards a knowledge-based economy in the Gulf States, in an effort to guarantee a more sustainable economic future when oil and gas revenues start to decline.

In the last 15 years, this approach has been most celebrated in Dubai, which has become a major tourism and business destination, attracting substantial foreign investment, but, arguably, it is now being overtaken by the more cerebral approach of Qatar, whose prominence on the global stage edged up a notch when it was granted the 2022 World Cup of Football.

Qatar, recognised by the World Bank as the world's richest country per capita, was also the host country for the recent Design & Health Middle East 2013 International Symposium at the Hilton Hotel in Doha, from 13-14 November. Attended by more than 180 senior level speakers and delegates from Europe, North America, Africa and the Middle East, the symposium was evidence of the Emirate's commitment to become a knowledge hub in the Middle East.

Big ambition

Qatar is rapidly establishing its credentials as a hub in the Middle East for healthcare, education, science and research, reports Marc Sansom from the Design & Health Middle East 2013 International Symposium



John Lambert-Smith



Dr Hanan Al Kuwari



Paul Appleton

The state's transformation into an advanced, knowledge-based, sustainable and diversified economy is being driven by the Qatar National Vision 2030. Introducing Qatar's vision for health on the opening morning of the symposium, Dr Hanan al Kuwari, managing director of Hamad Medical Corporation (HMC), which organised the symposium in partnership with the International Academy for Design & Health, explained the aims of the National Vision 2030: "Our ambition is to become a world leader in education; a

world leader in healthcare and medical research; and a medical and education hub in the Middle East region."

Qatar faces many challenges, however, to deliver this vision in healthcare. In the search for faster, better and more cost-effective healthcare, Dr Hanan identified Qatar's health policy reform challenges as: ensuring equal access for equal need; meeting expectations for quality care; developing a patient-centric system; preparing for ageing populations; adapting to technologically-empowered customers; investing in new science and personalised treatments; addressing the rapid growth of chronic disease; and creating efficiencies amid the challenge of rising costs.

She said: "Our overall challenge is to transition from a health system that treats acute patients to being one that provides preventative healthcare, particularly for chronic and lifestyle diseases, with high-quality acute and tertiary care for those patients who need it."

"Currently, the leading causes of death in Qatar are trauma, cardiovascular disease, metabolic disease, and cancer," explained Dr Hanan. "The high rate of trauma is known to be in large part due to road traffic accidents and accidents in the workplace. Cardiovascular and metabolic disease are inextricably linked and are thought to be the result of smoking, lack of exercise, and poor diet. These are expected to rise as the relatively young population ages.

"Between 16% and 17% of adults currently have diabetes, while cancer accounts for about 10% of all deaths and is expected to grow as the young population ages. This is being addressed through a new and comprehensive national cancer strategy. There is also a growing problem with respiratory disease, thought to be associated with smoking and air pollution."

As the main healthcare provider in Qatar, HMC, which was established in 1979, supplies 90% of acute healthcare in Qatar with an annual budget of QR8.5 billion, 21,500 employees and 2,100 beds. Operating as an integrated care delivery system, it is split into three divisions: the Tertiary Group consisting of Hamad General Hospital, the Heart Hospital, the National Centre for Cancer Care and Research, the Women's Hospital, and the Ambulance Service; the General Hospitals Group, consisting of Al Khor Hospital; Al Wakra Hospital; and the Cuban Hospital; and the Continuing Care Group, consisting of Rumailah Hospital and the Nursing and Skilled Nursing Care Facility. All of the Doha-based facilities are situated within Hamad Medical City.

In spite of these resources, an increasing and ageing population is causing HMC's health services to come under ever greater pressure, explained Dr Hanan. "In the last ten years, our bed capacity has increased by 50%, our admissions by 30%, and our outpatient visits by over 50%; while our adult and child urgent and emergency visits have doubled."

To meet this demand, three new hospitals are set to open in 2015: the Women's Wellness and Research Center; an Ambulatory Care Center; and the Qatar Rehabilitation Institute. In 2016, the new Hamad Bin Khalifa Translational Research Institute is scheduled to open; it will be followed in the period up to 2022 by a series of new specialist facilities, including: a cancer hospital; a tertiary hospital; a mental-health facility; an intermediate care and specialty ambulatory centre; and expansion of the new heart hospital.

Each of the developments, explained Dr Hanan, will aim to achieve a standard comparable with any facility anywhere in the world by investing in not only the quality of the care but also in the quality of an environment "that supports and promotes healing by reducing stress and anxiety, creating a sense of place, and providing positive distraction through art and culture".

Expanding on the development plans for Hamad Bin Khalifa Medical City, John Lambert-Smith, executive director, health facility planning & design, HMC, described how the vision aims to "assure the optimum use of facilities and achieve the highest quality standards of access for patients throughout the country by 2022 and beyond".

He explained: "HMC's three community-based general hospitals will expand to develop key services and create sufficient critical mass to provide the best possible care to support the central Doha tertiary service. Additionally, a suite of specialty ambulatory service centers, will provide high-demand ambulatory services closer to patients, thereby reducing the need to travel to the tertiary campus.



A city within the city: Hamad Medical City



Historic Doha

"The proposed 2013 Clinical Services & Facilities Master Plan is the visible symbol of the rapid clinical improvements currently in progress and those achieved by HMC," added Lambert-Smith. "Our vision is to deliver a world-class patient-as-customer experience within a peaceful and healing environment at every service point across HMC. The plan aims to build a true health, research, and education system, which will attract, retain and inspire the best talent from Qatar, and globally."

Evidence of how Qatar and HMC's strategy for Hamad Bin Khalifa Medical City reflect leading-edge research and thinking is the way the masterplan has been approached by architects Allies & Morrison as an integrated part of the city infrastructure.

Paul Appleton, a partner at Allies & Morrison explained how the relationship of the facilities to the city is critical: "Hamad Bin Khalifa Medical City is a central urban health district of the city of Doha. The questions we asked ourselves were: 'What can Doha bring to a hospital?' And 'what can the hospitals bring to Doha?'" The result is a masterplan with the characteristics of a unifying landscape that prioritises pedestrians via a network of internal and external sheltered pathways, interspersed with gardens, within the context of a public realm framework that allows for future growth.

The strategy to develop Hamad Bin Khalifa Medical City as a fully integrated part of the city and the community is also recognition of the ambitions of the Qatar Supreme Council of Health and HMC that clinical services should both be accessible to the community and play a wider role in education and health promotion to address the growing public health problem of lifestyle and chronic diseases. The salutogenic approach towards encouraging Qatari society to adopt more healthy lifestyles is also seen in the development of the Msheireb, a new 35 hectare mixed-use masterplan for the regeneration of the historic heart of Doha.

Appleton explained how Allies and Morrison were given the role as the 'architectural voice' within the masterplan team for the Msheireb, defining guidelines for an appropriate new architectural language for Qatar that is both healthy and sustainable. "Traditional typologies are reinterpreted in a contemporary way, to create a portion of the city with shaded, pedestrian-friendly spaces and to bring Qatari families back to dwell in the city centre.

Appleton was just one of many international speakers and consultants working in the region to attend Design & Health Middle East 2013 International Symposium. Qatar's willingness to learn from the international experience, as well as share its own ideas and knowledge, demonstrates a level of sophistication and understanding that will support its ambition to be a world-class knowledge hub in the Middle East for health, education, science and research, as it continues its high-level integration with the global economy.



Health-promoting: Ambulatory Specialty Center Courtyard

Third global health transition

Sharing his vision and knowledge with delegates, the keynote speaker and Honourable Minister of Health for South Africa Dr Aaron Motsoaledi, who held meetings with his counterpart the Qatar Minister of Public Health Abdullah bin Khalid Al Qahtani during the symposium, stressed the critical role of infrastructure within the national health agenda across Africa.



Dr Aaron Motsoaledi,
Honourable Minister for
Health, South Africa

"According to *The Lancet*," explained Dr Motsoaledi, "there have been two global health transitions in the history of the world. The first was the demographic transition, when significant improvements in public health were enabled through investment in basic sewage and sanitation systems, greatly reducing premature death. The second was the epidemiological transition, when vaccines were introduced to control and, in some cases, eradicate communicable diseases on a scale never imagined before."

According to Dr Motsoaledi: "We are now entering a third global transition around the organisation and financing of health systems to enable universal health coverage. This will be achieved when every citizen in every part of the globe achieves their right to have good quality, accessible and affordable healthcare where their access is not determined by the socio-economic condition."

The three pillars of a strong and universal health system – quality, affordability and accessibility – are, says Dr Motsoaledi, dependent on a robust infrastructure. He quotes Dr Luis Sambo, director of the World Health Organisation Africa region: "First, strengthening the capacity of public health infrastructure to provide effective, safe and quality health services. Infrastructure includes staffing; buildings; technologies; utilities such as power and water supply; waste management; transport and communication; and financing investments, maintenance and recurring costs. Health infrastructure entails public investments and governments will have to explore innovative ways of harnessing the resources of the private sector, non-government organisations (NGOs) and communities."

In South Africa, emphasised Dr Motsoaledi, the entire concept of national health insurance to enable universal health coverage is being planned in line with these ingredients. "We have recognised the centrality of health infrastructure to the provision of good-quality healthcare."

12 July 2014

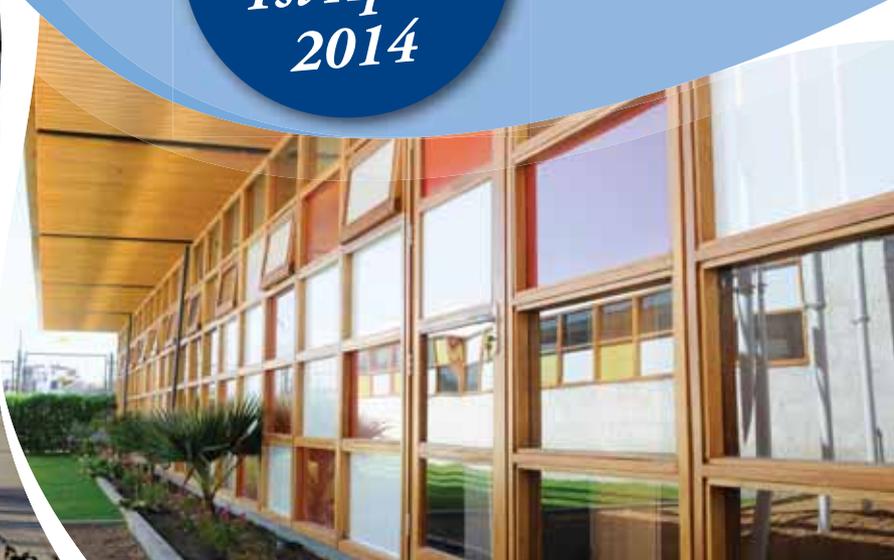
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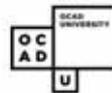
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Top left: Sheikh Khalifa Medical City, UAE, designed by Skidmore Owings & Merrill in JV with ICME and Tilke
Bottom left: South West Acute Hospital, Northern Ireland, designed by Stantec
Bottom right: The Children's Hospital Tony Molleapaza Rojas, Peru, designed by EGM architects



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Global standards

The 2014 Design & Health International Academy Awards, the leading international advocacy programme in the world recognising professional excellence in the research and practice of designing healthy built environments, has opened for entries

The Design & Health International Academy Awards has a huge influence on the design and development of salutogenic environments that support health, wellbeing and quality of life around the world. This year, the programme comprises 12 categories across key areas of international health delivery, and the prestigious Lifetime Leadership Award.

The final awards, which will be presented at a prestigious ceremony to be held on 12 July at the Fairmont Royal York Hotel in Toronto, Canada during the 10th Design & Health World Congress & Exhibition, will reflect important aspects of the exceptional work undertaken by researchers and practitioners at the forefront of the field. Recipients of the awards will be teams and individuals who, through outstanding efforts, have contributed to the progress of knowledge and demonstrated vision and leadership in exemplary initiatives within the field.

The 12 categories include: Health Project (over 40,000 sqm); Health Project (under 40,000 sqm); Future Health (Unbuilt) Project; Research Project; Mental Health Design; Elderly Care Design; Salutogenic Design; Sustainable Design; Interior Design; Use of Art in the Patient Environment; Product Design; and the prestigious Lifetime Leadership Award.

Eligibility

Built projects or research programmes completed between 1 January 2013 and 30 June 2014 are eligible to enter. The exceptions are the Sustainable Design Award, which allows entries of projects completed after 1 January 2008 and the Future Health Project Award, which only allows submissions of unbuilt projects or conceptual designs. Projects may be entered into multiple categories, provided they are tailored to meet the specific requirements for the judging criteria of each award. Previous entrants are not eligible to enter the same category but may enter other categories. The closing date for each entry is 1 April, 2014.

Judging panel, criteria and submission process

The judging panel consists of a group of independent experts from Europe, Asia, Africa, Oceania and the Americas. All experts in their field, the judges come from multidisciplinary backgrounds in research and practice.

There are four different submission forms, each of which has its own criteria, so please ensure the correct form is used for the correct award category. Complete the entry form and the 750-word submission statement relevant to the category being entered, and send to the address on the form together with a maximum of 10 Powerpoint slides. To download the awards entry form and submission statement, visit www.designandhealth.com

The judging panel:



Alan Dilani



Tarek El-Khatib



John Zeisel



John Steven



Ihab Elzeyadi



Alice Liang



Ronald Hicks



Guela Solow



Ian Forbes



John Cole



Deborah Sheehan



Tye Farrow

Judging process and timetable

The judging process consists of a two-phase process:

10 January Call for Entries / Awards open for Submissions

1 April Deadline for receipt of Submissions

2 April Phase 1: Entries are scored remotely by each judging panel against the approved criteria. The scores are forwarded to the category chairs, who make a recommendation on the shortlisted entries and award winners.

13 May Awards shortlist announced. Shortlisted projects are expected to register and attend the 10th Design & Health World Congress to present their project in a poster display and receive their award, either as an award category winner or a commended project. They may be required to elaborate on their submitted project to the judges or provide further information as required.

May/June Phase 2: Members of the judging teams report their final award decisions

12 July Awards Ceremony & Gala Dinner at 10th Design & Health World Congress & Exhibition in Toronto



Patient-centred
healthcare experiences



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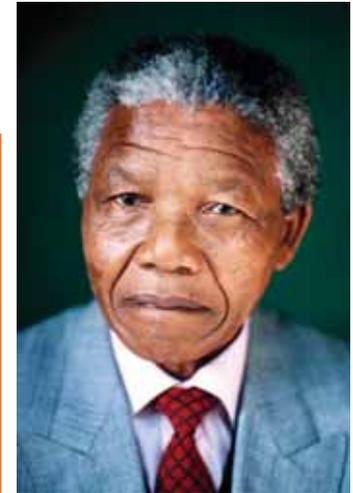


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The Salutogenic Leader

As the world mourns the passing of one of its greatest ever leaders, *Alan Dilani* reflects on how Nelson Mandela's legacy will be his salutogenic approach towards the creation of a free and more equal society



As we welcome the New Year, societies around the world are looking back in admiration of the iconic leadership of Nelson Mandela who, through his vision, knowledge and, ultimately, his humanity, reconciled a nation divided for decades by a brutal system of apartheid.

Mandela's passing on 5 December, 2013, is not only a loss to the Republic of South Africa, but also to the world. He will be remembered for his conviction and devotion to the creation of a free and more equal society. His struggle made possible South Africa's rapid transition from a pariah state to an emerging market economy, and one which continues to support improvements in the health and quality of life for millions of people.

At the International Academy for Design & Health (IADH), we are strong advocates of the message of salutogenesis as a theory for understanding the relationship between health, stress and coping. It is a research perspective that has never been more powerful than when considered within the context of the struggles of Nelson Mandela and the anti-apartheid movement. An historical and transformative figure, few have contributed more to the fight against poverty, injustice and social equality.

According to Aaron Antonovsky, stress is ubiquitous, but not all individuals experience negative health outcomes in response to stress; some achieve health *despite* potentially disabling stress factors. The theory of salutogenesis is that those individuals who are able to develop the social, economic and psychological resources they need to cope with the hardships of life will have a stronger 'sense of coherence' (comprehensibility, manageability and meaningfulness), leading to enhanced health and wellbeing. It is a theory that can be applied on an individual, group and society level.

For Mandela, maintaining a strong sense of coherence enabled him to retain and strengthen his vision for a free and more equal South Africa throughout his life; for example, when faced with the brutal conditions of his imprisonment on Robben Island, or as he presided over the difficult political transition from apartheid minority rule to a multicultural democracy to achieve a peaceful national reconciliation.

Salutogenesis is a powerful evidence-based theory because it is deeply rooted in the creation of meaning. Mandela's achievements were founded on his strong sense of coherence and salutogenic leadership, which he applied to give meaning to all peoples and cultures – black, white and coloured – of the new South Africa.

The core concept of meaning-making within salutogenesis is applicable at all levels of society and in many different settings, including the urban environment, residential areas, healthcare and educational settings, and the workplace. In these settings, a strong sense of coherence provides not only health benefits but also improves learning, knowledge and educational achievement, work performance and job satisfaction, and the personal, social and life skills needed to navigate relationships at home, work and play.

Nelson Mandela's deep humanity and understanding of the power of knowledge and education as a platform for uniting people of divergent beliefs, cultures and socioeconomic backgrounds helped him to dedicate his life to integration, freedom, equality and inclusion. As a knowledge-based network dedicated to improving the quality of life, health and wellbeing of humankind, the IADH is inspired by the vision of Nelson Mandela. His salutogenic leadership, inspiration, conviction and devotion is a guiding light in our collaboration with the Minister of Health, Dr Aaron Motsoaledi and the Nelson Mandela Foundation to sustain Mandela's legacy and support the creation of a healthier society worldwide.

Education is the most powerful weapon you can use to change the world

Nelson Mandela



Prof Alan Dilani is chief executive and founder of the IADH

Baku to the future

Breaking from the rigid and often monumental Soviet architecture that is so prevalent in Azerbaijan's capital Baku, the Heydar Aliyev Center by Zaha Hadid Architects promises to be a focal point for the country's cultural programmes, expressing the optimism of a nation with its eye to the future.

The salutogenic design establishes a continuous, fluid relationship between its surrounding plaza and the building's interior. The plaza rises to envelop an equally public interior space and define a sequence of event spaces dedicated to the collective celebration of contemporary and traditional Azeri culture. Elaborate formations such as undulations, bifurcations, folds and inflections modify this plaza surface into an architectural landscape that welcomes, embraces and directs visitors through the interior.

The building consists of two collaborating systems: a concrete structure combined with a space-frame system. To achieve large-scale column-free spaces, vertical structural elements are absorbed by the envelope and curtain-wall system. Curved 'boot columns' achieve the inverse peel of the surface from the ground to the west of the building, and the 'dovetail' tapering of the cantilever beams that support the building envelope to the east of the site. Meanwhile, the lighting design strategy differentiates the day and night reading of the building.



Heydar Aliyev Center, Azerbaijan

Lead architect: Zaha Hadid Architects

Design: Zaha Hadid, Patrik Schumacher
(special thanks to Charles Walker)

Project designer and architect: Saffet
Kaya Bekiroglu

Main contractor and architect of record:
DiA Holding

Consultants (structure): Tuncel Engineering,
and AKT



Hulton+Crow



CAMH Village Family Health Team, Canada, designed by ARK; commissioned by the Centre for Addiction and Mental Health

All roads lead to value

Although historically distinct markets, both Canada and the USA are flexing mind and muscle in preparation for the new healthcare economy, where value rather than volume will be king. **Andrew Sansom** reports

They call it the third rail in Canada; dare meddle with a system under which all citizens are guaranteed healthcare by the State and it would be as hazardous to a politician's career as stepping on to the third track that provides the electric power for the trains to run. Nevertheless, faced with an ageing population, spiraling costs and prolonged wait times, the sacred cow of public-funded healthcare must adapt, or risk collapsing in on itself.

A decade ago, the 2003/04 Health Accords were launched in an attempt to fix Canada's ailing system. With their focus on quality, accessibility and sustainability, the Accords provided the impetus to send total health

expenditure soaring from \$124bn in 2003 to \$207bn in 2012. Some progress was achieved, not least in reforming primary healthcare and moving to electronic health records. But health disparities and inequalities – and, significantly, many wait times – remained stubborn.

Standards, legislation and finance

In recent years, Ontario and other Canadian jurisdictions have drawn inspiration from the US-based Institute for Healthcare Improvement's Triple Aim framework, which embodies the principles of better health, better care and lower cost. Added into the mix in Canada is the principle of equity – central to the country's perception of its healthcare system – which is gradually reshaping around the value that can be delivered (this is a slower-moving trend in some provinces than others, where cost can still often be the prime focus).

This shift towards value has been translated into myriad statutes and best-practice standards at both



St John's Rehab Hospital: the John C and Sally Horsfall Eaton Centre for Ambulatory Care, Canada, designed by Farrow Partnership Architects and Montgomery Sisam

Confluence Health Central Washington Hospital, Washington, USA

One of the most evidence-based hospitals in HDR's portfolio is the Confluence Health Central Washington Hospital, located in the north west of the USA. The building adds 190,000 sq ft and 176 patient rooms to the existing hospital, providing healthcare close to home for more than 250,000 people.

Set in the Wenatchee Valley and inspired by Scandinavian architecture, the new US\$125m six-storey patient tower features rows of steel sunshades that shield the south-side windows from the region's 300-plus days of sunlight. Patient rooms are same-handed to decrease errors and increase staff familiarity and efficiency, as well as being acuity-adaptable, eliminating the need to transfer patients if their conditions worsen.

A post-occupancy evaluation has highlighted several design-led benefits, including: reduced energy consumption; staff satisfaction positively influenced by the interior aesthetic; increased access to natural light and views; and low noise levels in patient-care areas, partly on account of private patient rooms and decentralised work stations.

ICU beds contain a system that is able to translate simple commands in five languages, play soothing music, and verbally prompt patients to return to their beds if they attempt to get up.

Architect: HDR Architecture

Client: Confluence Health

Cost: US\$125m

Size: 190,000 sq ft

Beds: 176

Completion: June 2012 (phase 2)





The John C and Sally Horsfall Eaton Centre for Ambulatory Care, St John's Rehabilitation Hospital, Ontario, Canada

Delivered jointly by Montgomery Sisam Architects and Farrow Partnership Architects, the project comprises a two-storey addition to an existing rehabilitation hospital on a 23-acre site in north Toronto. The design sought to address critical programme needs and create a new image for the hospital that reflects its status as a forward-looking regional rehabilitation centre.

Founded in 1937, St John's Rehab required a modern design and deeper connection to the outdoor environment. Central to the proposal is a glazed porch corridor, which fronts all public spaces in the building on to a tree-covered tableland and ravine landscape. Between the porch and the ravine is a garden court, which doubles as outdoor therapy space.

The facility also includes a state-of-the-art therapy pool, a new ambulatory-care wing, a wellness centre, an expanded education and research wing, and renovated inpatient areas.

Architect: Montgomery Sisam
Joint project firm: Farrow Partnership Architects
Client: St John's Rehabilitation Hospital
Contractor: Buttcon Limited
Cost: CA\$40m (construction)
Size: 50,000 sq ft (new-build); 35,000 sq ft (renovation)
Beds: 160
Completion: March 2013

regional and national levels. The Ontario Excellent Care for All Act 2010, for example, mandates certain standards of disease prevention and control, efficiencies and quality in the design of facilities, while 2011 saw the introduction of the CSA Z8000 Canadian Healthcare Facilities standard, which outlines expectations in terms of operations, accessibility, safety, infection control and sustainability – creating the memorable acronym OASIS.

Cliff Harvey, senior architect at the Ministry for Ontario Health and Long-term Care, applauds the Z8000 standard's goal-setting approach and non-

prescriptive “push towards a better quality environment”. But he also recognises that “one of the challenges is to align standards and design information with the transformation agenda, because currently there is a gap between strategy and implementation”.

Ontario spends around \$2.2bn a year just to maintain facilities, so a 1% saving delivered through smarter design could generate \$22m a year, which could be reinvested into frontline operations. With such numbers at stake – and with municipalities struggling to keep pace with demand for improved services and infrastructure – it is not surprising that private-public partnership (P3) models and variations dominate the procurement landscape in most provinces.

Design-build-finance-and-maintain (DBFM) models present an interesting proposition, not least as vehicles to deliver greater innovation – an issue on which, in regard to traditional P3, the jury remains out. Tye Farrow, of Farrow Partnership Architects, describes DBFM as “a great delivery method because the requirements over what we submit are thinner”, while frequent meetings with user groups can deliver a higher level of interest and willingness to explore ideas. “Some P3 projects are being delivered that comply with a variety of ideas, but what



Humber River Hospital, Canada, designed by HDR

they fail to do is raise aspirations," he says. "We could start to see more DBFM projects because they have a shorter fuse and are more interactive; the results we've seen are very strong."

Zeidler Partnership Architects' Amos Caspi agrees that DBFM projects are increasingly common but their use over other models tends to be where the project is large and complex, or where the size of renovation work involved is substantial. Another alternative procurement method, called integrated project delivery, requires the entire building team to work in collaboration from conception through to maintenance, in order to increase value, maximise efficiency and reduce waste on a project; it is the template being adopted to deliver the replacement for the Moose Jaw Union Hospital, in Saskatchewan.

Bill Scrantom, Arup's healthcare leader for North and South America, suggests such models can go even further: "My favourite version of P3 – these massive long-term investment strategies – is when there's an operational component and it's not just a design-build-finance strategy. Then there's a lot of attention paid to the efficiencies of the building and making sure the building is going to be cost-effective to operate – and there should be! But the real cost is in the care; we simulate energy and the operations costs of the building, but who's simulating the cost of care?"

For the time being, traditional P3 remains dominant and is entrenched in several provinces, including Ontario (where it is called AFP), Quebec and British Columbia; in Alberta, P3 exists but only for education projects. In the US, meanwhile, the decentralised, local-business oriented framework can often strangle the benefits to be gained through P3, a situation which ensures that traditional design-and-build prevails.

From asylums to assimilation

Community-health centres and primary-health facilities are springing up all over Ontario, the ongoing realisation of the provincial government's goal of moving certain services out of large hospitals and into smaller, local facilities to speed up access. This is particularly true of mental health, an area traditionally under-represented. According to official statistics, in 2012, 17% of Canadians aged 15 or older perceived themselves as having had a need for mental-health care in the past 12 months; a third of these individuals felt their needs were not fully met.

Moving these types of services into community-health centres sits at ease with the Canadian spirit of equity, with certain facilities heavily focused around the needs of people who may be homeless or poverty-stricken. As urban integration fosters a sense of normalisation in tackling such problems, so demand for access to psychological treatment services is likely to rise. But it is also hoped that via community absorption, the stigma attached to the condition might be eroded.

These dynamics are borne out in two projects involving ARK architects – the Sherman Health and Wellness Centre, a new satellite facility for Mount Sinai Hospital, and the Centre for Addiction and Mental Health (CAMH) village family health team. Bringing together a network of family physicians, nurses, social workers, dietitians, pharmacists and other professionals, CAMH village family

Normalisation of mental health is the highest level of ambition in Canada



Spaulding Rehabilitation Hospital, Massachusetts, USA

Providing acute rehabilitation care in Charlestown, the new Spaulding Rehabilitation Hospital has replaced a 35-year-old facility and features 132 private patient rooms.

Perkins+Will conceptualised the new building and campus as a therapeutic tool for patients, but with universal accessibility a key goal. With 75% of the first floor dedicated to public accommodation, the hospital also includes outpatient services, a pool for aquatherapy, an activities suite, transitional patient apartments, two large gyms, as well as a number of satellite gyms.

Research spaces focusing on gait and movement analysis, muscle regeneration, bio-robotics, and longitudinal effectiveness studies were designed with accessibility and flexibility in mind.

Surrounding gardens provide therapeutic trails, bounce walls, a putting green, and a basketball half-court. The interior environment maximises daylight and views but is balanced against a high-performance building envelope. Green roofs mitigate stormwater run-off, reduce cooling loads and heat-island effect, and provide therapeutic environments.



Architect: Perkins+Will
Client: Spaulding Rehabilitation Hospital
Partners: HealthCare
Contractor: Walsh Brothers
Cost: undisclosed
Size: 378,367 sq ft
Beds: 132
Completion: April 2013

Anton Grassl/Esto

health team is formally linked to the city's renowned mental-health and addictions hospital.

Set in Liberty Village, an up-and-coming area of Toronto, the outpatient clinic aims to integrate the homeless and disenfranchised communities with better-off sections of society, such as young professionals.

"Normalisation of mental health as part of the fabric of healthcare is the highest level of ambition in Canada," says ARK principal Guela Solow-Ruda, who suggests people prefer to tell their employer they need time off to see their gynaecologist or divorce lawyer than admit to a mental-health condition. "The mandate from government is that this is not a two-tier system, so the spirit of the clinic is really Canadian."

Commenting on the challenges of creating community cohesion, she points out that the waiting room sits perpendicular to the street, creating an inviting public space. A non-intimidating reception area and a staff lounge adjacent to the waiting room offer balance between soft surveillance and retaining the democratic ambience. Safety and security is subtle: decompression rooms with independent ventilation cater for anyone who is seriously ill, exhibits violent characteristics, or is

unhygienic; and if someone needs to be removed from the premises, a back-door policy offers a dignified exit. Exam rooms feature two exits, giving staff confidence that they will not become trapped in a stressful confrontation, while pods of nature graphics not only enhance the sense of serenity but aid orientation.

Integrated health and the continuum of care

According to Solow-Ruda, the integrated health team is a growing trend, as governments try to join up a traditionally fragmented system and ensure patients do not fall through the cracks, only to re-emerge with chronic problems further down the line.

Speaking about the Sherman Health and Wellness Centre, in Vaughan, Ontario, she explains: "The architectural design features that assist the integrated health team come in the form of the collaborative work spaces we've designed. There are big open areas with private pods, so they can all be on their laptops getting on with their individual work, but they're in the same room, so they can share thoughts. They love it – it really stimulates dialogue, teamwork and collaborative thinking, so that the diverse needs of the whole patient are considered." Diversity is arguably the

centre's raison d'être, with a family medicine clinic, a functional-pain and rehabilitation clinic, and visiting specialist spaces all provided on a campus site, mixing educational, recreational and spiritual services. Examination rooms are concentrated in the heart of the building, with circulation pushed to the edge. The continuous-loop route not only ensures clinicians cut out repeat walking actions, but, in allowing for more natural light, also adds to the patient experience.

"The positive patient experience is enhanced through access to daylight," says Solow-Ruda. "Because they know where they have come from when they go in to see the doctor, they experience a sense of being more in control and, by being in control, it is hoped they can become their own healthcare advocate."

Integrated care is also evident at CAMH's main Toronto site – with phase 1B of a major construction project completed in 2012 through a consortium (KPMB, Montgomery Sisam and Kearns Mancini Architects), Cannon Design and Stantec Architecture. The result is a new inter-generational inpatient and outpatient building consisting of geriatric mental-health and child/youth/family programmes, office, education/research and retail space.

It is designed around the theme of an "urban village", which integrates the CAMH site with neighbouring streets and blocks, while ample parkland is preserved within the master plan and supplemented through wide planted boulevards. To enhance the sense of integration and normalisation, spaces for retail, a patient-run café, and a gallery showcasing patients' artwork help invigorate the setting.

Joined-up integrated care has an increasingly important role to play in the new economy, not least because of the potential savings up for grabs and the desire of hospitals to avoid costly re-admissions. In 2009, for example, there were 140,000 instances of patients re-admitted to hospital in Ontario within 30 days of their original discharge. Cliff Harvey waxes lyrical about the Ontario Ministry's introduction of Health Link pilot projects, which are designed to encourage greater collaboration and co-ordination between a patient's different healthcare providers, improve access to family care, reduce avoidable emergency-room visits and readmissions, and cut referral time to specialists. He explains: "In Ontario, between 1 and 5% of the population use between 60 and 90% of the healthcare resources. Monitoring through Health Link can reduce pressure on the system both from an economic and a wait-time point of view."

By being in control, patients can become their own healthcare advocate

Nanaimo Regional General Hospital, Emergency & Psychiatric Emergency Services, British Columbia, Canada

The design objectives and sustainability strategies were to achieve a LEED Gold solution around the four values of 'timely', 'respectful', 'quality of care', and 'a place people would want to come to work'. The challenge was to create "an environment that staff would want to come to, even on their day off".

Stantec's design team and the hospital's medical staff explored ways to improve patient access and flow. Other considerations informing the design were functionality, privacy/confidentiality, safety, and quality of the environment. Six within-care area courtyards were introduced, bringing beauty and calm to these high-stress environments. Work stations and waiting areas overlook courtyards, while the two psychiatric treatment areas also open out to secure courtyard gardens.

Extensive use was made of wood, displacement ventilation, a thermal labyrinth and natural ventilation. Through computer modelling and cost/benefit analysis, capital costs of the courtyards were weighed against the potential operational savings on staff costs, medical errors and improved clinical performance. Data from its first year in operation suggests these savings are already being realised.

Architect: Stantec

Contractor: CMF Construction

Client: Vancouver Island Health Authority

Cost: CA\$38.6m

Size: 3750sqm

Completion: September 2012



Indiana University Health Neuroscience Center of Excellence, Indiana, USA

Delivered under P3, the six-level Indiana University Health's Neuroscience Center of Excellence houses one of the nation's largest concentrations of specialised neuroscience clinicians and researchers for adult outpatients with neurological disorders. Among other things, it features collaboration and education space, a fitness centre, outpatient rehabilitation, and a robotic lab. It is joined to a neuroscience research building to speed application of research to clinical treatment.

The healthcare environment provides positive distractions for the patient – inhibiting emotions of fear, loss of control, objectification and confusion – while creating spaces that communicate trust and confidence; foster the involvement of the patient and caregiver; and nurture human contact and empathy, as well as promoting advocacy.

Linear waiting balconies and stairs are exposed to the lower levels, offering opportunities for physical mobility. The effect is to promote cohesion, comprehension and manageability, thereby minimising stress of the unknown. Natural light, ventilation, non-toxic materials, welcoming staircases, serene colours, and clear wayfinding signals all add to the calm environment.

The centre employs the universal grid system, in order to provide benefits in initial capital cost, operating economies and future adaptability.

Releasing the bottlenecks

In the US, cost concerns are just as pronounced, but to suggest there is no national health system in the US is not entirely accurate; federal-funded hospitals with emergency departments have a duty to treat any acutely-ill citizen who enters seeking treatment, irrespective of whether they are insured – an incredibly expensive model.

There is still uncertainty about what the Patient Protection and Affordable Care Act will bring, but HDR Architects foresees an environment in which rising demand for higher-quality and more cost-effective care will compete against a backdrop of reduced reimbursement; new reimbursement policies are based on a savings bonus, including bundled payments for acute episodes of care and care outcomes.

"The Affordable Care Act focuses on outcomes," says Tye Farrow. "In the past, there has been access to massive

Architect: Cannon Design

Clients: Landmark Healthcare Facilities; Indiana University Health

Cost: Undisclosed

Size: 270,000sqm

Beds: None

Completion: June 2012





Niagara Health System, St Catharine's site, Ontario, Canada

St Catharine's is said to be the first design-build-finance-maintain (DBFM) hospital to be delivered through Infrastructure Ontario, the provincial government's alternative-financing procurement model. Plenary Group secured the contract and acted as project lead, developer and equity investor.

As well as creating a 375-bed hospital consolidating acute and ambulatory services on a new site, additional programmes, including cardiac catheterisation and mental-health care, are now accessible to local residents. The site also includes the Walker Family Cancer Centre.

The facility includes 80% single-patient rooms to promote best practices in infection control. It is one of the only hospitals in the world to have a dedicated HVAC system, enabling the hospital to be split into two distinct air-handling zones for complete isolation in the event of a pandemic. The number of windows in rooms has increased to enhance natural light, while a healing garden promotes therapeutic meditation.

A compact building footprint reduces travel times by co-locating key departments both horizontally and vertically. Stress-free orientation is fostered by a 'main street' layout and colour themes. Standardised features afford staff familiarity, easy access to supplies, and multiple lines of sight from nursing stations.



Architects: B+H and Silver Thomas Hanley
Contractor: PCL Constructors Canada
Client: Plenary Group Canada (concessionaire)
Cost: CA\$539m
Size: 960,000 ft² (89,187m²)
Beds: 375
Completion: Early 2013

amounts of medical technology in the US, but everyone in the system was rewarded for inputs such as medical treatments and tests. Now a shift has occurred away from over-treatment and unnecessary treatment. Healthcare

organisations and doctors will be paid for keeping people healthy and delivering value rather than volume of care."

The immediate consequence of the Act will be the influx of newly insured patients who had previously been denied access. At the same time, it is hoped pressure in the system will be released by the Act's emphasis on sanctions for avoidable readmissions, and driving investment in elderly care and rehabilitation facilities within the community. By moving low-acuity services out of the hospital, it will become a 'sicker' place with services carried out at greater intensity. With the emergency department, intensive-care and trauma services therefore likely to take centre stage, designers will be challenged to release the bottlenecks that occur in these departments and help move patients through the healthcare system more quickly.

Releasing patients from in-patient areas will demand a system-wide solution, says Amos Caspi, who identifies some emerging trends in emergency-room design. One is lean processes and how design can help operational goals, such as seeing more patients in shorter timeframes, but also in tighter areas. "Another strong trend is the waiting area," he adds. "Outside the emergency department, there is a small area for family members, but it is not the patient waiting there. They are being moved to sub-waiting areas, inside the emergency room, and next to the care-giver."

Safety, security and satisfaction

The Act will place added pressure, too, on ensuring the safety and security of patients in these new settings. Beginning in the financial year 2015, hospitals will also be reimbursed on their ability to reduce patient harm as a result of hospital-acquired conditions. While there is a clear medical argument in support of single private rooms – even more so in



Creating healthy, active, and engaging environments



George Brown College
Waterfront Health Sciences Campus
Stantec Architecture/KPMB Architects in Joint Venture

Design with community in mind
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Juravinski Hospital and Cancer Centre, Breast Assessment Centre, Ontario, Canada

The design for the CIBC Breast Assessment Centre at Juravinski Hospital aims to reduce anxiety in a holistic fashion: through physical integration with the city and the existing hospital, and its community activity and education. Zeidler Partnership Architects describe it as “a prototype for community-centred care that may be applied universally”.

Based on the principles of salutogenesis, the centre is one of the first in North America to follow an international trend in wellness centres that concurrently emphasise emotional and physical health. This idea is exemplified in the siting of the pavilion, which is nestled in the courtyard and set back from the main street.

The pavilion's façade is composed of open-slatted wood, which filters light from the garden into the main waiting area. Local wood has been chosen for its strength, versatility, low environmental impact, and energy efficiency. Designed for sensory appeal, the centre highlights serene sounds, such as rippling water, while filtering unwanted ones. The atmosphere ensures positive stimulation for women receiving preventative and diagnostic services.

Architects: Zeidler Partnership Architects
Contractor: GS Wark
Client: Hamilton Health Sciences Network
Cost: CA\$5m
Size: 11,100 sq ft
Beds: None
Completion: Summer 2014



a private-insurance market such as the US – the way in which some hospitals have taken inspiration from the hospitality sector is also driven by marketing.

The immediate future could involve a delicate balancing act between nudging people to become their own healthcare advocate and imparting a sense of individual responsibility to lead healthier lifestyles, while, at the same time, continuing the charm offensive in a bid to push up patient-satisfaction ratings. As Bill Scrantom suggests, hospitals in the US cannot afford to treat patients like commodities. “Part of the reimbursement equation for hospitals moving forward has everything to do with patient satisfaction,” he says. “So, when you walk in the door, you need to go: ‘Wow, I feel good about this place – it’s clean, it’s beautiful, everyone’s so nice; I’m confident that I’m going to get good healthcare.’ I give you high rankings, and that helps you with your reimbursement.”

Safety and cleanliness are advanced in Canada, too, a country whose experience of SARS in 2002/03 left a significant mark. Says Cliff Harvey: “In Ontario, we haven’t quite gone to 100% single beds but we have gone to 80%, and intensive-care-unit beds are all single-bed rooms. Exam rooms are enclosed cubicles and we’ve moved away from open wards.”

He also senses a trend in not just relying on engineering solutions to manage infections but to focus on the culture of the organisation, and the role, in particular, that design can play in improving staff behaviour:

Lean, green, digital healing machines

To guard against unanticipated costs, healthcare owners in both countries want facilities that they can easily adapt for future needs and capacities, as well as all the latest technology to deliver care beyond the confines of the traditional setting.

Promising to be North America's first fully-digital hospital – as well as lean and green – Toronto's Humber River Regional Hospital will be a 656-bed hospital, slated for completion in spring 2015. Delivered through the Plenary Healthcare Partnerships team, with HDR providing architectural services, the project's digital innovations include smart-bed technology that monitors patients' vital signs and updates e-medical records immediately; integrated bedside terminals that give patients control of their environment and enable them to communicate via video; and voice-recognition software that allows staff to complete charts verbally. Lab specimens will be delivered via pneumatic tubes, with results returned to mobile devices within minutes, while automated-guided vehicles will deliver supplies.

Meanwhile, St Mary's Hospital in Sechtelt, British Columbia – designed by Farrow Partnership Architects and Busby Perkins+Will Architects – is upping the environmental stakes. The hospital, which opened last year, is said to be on course to be North America's first carbon-neutral hospital. This will be achieved not only through a high-performance building envelope but also via a geo-exchange heating and cooling system, comprising 125 boreholes, each 250 feet deep.

One of the few hospitals with operable windows in all clinical and inpatient areas, 75% of spaces have access to natural daylight; and skylights and clerestory windows are incorporated in the emergency room.

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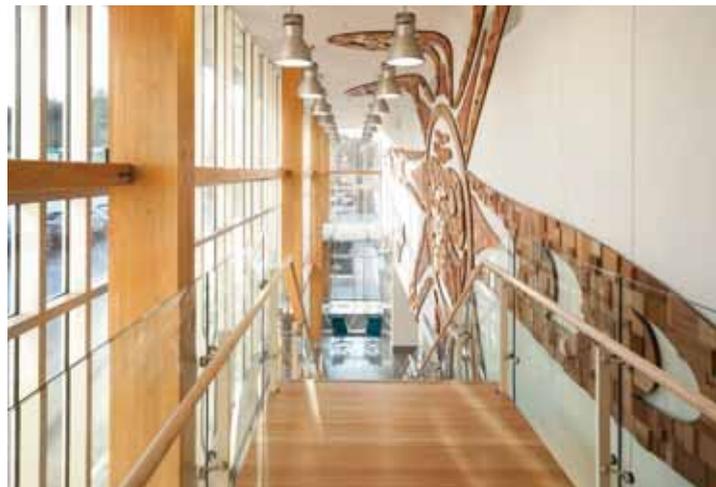
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St. Mary's Hospital | Sechelt, British Columbia
Farrow Partnership Architects in association with Perkins+Will Architects
Photograph: Latrelle Delage Photography



Central Washington Hospital, USA, designed by HDR



St Mary's Hospital, Canada, designed by Farrow Partnership Architects in association with Busby Perkins+Will Architects

Bruce Raber, vice-president of Stantec's healthcare practice, insists "sustainability is one of the big factors that we don't lose sight of", pointing out that under P3, severe penalties can be imposed for failing to meet standards. Citing some of the innovations in this area, he adds: "We're looking at displacement ventilation, which provides better air; cleaner air, and is more cost-effective. Depending on the climate, geothermic systems are being used. But there is also more application around the sustainability theme with some of the features seen in Europe: for example, green roofs, external shading, ventilation control via building-automation systems."

There is, however, also a sense that old habits die hard. Phil Nedin, who heads Arup's global healthcare business, says: "We think we're building for the future, but actually we're not. For example, if you look at the different forms of acute hospitals, one of the popular forms is the podium and bed tower. In its time, that

was a very, very popular form of building. But I am not aware of any podium-and-bed-tower hospital that's ever been converted to anything else."

According to Bill Scramton, land availability is a major issue in driving the vertical approach, but he is optimistic that solutions are emerging: "I do think that there is an attempt to incorporate penetrations and break up the mass of the podium in these scenarios. It's really being driven by the concept of driving natural light into the facility, making it a better healing environment and more energy-efficient. And maybe that helps it to be more adaptable to different building types, too."

While careful not to dismiss such ingredients as sustainability and lean design, Tye Farrow sees these as baselines from which to develop environments that are truly salutogenic. What this means in the context of lean design and operational efficiencies, he explains thus: "It's not just the path you travel but the quality of that path and, with travel distances, it has to be an enjoyable experience. It should be about the regenerative impact it can have on your mental health. If you're highly-stressed and as you're moving between points you have the ability to physically and mentally exhale, that has a significant impact on your ability to thrive."

As Farrow sees it, the key constituents for health-causing environments are variety, nature, authenticity, vitality and legacy. It is these five values that he feels must become part of the design ethos of healthy buildings and planning in the future, not just in North America but across the globe.

Andrew Sansom is a freelance writer and associate editor of *World Health Design*

Unite and heal

WHD reports on the Mike Nightingale Fellowship, which has a vision to improve the quality of life for communities in developing countries in a sustainable way

Registered as a UK charitable trust in May 2013, the Mike Nightingale Fellowship (MNF) operates as a catalyst, working with agencies to realise agreed objectives that would be difficult to achieve without collaboration. Initially focused in South Africa, where Mike was born, the trust is working in the health and social-care sectors at national, provincial and local levels.

National and regional input

Nationally, the charity has been collaborating with the Infrastructure Unit Systems Support (IUSS), a specialist group that provides guidance support for the National Department of Health. The IUSS is currently engaged in an ambitious programme of creating 45 design guides aimed at improving design standards for health facilities on a national scale. Draft guidance for emergency departments has been peer-reviewed by the Fellowship, which is hoping to roll out a programme of further reviews and other initiatives, including a student design competition,

in collaboration with Architects for Health, at the International Union of Architects conference in Durban this August.

Led by MNF trustee Nigel Draper, the charity has already run two week-long workshops bringing together healthcare-facilities professionals in South Africa's various provinces to exchange ideas and inspire best practice in the design and delivery of new and refurbished hospitals and clinics. Nigel says: "The first workshop, held in London in April 2012, gave eight Western Cape health and works managers a comprehensive workshop covering strategic planning, briefing, design and procurement, using current Cape Town projects as exemplars and visiting relevant London examples to make comparisons."

The second workshop, recently hosted in Cape Town and jointly hosted by the Fellowship and the Western Cape Department of Works, involved professionals from four provinces: Western Cape, Eastern Cape, KwaZuluNatal and Gauteng, as well as the National Department of Health. It is hoped that the event could kick-start a regular programme of provincial forums.



Hout Bay's prime residential areas are mainly occupied by wealthy white people

Local initiatives

In addition to its national and regional advisory work, the Fellowship aims to make a real difference at a local level. Situated just 30 minutes from Cape Town, Hout Bay is, in many ways, a microcosm of the country; it is made up of three distinct settlements living side by side, but hugely separated physically, ethnically and culturally, not to mention by their gross differences in wealth. There are 17,000 wealthy, predominantly white business and retired people occupying the prime residential areas, mainly in gated security estates.

There is a settlement of 29,000 Cape coloureds, who were resettled following the destruction of the ethnically mixed District 6 in central Cape Town. They were housed in Eastern European-looking slab blocks in Hangberg, a prime bay site where many worked as fishermen. Competition from industrial-scale fishing trawlers has led to high unemployment, as well as a subsequent rise in people with drug and alcohol problems.

The third settlement is the informal township of Imizamo Yethu. It comprises 35,000 people, who live in an

area a tenth of the size of that occupied by the 17,000 wealthy 'valley people'. About a third of the dwellings in the township are small but sound brick-and-tile houses mainly donated by charity; the rest are corrugated-iron shacks typical of South African townships. About half the residents originate from other African countries and have come to South Africa to seek work.

Mike is only too aware of the palpable tension between the ethnic groups in Hout Bay; one day, while he and his partner were staying in his secure home in the settlement, two hooded youths from the township broke into the property and attacked the couple. The youths eventually fled, but the incident left an indelible mark on Mike. "This incident completely opened my eyes to the harsh reality of living in a close – but grossly unequal – society," he says. "Hout Bay is a stunningly beautiful place, largely peopled by very friendly, well-meaning folk in all three communities, but until they can sort out their differences and live together for their mutual benefit, they will continue to epitomise the worldwide malaise of separate development within communities."

A test laboratory

Because of its close connections with people in the three communities and its links with dozens of charities in the area, the Fellowship hopes to harness the abundant good will that Mike refers to, in order to create a more integrated society. Mike sees the area as a test laboratory for similar environments in South Africa and worldwide.

Mike comments: "We fully understand the scale and complexity of this challenge and are prepared for the long haul of developing an inspiring vision, forming lasting partnerships and facilitating effective solutions collaboratively. As a small new charity, with limited resources, we want to maximise our ability to support positive integration in Hout Bay, by acting as a catalyst to bring together the impressive array of national and local government and charitable initiatives."

Serving as the organisation's talisman in Hout Bay is Nathan Roberts, co-founder of the Sibanye Restaurant in Imizamo Yethu.

Nathan also runs the Everyday Heroes club, which mentors township boys between the ages of 13 and 17 to prepare them for legitimate employment. The Fellowship has just approved a grant to the club to fund a second co-ordinator for the team of volunteers that mentors the boys. With this investment, the club aims to double in size in a year and develop a tested programme capable of being replicated elsewhere.

An aligned vision

During the Fellowship's recent visit to Hout Bay, Nathan organised a series of meetings with charities interested in community integration, including the Hout Bay Partnership: "Over the last five years, they have recognised the dangers and missed opportunities of the unsustainable separate development of the Hout Bay communities," says Mike. "Their vision exactly corresponds with that of the Fellowship: to use sustainable development as a vehicle to inspire integration and self-interested co-operation."

Hout Bay has stunning assets, including an undeveloped river leading to a large sandy bay, with the potential for a world-class waterfront development accessible via the newly commissioned Cape Town rapid-transit system. The excellent existing road system could be complemented by a pedestrian and cycling 'heart route' along the river:

The elements with most potential to bring the whole community together are integrated health, education, housing and leisure facilities, all made economically and socially sustainable by excellent local employment



Eastern European-looking slab blocks in Hangberg



The informal township of Imizamo Yethu

MIKE NIGHTINGALE FELLOWSHIP

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The Mike Nightingale Fellowship was established in 2012 to support the development of more sustainable communities in low to middle income countries. Initially focusing on South Africa, the charity is a catalyst for innovative projects through a mixture of charitable funds, skills development, education, knowledge and expertise. Join the Fellowship at its inaugural fundraising Gala Dinner and Charity Auction to help change lives and create a more sustainable world.

How you can participate:

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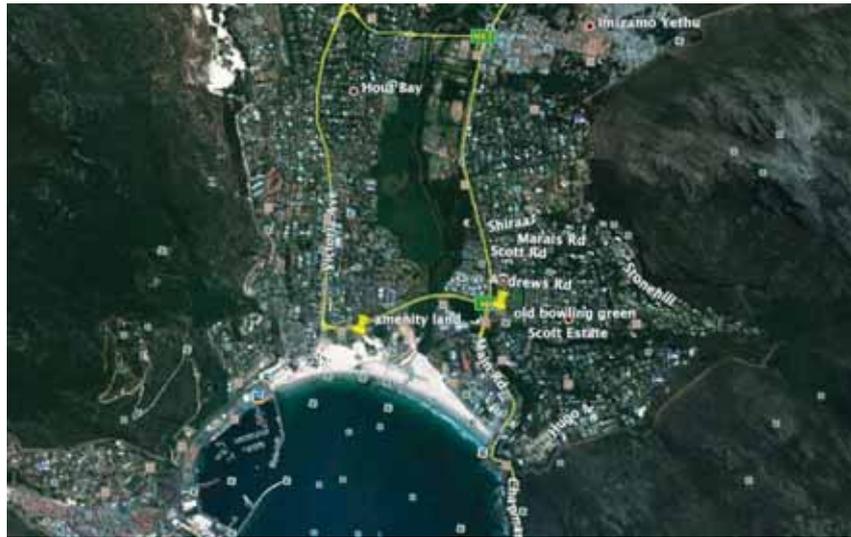
Venue: The Crystal, Royal Victoria Docks, London



For more information, contact info@mikenightingalefellowship.org | www.mikenightingalefellowship.org



Members of the Everyday Heroes club, Hout Bay



Concept plan for Hout Bay

opportunities. Indeed, for some time now, the Western Cape Department of Health has been seeking a suitable site for a large health clinic to provide much needed co-ordinated primary healthcare for the growing population of Hout Bay.

The Fellowship is providing financial support for specific charities already working in Hout Bay that fit into the vision of future integration described above. It has recently agreed to fund the salary of a child-care worker and extended hours for a programme manager at Ikhaya Le Themba to help educate children and their families from disadvantaged homes in Imizamo Lethu. A condition of this extra funding is that the individuals concerned work directly with the Everyday Heroes club – the expectation being that, via an auditable trail of assistance and mentoring, tangible results in child education will manifest.

Skills challenge

The Fellowship believes there is a gap in the market in the existing network of government and charity-based organisations around preparing young people for work in Hout Bay. Says Mike: “We have close links with a very successful UK-based charity called Aspire Oxford, which specialises in preparing and equipping disadvantaged people for employment by giving them relevant skills and, most importantly, the confidence to hold down a regular job. This is achieved by offering firms and individuals competitively priced, high-quality services, such as landscape maintenance in professionally supervised teams. In this way, the team members pick up the skills and confidence they need for future employment, or running their own business.”

One of the Aspire managers asked the Fellowship to test if the model could work in Hout Bay: “We got a very positive response from the manager of a 100-house estate, who is collecting data on gardening, pool maintenance, maid service and house-painting services, so a business plan can be drawn up,” explains Mike. “We also have links with Workspace, which has very sophisticated wood, metal and fabric-working workshops in Hangberg, Hout Bay – ideal for training people for Aspire-type services – so there are further opportunities for synergies there.”

The Fellowship has also forged links with former doctor and Hout Bay resident Dr Johnny Anderton, who is exploring how to provide an affordable alternative to shack living in informal settlements. His E-Khaya concept, made from sandbags, is described as an elegant fire and sound-resistant dwelling, suitable for self-build and a third of the price of equivalent government housing. The Mike Nightingale Fellowship wants to encourage the allocation of new housing sites for this type of experimental housing as part of the new Hout Bay plan.

- To raise money for this and other initiatives, the Mike Nightingale Fellowship is holding a gala dinner and fundraising auction in the Crystal, a Siemen’s sustainable building initiative in London on 6 June 2014. For more information, visit www.mikenightingalefellowship.org

We understand the scale and complexity of this challenge and are prepared for the long haul

Peak practice

WHD learns how the experiences of one woman's search for a suitable residential-care facility in South Africa for her sister led to the development of a new design concept through her mental-health charity

Mental-health care, treatment and rehabilitation in South Africa all rely heavily on outdated hospital and institutional models, which are simply incompatible with the dignity of equal citizenship. The housing that is available is most often placed outside of city or town borders, enclosed and separated from society.

Vision, mission and principles

With an ambition to transform the lives of people with learning disability and mental illness through global best

practice, Climb Any Mountain was set up in August 2011 by Kim Crossman, in response to her family's efforts to find an appropriate residential-care facility for her younger sister Cara, who was born with learning disability. Climb Any Mountain's long-term goal is to create a more substantive life for people with mental disability by reducing both physical and social isolation, and by creating communities that accept and understand how to deal with their disability. The organisation is committed to giving people with intellectual disability and mental illness across South Africa a voice and choice in the decisions made about their living situation and lives, regardless of creed, colour or class.

Climb Any Mountain only works with local service-providers; as well as being aligned with the charity's vision of fostering independence and empowerment, these local organisations must comply with minimum criteria in terms of capability.

Creating the TLC

Many countries have gone through the process of deinstitutionalisation with varying degrees of success. By combining global knowledge with local expertise, Climb Any Mountain began to formulate the vision for the transitional living centre (TLC). Kim explains: "We wanted a model that learned from the past, appropriate

There were two design components to consider: the services provided and the physical premises

to the culture and community, and aligned with our principles of inclusion and empowerment."

Critical to the sustainability of the service is that the housing be affordable and can be funded via service-user disability grants and service-providers' state subsidies.

In setting out to realise the vision for the TLC, the initial step was to find a service-provider with capability for residential day services and social-service support and – most critically – who shared the same vision.

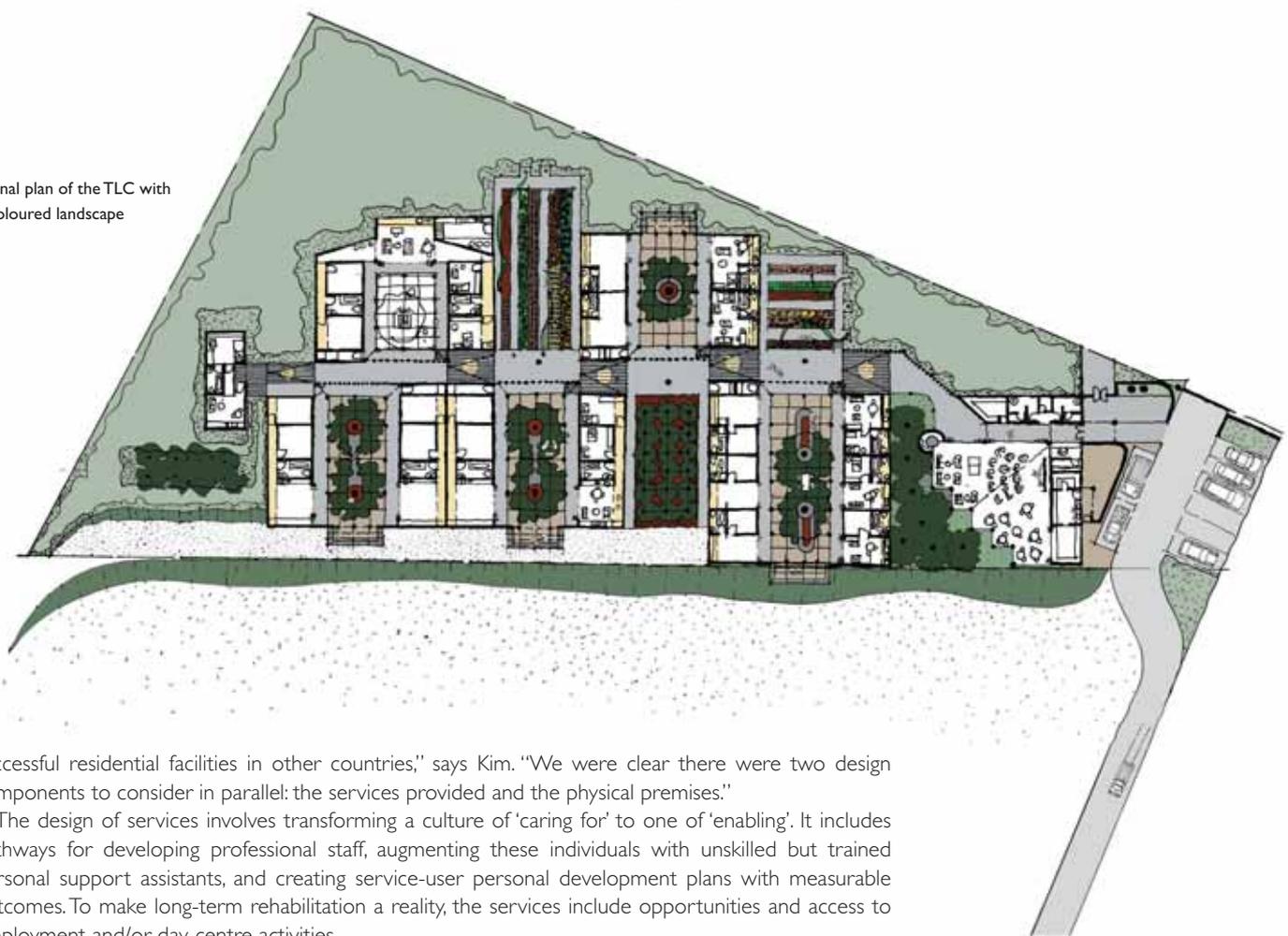
With its passion and commitment to empowering and enabling people to live independently, the Pietermaritzburg Mental Health Society surpassed expectations. It assigned land to develop a purpose-built, supported living facility for the mentally disabled – the first of its kind. The land is adjacent to existing services, enhancing the existing structures of 24/7 medical and staffing support.

The next step was to harness local and community knowledge. "We began with facilitating dialogue and cross-fertilising ideas and concepts, including visits to



The design of services involved transformation of a culture of 'caring for' to one of 'enabling'

Final plan of the TLC with coloured landscape



successful residential facilities in other countries," says Kim. "We were clear there were two design components to consider in parallel: the services provided and the physical premises."

The design of services involves transforming a culture of 'caring for' to one of 'enabling'. It includes pathways for developing professional staff, augmenting these individuals with unskilled but trained personal support assistants, and creating service-user personal development plans with measurable outcomes. To make long-term rehabilitation a reality, the services include opportunities and access to employment and/or day-centre activities.

The physical build requires spaces for individuals to develop and master skills of independent living, as well as spaces to facilitate socialisation within the development. By building four, two and one-bedroom, self-contained accommodation within the same environment, the space will house people with a range of abilities and allow progression to more independent living space before moving out into the community. The physical design comprises areas for occupation and industry. It is also important that the space is of a human scale and representative of the South African community.

Once the design brief was fully articulated and aligned, Climb Any Mountain launched a competition through the South African Institute of Architects. This process challenged the best design houses in the country to produce a working model that was locally born, culturally sensitive, and could be replicated across the country. The competition was judged by Dr Jennifer Beningfield (architect, writer, and principal of Openstudio Architects), Dr Lindsay Bremner (director of architectural research at the School of Architecture and the Built Environment), and Kim herself.

The judges were impressed with the calibre of work submitted by all four finalists but were unanimous in their decision on the winning TLC design, which was awarded to Jo Noero of Noero Architects.

The TLC design

Noero's TLC design comprises a series of secure differentiated productive landscapes surrounded by single-storey buildings. The design intentionally implies the order and structure of a city, to bring the idea of everyday life into focus and offer ways of understanding the world outside the TLC.

The units of accommodation are differentiated and organised around separate and secure courtyards. The structures are built to human scale, and the layering of communal to private spaces enables residents to participate in the life of the centre, as well as retreat if and when they elect to have more privacy. The design is secure enough to be protective, but views out over the surroundings give a sense of openness and generosity to the circulation and flow through the entrance and into the building.

Familiar construction techniques enable the building to be constructed



The physical build provides spaces for socialisation



Giving people a voice and a choice over what independent living looks like is a key part of the design philosophy

without requiring special skills or technology, while the architectural language will be familiar to people from many different backgrounds.

Communal courtyards alternate between the units of accommodation. These spaces are treated as productive landscapes, which the residents control. Shared production spaces serve to foster a sense of togetherness and can be used to emphasise the dignity that is associated with labour. The design allows residents to participate in the details of their environment, including the planting of the courtyards.

A range of measures is integrated into the design to reduce the costs of energy and water consumption by 80%. These include a rock-store cooling system, solar heating and energy generation, rainwater harvesting and water recycling. A flexible lyrical organisational device allows the design to be customised in terms of scale, materials, colours and internal landscapes.

Funding, schedule and challenges

The funding requirements for the Pietermaritzburg TLC are R15m (c. £1m). The documentation and approvals are scheduled to take five months, commencing in January 2014. The construction, thereafter, will take nine months, with the TLC complete in April 2015.

The TLC is intended as a blueprint for future services nationwide, accelerating the transformation of living conditions and opportunities for people with mental disability in South Africa. The greatest challenge will be to ensure fitness of purpose: that the physical shaping of the spaces and the way they are made provide an environment that fulfils the intention not just for now but for years to come. It will also be imperative to ensure that the services can be cost-effectively maintained and remain accessible to individuals, funded solely through disability and social grants.

Future plans

Climb Any Mountain's long-term vision is to replicate the TLC with at least one service for each province. After the establishment of a TLC, the next phase involves developing supported community-based housing in and around each TLC service, so that individuals can 'graduate' after mastering basic skills of independent living. Creating and sharing this practical concept of what de-institutionalisation could look like has inspired other regional mental-health societies, which have expressed a desire to partner with Climb Any Mountain.

The regional mental-health societies fall under the umbrella of the South African Federation for Mental Health and collectively make up 47% of all community residential facilities across South Africa. Impacting the service delivery here has lasting consequences for the standards and models of delivery of care nationally.

Kim comments: "We have learned in our journey so far that regardless of the severity of their disability, individuals wish to live independently. We have learned not to underestimate the futures in which people want to live. And we have learned not to assume, but to ensure the process specifically gives people a voice and a choice over what this looks like."

With 10 TLCs to build across the country and plenty of competition for government funding, there is a need to raise private capital to build the physical spaces. There is also an opportunity for corporations to donate gifts in kind to furnish and fit the buildings. Any individual or organisation seeking more information on how to support the charity should e-mail info@climbanymountain.org



Communal courtyards alternate between the units of accommodation

It's a two-way street

What can high-income countries learn from those less well-off in relation to mental health? An online knowledge-sharing programme seeks to find out

Turning the World Upside Down (TTWUD) aims to promote and celebrate ideas on health applied in low and middle-income countries (LMICs). Built on the belief that knowledge transfer and innovation runs two-way, it is particularly focused on what high-income countries can learn from LMICs. The project's journey began with a book, *Turning the World Upside Down: The search for global health*, authored by Lord Nigel Crisp, ex-chief executive of the NHS in England and former permanent secretary of the UK Department of Health. The book, which was reviewed in the April 2010 issue of *WHD*, captured learnings from practices applied in a host of LMICs.

The project has now evolved into an online platform where anyone can share their experiences, ideas and insights, by submitting a case study, or writing a commentary on a project currently on the site. The case studies are examples of where people have developed new ideas or skills, or are using old insights that could be – or have been – transferred to other countries.

In November last year, a ceremony for the Turning the World Upside Down – Mental Health Challenge was held in London. It featured a 'Dragon's Den-style' panel of experts, who chose a winner after hearing presentations on the following four shortlisted projects. For more details, visit www.ttwud.org



Lord Nigel Crisp

Winner: Dream-A-World Cultural Therapy intervention

Dream-A-World Cultural Therapy (DAW CT) is a group psychotherapeutic intervention of creative-arts therapies and remedial academic support. In 2006, it was applied as a 'proof-of-concept' intervention to assist 30 children from an inner-city primary school in Kingston, Jamaica over a two-and-a-half-year period.

The project aimed to: improve academic performance; increase self-control and modify maladaptive behaviours; and increase self-esteem among students in the study cohort, who were identified as high-risk based on their poor academic performance and behavioural problems. A matched control cohort was also selected.

Over the project period, the study cohort attended three 40-hour summer workshops, 28 after-school sessions, and three field trips. The 'Dream-A-World' aspect involved asking the children to imagine and name a new world on another planet. The children were helped to compose songs, poems and dances about their new world, and they refined and performed these over the project period.

The ASEBA (Achenbach system of empirically-based assessment) teacher-report form (TRF) was used to evaluate behaviour changes at baseline and at the end of the intervention. Changes in academic performance were measured using the children's end-of-year grades for language arts, mathematics, science, and social studies.

All children in the study cohort passed the grade-six achievement test at the end of the project; all have since entered accredited high schools in Jamaica. Measured using the ASEBA TRF, the intervention group made significant improvements in social and behaviour adjustment, academic achievement and artistic, musical and dramatic performance. In July last year, a 'scale-up' three-week DAW CT workshop was set up in four more inner-city primary schools. This will see 100 students and 100 matched controls followed, as in the 'proof-of-concept' project, until August 2015.

Edited from an account by Frederick Hickling, professor emeritus, University West Indies



Above: Teachers and students at George Headley Primary School ('scale-up' project)

Below: Dream-A-World 'show and tell' performance, Duhaney Park Primary School ('scale-up' project)

Mobile tele-psychiatry is an affordable way of delivering mental-health services in rural areas

Mobile tele-psychiatry

India has just 4000 psychiatrists to cater for a population of 1.3 billion. Lack of access to affordable mental-health care, especially in rural areas, leads to chronic illness and causes families to fall into deep poverty. Mobile tele-psychiatry is seen as an affordable way of delivering access to mental-health services in rural communities.

The Schizophrenia Research Foundation (SCARF) began experimenting with tele-psychiatry in 2005, as part of an intervention programme for tsunami victims; in 2010, the Tata Education Trust offered support to cover the Indian district of Pudukottai, in Tamil Nadu.

SCARF's mobile tele-psychiatry service is provided on a bus containing a consultation room and a pharmacy. Communication takes place between a psychiatrist based at SCARF, in Chennai, and the patient via flat-screen TVs and high-definition Web cameras, using a wireless 3G Internet connection. After a tele-consultation, a prescription is dictated by the psychiatrist, which is dispensed by the on-board pharmacy, and a follow-up appointment is arranged. Medication is provided free – an essential component of the programme considering the patients' financial limitations and the fact that psychiatric drugs are rarely stocked in rural pharmacies. The other main thrust of the programme is raising awareness about mental illness, with campaign films broadcast on a TV screen fitted to the rear of the bus.

Around 1500 patients have accessed the programme and received treatment for severe mental disorders. More than 50% of the patients in the catchment area who have never been previously treated were reached.

Challenges include lack of, or inadequate, network connectivity and bandwidth. Nevertheless, with the emergence of improved and relatively cheap network technologies, now is the time to exploit mobile tele-psychiatry's potential.

Edited from an account by Sujit John, research coordinator at the Schizophrenia Research Foundation (India)



Registrations for BasicNeeds are taken in Nepal



SCARF's mobile tele-psychiatry service is provided on a bus



ATV on the rear of the bus broadcasts awareness films

BasicNeeds

Mental illness and epilepsy have long been the 'poor relation' of global health agendas. In 2000, BasicNeeds was set up to respond to this situation and developed the Model for Mental Health and Development. The model combines health, socio-economic and community-oriented solutions with changes in policy, practice and resource allocation; it comprises five elements:

1. Capacity building: Identifying, mobilising, sensitising and training mental-health and development stakeholders;
2. Community mental health: Enabling effective, affordable community-oriented mental-health treatment services;
3. Livelihoods: Facilitating opportunities for affected individuals to gain or regain the ability to work, earn, and contribute to family and community;
4. Research: Generating evidence from the practice of mental health; and
5. Collaboration: Managing relationships with stakeholders involved in implementing the model and/or are responsible for policy and practice decisions.

BasicNeeds has been active in 12 low and middle-income (LMICs) countries and has reached more than 580,000 people. It is currently collaborating with a UK-based organisation to see if it can meet the challenges of a high-income country. This work is focused on building the capacity of people with mental illness and placing them at the centre of data collection and research processes. By 2018, BasicNeeds aims to reach at least 1 million more people living with mental illness and epilepsy.

Edited from an account by Chris Underhill MBE, founder director of BasicNeeds



Community-oriented mental-health support

SUNDAR: Mental health for all, by all

Inspired by 'task-sharing' interventions in other areas of healthcare in India, non-governmental organisation Sangath adopted an approach that has been replicated across a diverse range of mental-health conditions.

The model is characterised by several principles:

- designing interventions based on global evidence of effectiveness and local evidence of cultural acceptability;
- systematically testing intervention delivery to ensure it can be delivered by lay health workers and will be accepted by patients and families;
- involving diverse stakeholders in shaping content and delivery;
- embedding the intervention in established healthcare platforms to ensure scalability;
- evaluating the effectiveness and cost-effectiveness of the intervention via randomised controlled trials;
- disseminating the findings via a variety of methods; and
- working with ministries of health to scale up innovations.

The following principles emerging from these experiences have been formed into the acronym 'SUNDAR' (which means 'attractive' in Hindi):

1. We should Simplify the messages used to convey mental-health issues.
2. We should Unpack interventions into components that are easier to deliver and incorporate culturally sensitive strategies.
3. Interventions should be Delivered close to people's homes.
4. We should recruit and train Available manpower from local communities to deliver these interventions.
5. We should judiciously Reallocate scarce and expensive mental-health professionals to support these community-health agents.

This approach is built around a collaborative care framework involving four key human resources: the front-line lay health worker; the person with a mental-health problem and their family; the primary or general healthcare physician; and the mental-health professional.

Edited from an account by Vikram Patel, Professor of International Mental Health at the London School of Hygiene & Tropical Medicine (UK)



A counsellor supporting a patient who has depression



An outdoor activity to highlight the importance of relationships

Generational change

The world's ageing population may present a crisis of care, but a growing understanding of how elderly people want to live and be cared for is translating into some sensitive humanist design, writes *Emily Brooks*

The world is at a demographic crossroads: in the next five years, the number of adults aged 65 and over will, for the first time, outnumber children under the age of five. Long life represents an incredible achievement for medicine, but it has also created a looming crisis of care that is only just beginning to be felt. In the world's two most populous countries, China and India, the figures are stark: China's older population will rise from 110m to 330m by 2050; India's older population, 60m, will reach 227m by 2050. The problem is exacerbated because, although these countries may be in the midst of economic boom, their current older populations are generally not wealthy enough to pay for their own care. In China, the one-child-per-family rule is set to have a devastating effect on family members caring for elderly relatives: there simply won't be enough children to take on traditional caring roles, especially given the rise of women who join the workforce rather than take on home-based roles, and the increasing urbanisation that draws children away from where their parents live. Globally, there will be a huge need for care workers who can visit the elderly in their own homes, as well as increased demand for care homes that can attend to the needs of those with dementia, a disease whose prevalence increases with age.

The digital dichotomy

"For many in China, it seems that 'optimal care' means support systems for its senior population; for many individuals though, it seems that 'optimal care' means support so that individuals can take care of themselves – supported by family members or by outside carers," says Mel Fairbourn-

Garden design for a virtual dementia hospital





Client: Moorings Park
 Design architect: Perkins Eastman
 Architect of record: Burt Hill/Pollock Krieg Architects
 Interior design: Wegman Design Group
 Size: 83 acres
 Cost: Undisclosed
 Completion: 2013



Varley of DWA Architects, a British practice highly experienced in designing environments for the elderly that is now looking to export its expertise; it has just won a competition to design a 'care village' for more than 1,000 residents in Guangzhou, which will be built, wherever possible, in line with the UK's dementia design guidelines (see case study). "On the one hand, 'optimal care' means an independent, assisted or continuous-care community to provide the necessary support systems needed to maintain independence and dignity," says Fairbourn-Varley. "But, on the other hand, China has also responded by developing often outdated care-home models, the design of which pay little attention to the dignity of individual elderly people.

"The elderly-care industry's current development suffers greatly from the inadequacy of suitably designed senior care and specialist housing facilities. This is coupled with the inadequacies and huge gaps across the country, in both the number and the quality of trained specialist carers and nursing staff, gerontologists, geriatricians and medical specialists." A collaboration between local government and a local charity, the project hopes to demonstrate to China that, with the right model and expertise, elderly care – and particularly dementia care – can be delivered cost efficiently.

With rising demand for elderly care, China welcomes foreign and private involvement in this sector; but it needs the foresight not to make the same mistakes as the West. Gated, isolated communities of older people are no longer considered economical, or socially beneficial to either residents or wider communities. On the other

Moorings Park, Naples, Florida, USA

The latest building phase in this upmarket continuing-care retirement community (CCRC), first opened in the 1970s, has seen the introduction of a wellness component, the 3,400sqm Center for Healthy Living. The centre offers a mix of clinical and non-clinical services, including physicians, rehabilitation, an exercise programme geared towards older people, a spa, salon, restaurant and lecture theatre. This approach to keeping body and mind active and well fills some of the perceived gaps in hospital care, and has proved an attractive selling point to those seniors who, until now, have preferred to stay in their own homes rather than move into a retirement community. Perkins Eastman designed the centre, with interiors by Wegman Design Group, while at the same time completing 29 new residential apartments on the 83-acre campus.

Daniel Cinelli, principal at Perkins Eastman, says the senior-living market all over the US is "starting to talk about repositioning their CCRCs in terms of wellness; a lot of the communities we're working with are really taking it seriously. They're saying to the hospitals, 'if you're not going to be doing it [providing adequate services for seniors], then we'll go and hire a physician and start a wellness clinic ourselves'"



Elderly Person Care Village, Foshan, Guangzhou, Guangdong Province, China

British practice DWA Architecture won an international competition to design this elder-care campus, designed to accommodate 750 seniors with severe and terminal care needs and 450 independent and assisted-living specialist apartments. As a collaboration between local government (which has paid for the land) and a local charitable foundation (which will pay for the building of the village), “the express intent is to influence the senior-care market by evidencing that through vibrant public-philanthropic-business partnerships, it is possible to deliver and operate high-quality specialised care that is affordable to the incomes of local populations,” according to DWA Architecture’s Mel Fairbourn-Varley. The community is unusual in its commitment to dementia care, “something many privately invested residential-care operations in China rarely wish to undertake,” he adds.

The architecture is based on UK dementia design standards where possible, with special care taken to provide easy access and movement throughout the campus, inside and out. The buildings are raised above ground level to provide additional space underneath for recreational activities in harsh weather, such as hot and humid conditions. The architecture fuses local Lingnan culture with a more modern, international style, while the landscape will be adorned with native flora, supporting the principle that the environment should be meaningful and familiar to elderly residents, particularly those with dementia.

Architects: DWA Architects/TLD Design Consulting

Size: 67,000sqm

Completion: Estimated 2016

hand, integration with the wider housing stock keeps people in their own homes for longer; which is cheaper than 24-hour care; and keeps elderly people active within their communities.

“Lots of older people need extra care, but that shouldn’t be a reason to close them off from society. We try to overcome that separation,” says Jan Haerens of Belgian practice 51N4E, which has designed a contemporary extension to a care home in Nevele near Ghent, which opened in 2012. “The idea is that we try to integrate the building and its surroundings – giving the building meaning in the town or village it stands in. We don’t like introspection.” In Nevele’s case, the new extension fills up the remainder of a tight site surrounded by housing, with large windows and broad terraces making the activities within visible to the communities, as well as making the residents feel that they are connected to the wider world. This concept is repeated on a smaller level inside, where residents’ private apartments face on to large corridors, with the option of sliding back the glass living-room wall to integrate the space with the corridor outside. This was 51N4E’s first elderly-care project, and Haerens says that, although one of the biggest challenges was working around all the specific building regulations concerning this sector; in the end it came down to creating something on a human level: “We tried to look at it as a building for collective living rather than a care project – how to live together with a lot of people, whether they are young or old, is the essential question.”

Breaking down walls

In the US, previously cut-off seniors’ developments are using health and wellness as a way to integrate with the wider world. Perkins Eastman’s latest phase for Moorings Park, a Florida continuing-care retirement community (CCRC), includes a Center for Healthy Living with a gym, spa and restaurant, as well as in-house physicians, which is attracting the wider population. “We call it CCRC without walls,” says Perkins Eastman’s principal Daniel Cinelli, who says that many other communities are

Potter Street Redevelopment, Dandenong, Victoria, Australia

Potter Street's mix of residents – intellectually disabled adults, and the aged – make it an unusual care environment, and allows parents and children to live, and be cared for, together. It is a collaboration between disability-support organisation Wallara and aged-care specialists Wintringham. Allen Kong Architect was charged with providing a supportive environment for those who may have multiple challenging behaviours, eschewing the idea that care settings must be, above all, 'homelike' in favour of familiarity and individual control, with direct access to outdoor space central to that concept.

Wayfinding and circulation is provided via a series of verandahs, while living quarters open out on to semi-private courtyards, fostering a sense of privacy and independence while being sociable areas, too. Simple construction materials – timber and polycarbonate – are modular, allowing for future adaptation if residents' needs change, while a vibrant colour palette provides visual stimulation and helps with wayfinding.

Clients: Wallara Australia & Wintringham

Architect: Allen Kong Architect

Cost: AU\$12.8m

Completion: 2012



starting to rethink their proposition in terms of the health facilities they can offer, especially given the way that older generations are now taking more personal responsibility for their health. Cinelli also foresees a further blurring of the borders between clinical and wellness facilities, with diagnostic equipment being added to healthy-living centres.

We can also expect to see more dedicated clinical facilities for the elderly. Michigan-based Trinity Health has opened several seniors-only ERs, with plans to open a total of 29 facilities in US hospitals. Here, care is tailored to the over-65s, with a holistic approach that enquires after the whole patient – checking for symptoms of dementia or Parkinson's and finding out what their care arrangements are at home, not just treating the broken arm they came in with.

In Australia, Allen Kong Architect's redevelopment of a facility with mixed residents – adults with learning disabilities, and the elderly – puts personal experience and choice at the heart of design. This community is a collaboration between a disability charity and an aged-care specialist provider, and enables disabled children and aged parents to live in the same setting. Access to the outdoors, via residents' own front doors and along a series of verandahs, offers a sense of ownership and personal choice, as well as delivering all the health benefits of being outside while feeling safe and secure. Kong distinguishes between the usual brief for a care facility – somewhere 'homelike' – in favour of somewhere 'familiar': "This developed from the understanding that many potential residents did not have a typical home. The idea of familiarity covers a greater range of environments where people will have



Martin Saunders



Client: OCMW Nevele
Architect: 51N4E
Size: 4,400sqm
Cost: €6.4m
Completion: 2012

OCMW Nevele Seniors' Campus, Nevele, Belgium

Brussels-based architects 51N4E won a government-sponsored competition to extend this care home in Nevele, a town just west of Ghent. With no previous experience of designing for the elderly, 51N4E's innovative design makes a feature of the corridors outside residents' rooms – private living spaces directly overlook the wide corridors, so that residents can see the daily comings and goings outside. The glass door between the living quarters and the corridor can be slid back to create a single space; there are separate sleeping quarters further within, which have windows to the outside, and features such as the broad windowsills are intended to make the rooms easily customised with personal effects. Broad external terraces and shared seating spaces for social interaction.

Unlike many care-home models, the architecture is emphatically contemporary, its many large picture windows interspersed with dark red square tiles; those living on the neighbouring housing estate can see the activities inside, as much as the elderly residents can see out, an important part of 51N4E's philosophy of creating care facilities that are not closed off from their surroundings.

Filip Dujardin



lived, and the primary aspect of this is access to the outdoors, and emphasis of their own front door to the outside (not to a corridor) – which is a symbol of control over their lives." This project may be atypical in its mix of residents, but the way it uses space to create somewhere easily readable and navigable could have an application anywhere.

Dementia-friendly design

The concept of familiarity becomes crucial when designing for those with dementia. In the UK, people with dementia occupy around two-thirds of all residential-care beds, and an appropriately designed environment that is legible and understandable can assist them in being able to look after themselves for longer; this has both health benefits for the individual, and economic benefits, because they need less external care. "It is easy to persuade people that dementia-friendly design makes the cost and burden of caring lighter, and makes life better for the person with dementia," says Professor June Andrews, director of the Dementia Services Development Centre (DSDC) at the University of Stirling.

Its latest project concerns the design of a 'virtual hospital' that is dementia-friendly: half of all patients in acute hospitals have dementia, and Andrews says that "it has been noticed that if a person has to go into an acute hospital – if they break a leg, for example – then it's relatively unusual for them to return to their previous level of functioning before the hospital admission. We have to ask ourselves: what is it that makes people with dementia have longer stays and be that much more poorly than

another person who might be the same age and in the same physical condition, but without dementia?" Acute care's fast-paced environment, with many faces to recognise, are factors, but design is highly important, too. "If you get the design of the environment right, you only need to do it once and it stays right," says Andrews. "It makes the job of the staff and the experience of the patient much easier, and it may reduce the length of stay and the number of adverse incidents, such as falls."

Some of the design measures suggested include a smooth, matt, even-coloured surface for floors, least likely to lead to a fall; good levels of artificial lighting as well as access to daylight (windows should be low enough so patients can see the outdoors while sitting in a chair) or, even better, outside space; and strong signature colours for exit doors and bathroom doors. Dementia-friendly design also requires a degree of understanding about what is most familiar to any given culture or country – elements such as taps and toilet flushes vary greatly across the world, and it is up to the designer to alight on the most recognisable model. However, the majority of suggested features have universal application for those with dementia, giving the DSDC's research a global reach (the virtual hospital is available to view online at <http://dementia.stir.ac.uk/design/virtual-environments/virtual-hospital>).

In Australia, Dementia Training Study Centres have been funded by government to disseminate best practice regarding dementia care. The University of Wollongong's centre has a special remit for design, and last July launched a national education and consultancy service on designing dementia-friendly hospitals and inpatient units, rolling out a series of workshops across every state for architects, health planners and other health professionals. Like the DSDC's work, it highlights the need to disseminate what are often entirely common-sense principles to a wider audience.

Emily Brooks is an architectural writer



The spa at Moorings Park, Center for Healthy Living

Randall Perry

This is an exciting time for art in healthcare environments. Judging by recent high-profile examples, it is now becoming standard practice to bring artists on board at an early stage in a building's development, often leading to inspirational collaborations between artists and architects. Increasingly, art consultants or strategists are being given overarching roles in placing diverse works throughout a building to create a far more compelling, unified scheme with a coherent, patient-focused sensibility.

Joanna Espiner, senior project manager at Willis Newson, one of the UK's leading art consultants, agrees that recent years have seen rapid evolution in this field, particularly in the UK – driven partly, she says, by the fact that any scheme aiming for BREEAM excellence needs to have an art consultant on board, working closely with artists, architects and stakeholders to ensure a better fit, both with the building and the community.

So what does this growing partnership between artists and architects throw into the healthcare design equation?

Emerging artistry

Close collaboration between architects and artists is paying dividends in intensifying connections between place and people. **Veronica Simpson** explores the latest international innovations

Unrestricted exuberance

Jane Willis, director of Willis Newson, says: "Because an artist is coming in to work as part of a huge building but not working on the building – they are not responsible for it – they can bring a really intense focus and playfulness. They can really think about how to solve things and challenge and push the boundaries. The other thing I see coming through is a real poetic sensibility."

This is true not just of artists but also clients. Ten years ago, for example, some of the creations that Studio Weave – artists, architects and designers – have recently come up with for healthcare settings would have been inconceivable. And this can only be because clients have become more aware of the value of a skilled, well executed and high-quality intervention (or, perhaps, because art

consultancies have honed their ability to convince them of the benefits).

Studio Weave and Willis worked together at Bristol Royal Infirmary's patient ward to try to solve an acoustic problem with the new building. Making reference to the city's naval and shipping past, Studio Weave conceived of a giant sculpture made of rope, now weaving through the atrium, which provides both a welcoming contrast to the clinical spaces around it and a valuable acoustic baffle. Likewise, in Great Ormond Street, an uninspiring interim space between a new building and an old one (scheduled for demolition but not for a few years), has now been transformed into the 'Lullaby Factory' – a collection of gramophone trumpets and copper pipes that play lullabies to listening children, courtesy of Studio Weave's high-spirited approach to problem-solving.

What art, when delivered at its best, can bring to a building is to render humane, magical and uplifting that which might otherwise be clinical, practical or banal.

But it's not just art's ability to delight and surprise that is being harnessed in a good scheme. Working together with enlightened clients and architects, artists are being given the opportunity to develop far more sophisticated responses specific to the environment, the client and the patient group. This can take the form of turning dead space into something delightful (as with the Lullaby Factory); or diminishing the boredom of waiting during a day's consultations at a busy ambulatory day centre;



UCLH atrium

AnthonyWeller/archimage



Client: University of Kentucky HealthCare
 Architecture, interiors and art co-ordination: AECOM
 Budget: Construction \$231m core/shell; \$112m fit-up; art budget \$3m
 Completed: May 2011

University of Kentucky Chandler Medical Center, USA
 AECOM's new 1.2m sq ft replacement hospital, University of Kentucky's Chandler Medical Center, integrates architecture with art thanks to a formal Arts in Healthcare programme. The Arts Committee worked closely with architects, interior designers, IT and landscape architects to plan for art locations from the earliest stages, while raising around \$3m through private donations.

Large-scale commissioned artworks are placed at strategic wayfinding points; the local tradition of folk art is supported with a special collection, exhibited in the Patient Education Center, directly off the main entrance; an ongoing live arts programme is staged in a 305-seater auditorium. A huge interactive media wall stretches along the back of the main lobby area, with a changing montage of film footage and stills photography displayed across multiple screens to reflect the state's diverse culture and traditions.

Elsewhere, a 6,000 sq ft patient waiting area offers a lounge/gallery atmosphere, animated by paintings, sculptures and tapestries from Kentucky artists. In patient rooms, inspiring regional landscape photography is showcased, with pieces selected by hospital staff.

It was the winning project in this year's IADH Academy Awards International Use of Art in the Patient Environment category.

or, perhaps, creating a quirky and personal narrative around a small speciality healthcare building. It can also play a major part in generating a connection with community and local history within a big, impersonal new hospital facility; and it can even turn a healthcare building into a tool for assessment.

Where others fear to tread

In planning the University College London Hospital (UCH) Macmillan Cancer Centre – the UK's first ambulatory cancer facility – Hopkins Architects worked with strategist Morag Myerscough to create a series of pieces that would function, according to Myerscough, as "things to make you think about other things".

During an Architects for Health seminar in London this June, Guy Noble, arts coordinator for UCH, and Hopkins partner Sophy Twohig described the main challenge for the building as "the management of waiting", adding: "There is a main waiting space for 150 people and then sub-waits on every floor. We realised that what this does is create opportunities to enjoy art." The resulting artworks – including a print from iconic pop artist Peter Blake and a tapestry from Turner Prize winner Grayson Perry – are a far cry from the tame posters of flowers or pastoral landscapes that would, if you were lucky, typify most hospital waiting areas once upon a time. Not for nothing did the building (and its art) win the Royal Institute of British Architect's National Award in 2012, while it also won UCLH a RIBA award for client of the year. Says Noble:

"There's a tendency to water down art in healthcare settings. We really didn't want to do that."

Many of the works are provocative and problematic, in ways that would cause many a conservative healthcare client to run a mile. For example, artist Stuart Haygarth, after consulting with a panel of patient representatives, created a striking atrium sculpture/mobile made from pieces of colour-themed, mostly plastic flotsam collected along the south coast of England, along with some of the patients' own contributions. Noble says: "Putting a lot of rubbish in an NHS hospital is not without its challenges." The items were given an ultraviolet sterilising treatment, washed and then hung. Elsewhere, Grayson Perry has placed a tapestry exploring themes of life and death, titled 'What will survive us is love' "We do have a tendency to patronise patients and think they won't want to talk about death," says Noble. "But actually they do. And Grayson isn't afraid to go into that territory."

Some would regard even that as tame compared with audio-visual piece 'Anarchy in the Organism', by Simeon Nelson: an animation and soundscape of a normal living cell passing through different states of cancer. Says Noble: "I know the patients found this a tremendously challenging but rewarding experience, and they particularly enjoyed being able to discuss their cancer with an artist."

Many of the pieces were donated by the artists, which meant that the budget for this impressive building went a lot further.

There's a tendency to water down art in healthcare settings - we didn't want to do that

A rather different, quirky and personal narrative was required by the Royal Brompton & Harefield Hospital (RB&H) for its new Centre for Sleep, based in a refurbished Victorian fire station. The RB&H Arts team took the unusual step of commissioning a single cartoonist and illustrator, Steven Appleby, to come up with all the diverse art interventions, from signage, in his characteristic scrawling handwriting, to murals depicting a humorous mind map of how sleep occurs, as well as illustrations on glass in the foyer. With his perceptive and light-hearted take on human frailty, Appleby's designs combine to create a strong and appealing narrative to patients' experience of the building, as well as a unified character (it was awarded Highly Commended in the IADH Academy Awards Use of Art in the Patient Environment category this year).

Marilyn Cintra, director of the Health and Arts Research Centre in Australia, and lead judge of the Art in Healthcare Environments category at the 2013 IADH Academy Awards, was particularly struck this year by the role that art is playing to intensify engagement with patient – and local – communities. She says: "Where art's purpose used to be seen as purely decorative, now I feel that it is widely recognised that art has a real function as part of the environment, not just in enhancing health outcomes but in connecting people."

This year's category winner, the University of Kentucky's Chandler Medical Center, is a case in point: an extensive and diverse arts programme has been put in place to reinforce local and regional identity (see case study, p47).

Give me sunshine

When it comes to art being used as a strategic tool in patient treatment and engagement, there can be few more convincing examples than Sunshine House children's development centre in south London.

Five years after it opened, there's no doubt in the minds of staff that the combined art and architecture programme has made a difference not just to the quality of the environment but in their ability to assess and entertain patients. Sunshine



Southwark Council



Tim Soar

Top: Sunshine House, kids play with enamel tiles

Bottom: Sunshine House voids



Client: Limpopo Department of Health, South Africa and Global Fund, Pretoria

Architects: Hospital Design Group with the Council for Scientific and Industrial Research (CSIR)

Cost of construction: R44m

Consultants: Sakhino Health Solutions



Global Fund MDF TB Hospital, Limpopo Province, South Africa

One of the world's most afflicted regions for TB as well as HIV/Aids, South Africa's health officials have been trying to address the need for humane and efficient treatment facilities that reduce cross-infection. In collaboration with CSIR research facility, Hospital Design Group (HDG) Architects devised a new approach to long-term accommodation of patients with drug-resistant TB, in which art plays a pivotal role. The single-storey buildings are grouped around a series of courtyards where formal sculptures by local artists create focal points, in the hope of encouraging patient, staff and visitor engagement. Colour used around the building has been chosen to highlight certain seasons and indigenous vegetation, to maintain a sense of connection with the outside world.

Last but not least, local mosaic artists have been brought in to mastermind elaborate mosaic workshops for the patient groups, which have proved so popular that they have been taken on as an enduring part of patient therapy, resulting in vibrant patient artworks that are displayed on easily mountable and replaceable 60cm x 60cm panels attached to the ward wall. Landscaping of the courtyard gardens has also been carefully considered, with a rich variety of plants, colours and forms offering vistas and shading. Patients are also encouraged to get involved in gardening and garden maintenance, providing a useful and positive role within the patient community, as well as skills they can take with them when they leave.

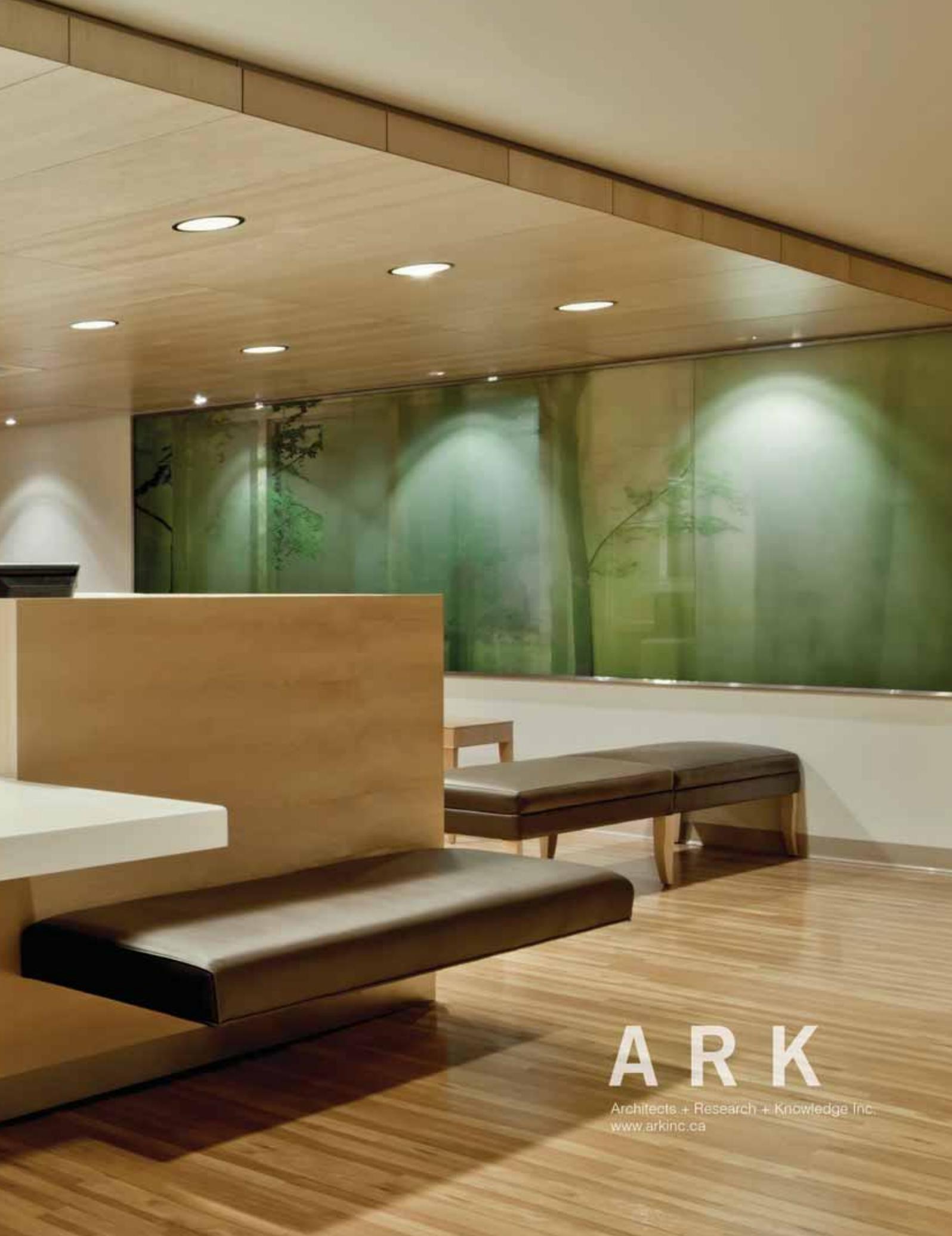
It was Highly Commended in the IADH Academy Awards, International Art in the Patient Environment category, 2013.

House is a multiple award-winning £7.7m project, undertaken by AHMM in 2007 on behalf of Building Better Health, combining a variety of services for children with complex needs. Client Guy's and St Thomas' NHS Trust, through its charity, has a commitment to spend 1% of capital costs on art in all its sites. Modus Operandi art consultants worked with the architects from early on in the design process to identify two principal artists – Dutch artist Milou van Ham and London-based artist Jacqueline Poncelet – who could generate layers of interest, colour and movement into the building.

The artworks are concentrated on the ground floor and basement, where the reception area, breakout areas, consultation rooms and gym/physio rooms are located. Three voids have been punched into the elongated rectangle of the building to bring light into the basement and help it penetrate deep into corridors on every level. Milou has animated each void with a large, hanging geometric sculpture, which plays on specific words she developed in workshop consultations with local children. The same words appear reversed, upended, inverted and scrambled on glass panels around the voids and are raised to encourage touch and exploration by the many

visually impaired visitors.

Poncelet's interventions are more strategic in creating atmosphere and assisting wayfinding. She played a major role in the choice of colours, which give the building its lively and appealing character. From the outside, sky-blue brise soleil contrast with the dove-grey brick, as do the vivid green, yellow and red painted elements delineating each void both outside and in. The same calming sky blue is used on blinds in consultation rooms. Poncelet devised a large and colourful tapestry of enameled, magnetic panels for the reception area. Posters and information for parents are displayed on these panels at eye level for adults, while there are more playful items in varied colours and shapes at knee level for children. Poncelet also came up with a decorative motif inspired by the brickwork, which emerges as a coloured stitching whether it's inlaid into the entrance path as a tile



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Southmead Learning & Research and Pathology Buildings, Bristol, UK

Client: North Bristol NHS Trust

Architects: Avanti Architects,

Art Consultants: Willis Newson

Completion: 2010

Contract: ProCure 21

Artists: Kate Blee, Perry Roberts, ArtNucleus

Construction: Laing O'Rourke

Engineering: Design Buro

In partnership with North Bristol NHS Trust, Willis Newson art consultancy delivered a public art strategy from very early on in the design and construction of new learning and research facilities, and pathology buildings on the Southmead Hospital site in Bristol. The project was part of the 'enabling' phase of the PFI redevelopment of the hospital, due for completion in 2014. Artists worked alongside architects Avanti and building contractors Laing O'Rourke to weave bold, enriching materials and colours into the fabric of the two buildings.

Lead artist Kate Blee designed the colour and composition of the exterior glazing, which clads both buildings. A rich pattern of greens, greys, blues and russets alternate with clear glazing, and this same palette is deployed inside the building. In addition, Blee designed two large ceramic wall pieces for each building's atrium entrance. They reflect light and incorporate tactile, dynamic surfaces to animate and arouse curiosity in the viewer. Two large laminate panels designed by Perry Roberts add further colour and pattern in the entrances.

Working with the architects, Roberts also devised supergraphics, which link with all the other art elements in the building and support wayfinding. As artists in residence, ArtNucleus photographers Simon Ryder and Reinhold Beuther were each assigned to a building, and they worked with staff to create a series of images that capture moments of change and transition; these are now installed in the building as an enduring record of the buildings and their occupants' narratives.

carpet, or replicated on a metal kickplate at the bottom of the doors; the doors themselves are painted in the similar or softer shades of the key palette and some are surrounded by tiny enamel tiles at varying heights, scattered among the consulting rooms, to help with exploration and identification. Says AHMM associate Thomas Gardiner: "Jacqui's idea was that every time a child comes in here, they will find something different."

Matthew Turner, a child-support worker who has been at Sunshine House since it opened, says: "The art work is really brilliant; we noticed it at first with the visually impaired, with the raised lettering on the glass panels. We have children who come here from birth to 19 and they always return to a particular piece of glass.

We see parents engaging with the kids over the lettering – they start going through the alphabet or playing word games with them.

"With a breeze, the entrance sculpture goes spinning around and we can see, if a child reacts to it, that they obviously have perceptual skills. We also get a lot of feedback from pediatricians. The way the child reacts to the environment tells them a lot about the degree of perception they have – even before they've got to the assessment rooms. The coloured doors and tiles make a huge difference, too. We can test their recognition and independence by sending them to different coloured areas."

Despite being five years old, and with a complex variety of elements and surfaces, the building looks in great condition. Turner agrees its popularity helps with maintenance. He says: "We had the infection-prevention control team inspect us recently and they said the building could be brand new – it's so clean. People like it so much they really look after it."

architecture that promotes health



MontgomerySisam
ARCHITECTS INC.





Consultation is an art in its own right, according to artist Sue Ridge, who worked with poet John Davies (aka Shedman) to help generate community engagement and interest around the new North Middlesex University Hospital (NMUH), a £123m PFI-funded hospital. The aim was to use the lift lobbies around its four-storey main atrium, plus the hospital waiting areas, as a canvas for whatever poetic and visual work resulted. Architects Nightingale Associates had already conducted research into the area's history, unearthing links with the poet John Keats (who lived and went to school nearby) as well as other literary figures. This inspired the idea of creating a collaborative community 'poetry wall' using digitally printed 'social wallpaper', plus a series of five photo-text images for hospital waiting areas.

Consultation began via Davies's portable shed, placed by the main restaurant, where opinions and feedback were sought from staff, visitors and patients, through interviews and creative-writing workshops. Davies and Ridge transformed the resulting conversations and compositions into the aforementioned 'digital social wallpaper'.

In the meantime, Ridge was inspired by a Michael Rosen poem, called 'These are the Hands', which celebrated the 60th anniversary of the founding of the NHS; she decided to photograph members of staff with open hands, collecting their names and informal descriptions of their jobs to frame and use in conjunction with the social wallpaper. The poetic and visual collage, weaves together the narratives of an extremely diverse community (with 147 different languages spoken in local schools) against the weft of local historical anecdotes, both ancient and modern. Says Ridge: "We wanted to convert the community's stories into 'our stories', helping people make the new hospital their own."

North Middlesex University Hospital, UK

Client: North Middlesex University Hospital NHS Trust

Architects: Nightingale Associates

Art consultants: First Aid Art

Artists: Sue Ridge and John Davies

Construction cost: £123m

Though there may be less glory in weaving humanising elements throughout a building than in creating big, spectacular artworks, ideally, there should be scope for both, argues Poncelet: "As an artist, it is your job to bring your experience, insight and wisdom as a human being and use that to inform your art."

Conclusion

Reviewing recent art in healthcare projects, Susan Francis, founder member and programme director for Architects for Health, senses that real progress has been achieved. But she is worried that this is the result of schemes commissioned and budgeted for under very different financial and political circumstances. With many fine healthcare architects currently struggling to stay afloat and hospital closures threatened, she foresees tough times ahead. Stressing that "art and landscaping are always the most vulnerable areas", she concludes: "It would be tragic if we lost the quality and expertise that we've developed so far."

Veronica Simpson is an architectural writer



Cruciform layout

Recently delivered by gbs architects, a new child and adolescent mental-health services unit has been built on the Warneford Hospital site in Oxford.

The cruciform layout of the new building, with its dynamic rooflines, aims to provide an edgy, modern feel, far removed from the traditional concept of an 'institution'. This shape also allows the building to integrate with the environment and the adjacent hospital, blending further through a palette of natural and inspiring materials – co-ordinated coloured render, rainwater goods and window frames, buff brick echoing the Cotswold stone of the hospital's listed buildings, and toned timber cladding. Internally, the cruciform

is a shape recognised as suitable for new mental-health units in the UK, as it provides good visibility for staff. Natural light floods the internal space through a series of sky-facing windows and lounges, centrally placed to break up both bedroom wings.

All bedrooms are larger, en-suite and offer greater privacy. There is a self-contained ICU suite, including a safe room, located adjacent to the staff base. The first floor features a large teaching area surrounded by art, gym and music rooms, to provide a dedicated location for adolescents to 'go' to school and mimic the normal separation between home and school life.



Setting the tone in the pine cone

Boasting iconic architecture by Woods Bagot and Research Facilities Design, the new South Australian Health and Medical Research Institute (SAHMRI) in Adelaide opened last year at the end of November.

Located in a medical precinct that will also be home to the new AU \$2bn Royal Adelaide Hospital (NRAH), the institute comprises 25,000sqm and is set to be a centre of research excellence accommodating up to 675 researchers. The co-location of research and hospital services is expected to create connections between researchers and clinicians, integrate medical research into practice, and help attract and retain high-calibre staff.

The building is defined by its striking façade, which Woods Bagot designed in partnership with Aurecon. Inspired by the skin of a pine cone, the building's triangulated dia-grid façade is said to respond to its environment like a living organism, acting as an articulated sunshade.

The fostering of collaboration between researchers is achieved through architecture that allows a visual connection between floors and an interconnecting spiral stair.



California dreaming

Consolidated Contracting Services, a leading Southern California commercial builder, has begun construction on a new 24,000 sq ft QueensCare Health Centers (QHC) facility in east Los Angeles.

The two-storey, structural-steel building will encompass 38 medical exam rooms, nine dental operatories for adult and paediatric dentistry, three counselling rooms and two meeting rooms. It will also contain a 1,000 sq ft conference room, which will serve as a venue for hosting health events and community meetings. Construction is scheduled for completion in August 2014, and the health centre will be open to serve patients in early 2015.

Served by the Metro Gold Line, it is expected to attract more than 55,000 patient visits a year – double the organisation's current capacity in east Los Angeles.

"This is the first major capital development project in the nearly century-long history of QueensCare Health Centers' operations," said Barbara B Hines, president and CEO of the healthcare organisation.

RBB Architects is the project architect; KPFF Consulting Engineers the civil engineer; N A Cohen Group the electrical engineer; and Applied Earth Sciences the environmental engineer. Carter Romanek Landscape Architects is the landscape architect.

Gearing up gradually

Patient services have commenced at the new North Lantau hospital in Hong Kong. Mott MacDonald provided engineering design services for the project, which was delivered through a joint venture between Leighton Contractors (Asia) and Able Engineering Company.

The hospital will help meet the needs of the growing local population and the various other tourist facilities situated on Lantau Island, including Hong Kong International Airport.

Covering an area of 20,000sqm, the eight-storey hospital sits above a single-level car park. Services will open in phases in line with the development of the local Tung Chung district. During the initial phase, an eight-hour accident and emergency service will be provided. This will be extended to 24 hours according to service demands and operational arrangements.

Specialty services, including surgery, orthopaedic and traumatology, paediatric and gynaecology, will also be provided and introduced gradually. Once in full operation, the hospital will feature a total of 160 inpatient beds and 20 day beds, with a wide range of patient services, including inpatient care, day hospital service and community nursing care.

Mott MacDonald's role included civil, structural, geotechnical and building services, traffic and environmental design, as well as life-cycle costing.



Military precision

A joint-venture team of Clark Construction Group and McCarthy Building Companies has completed construction of the new 1,000,000 sq ft Naval Hospital at the Marine Corps Base Camp Pendleton – six months ahead of schedule and more than \$100m under budget.

HKS Architects was the project architect of record, while HDR Architecture served as the architectural designer for the new hospital.

“The new facility utilises research-based design to enhance healing for patients, as well as efficient and effective design to conserve water and energy, protect from earthquakes, and optimise the work environment for staff,” said Captain Mark A Kobelja, commanding officer of the Naval Hospital Marine Corps Base Camp Pendleton.

Serving around 70,000 active-duty and veteran members of the military and their families, the new building replaces the old hospital built in the 1970s and will provide emergency, primary, intensive and specialty care. It will have 96 outpatient-procedure rooms, 205 exam rooms and 54 patient rooms accommodating up to 60 beds for non-ambulatory patients.

Sustainable design features include green roofs, healing gardens and an atrium open to the sky.



Collaboration and connection on campus

The £30m Hadyn Ellis Building, designed by IBI Nightingale, is the first phase of the new Science and Innovation Campus at Maindy Road being developed for Cardiff University.

The building is home to the European Cancer Stem Cell and Neuroscience and Mental Health Research Institutes, as well as the Medical Research Centre for Neuropsychiatric Genetics and Genomics. The building is also the new home for the University Graduate College and provides office and meeting space for Public Health Wales.

Acting as a ‘front-door’ to the campus, the building is welcoming, spacious and inclusive. The colourful exterior and landscaping complement its surroundings, while the glass façade provides an enticing view into the bustling foyer and exhibition area. The design establishes a collaborative space where researchers and the wider community can come together. Open balconies allow visual connection between those visiting and those working within the building, and link bridges striding across the atrium provide a physical relationship between dry and wet laboratory spaces.

Understanding **change**

All healthcare design brings complex challenges, and expert balanced support is critical. AECOM sees health and healing in the round.

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Design & Health Scientific Review

The pearl in the oyster



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

Natural light, façade design, effective shading, visual light transmittance, room type, floor-to-floor height, capital costs, operational costs, glare, procurement models, managing scope change, risk, "reflection time," bidding, innovation, change management, design typologies, walking paths, sustainable design, and versatile spaces serve as the subject matter for the research articles in this issue. The articles embrace the complexity and richness that design offers, employing computer analysis,

literature review, records analysis, questionnaire, interviews, photo-interviews where people are asked to represent their perceptions through photos, and a design charrette to explore these issues. Design is a process, the closest thing we have to making something from nothing, or at least creating something by arranging what is already there in a creative way. Design enables – provides affordances for – health at work, innovation, as well as the safe use of a park and the ability to get to a store easily as we age. Design is a catalyst for innovation, healing, and meeting people's needs. Design often leads to built environments that cost money to produce and maintain. Design is like the proverbial elephant surrounded by several blind people who, depending on whether she or he feels an ear, a trunk, or a leg, shouts out: "an elephant is like a leaf, a snake, or a tree." As Michael Polanyi points out in *Personal Knowledge*, an elephant of course is more than the sum of its parts. Its emergent properties of strength, endurance, living to old age, and long memory only make themselves manifest when one takes the time to step back, see the whole, and realises that the apparent "either/or" alternatives are really "either/and" parts of a greater whole. Reading the research articles in this issue make evident that individual perception and personal experience are inadequate to the task of seeing, embracing, and practicing design in all its complexity while managing design to achieve a creative, innovative, and useful end. It all seems too much... until one sees the pearl in the oyster – the whole that is greater the sum of its parts – the values the team holds and the degree to which those values are embedded in the process and the eventual product. As Steel notes, in his analysis of procurement models, values and their implementation are the most significant factors in a project achieving positive health – salutogenic – outcomes. "The achievement of salutogenic outcomes," he writes, "was seen as dependent on "the degree these outcomes are "valued by the client," a brief (design program) that "comprehensively documents the desired salutogenic outcomes... a project governance structure and decision-making process that supports the achievement of salutogenic outcomes at all levels," and a life-cycle approach to calculating financial costs and value. Every oyster is different and difficult to open. But once you find the pearl – once you become committed to the health promoting values design can support – you can relax and go with the flow. The complexity can be resolved. There are no more either/or dilemmas, just either/and resolutions.



58-65

Façade configuration costs and their influence on the healing environment
Alexander Symes BArch, RAIA



66-73

The impact of Australian procurement models on salutogenic project outcomes
Kelvin Steel FRAIA, MAIPM, BArch (Hons)



74-81

A holistic approach to designing for the elderly
Phil Smith, Dr Claudia Baldwin, Caroline Osborne

Hospital façades costs comparison: **Façade configuration costs and their influence on the healing environment and staff satisfaction**

Quantifiable benefits of façade configurations that either reduce length of stay or provide staff satisfaction are not necessarily considered in the funding models for healthcare facilities. This paper attempts to address this gap

Alexander Symes BArch, RAIA

During recent years, the importance of natural light as a design parameter to aid the healing environment has slipped down the design hierarchy for hospital façades. This can be attributed to a combination of: advancements in medical technology; an increased awareness of anthropogenic global warming and the resulting impetus to reduce energy use; and the typically increased capital costs of glazed façades compared with non-glazed.

In Australia, and potentially other regions in the world, this has created a perceived disconnect between the implementation of reducing operational costs for perimeter zones of healthcare facilities and the implementation of building envelopes that can benefit the healing environment.

The subject of windows' positive effect on the healing environment has been prevalent in design studies for the last four decades. The aim of this study is to consider the design of windows from a holistic perspective, to provide designers, operators and developers an understanding of the differences in various façade configurations and their respective capital costs, operational costs, and the potential benefits in reduced length of stay for patients and increased staff satisfaction.

Methods

In Australia, the percentage of windows to wall (windows-to-wall ratio – WWR), thermal transmission (U-value) and solar performance (shading co-efficient) are all subject to minimum legislative requirements, as defined by Section J of the National

Construction Code (NCC). Eight typical façade configurations that comply with these minimum requirements have been developed for contrast.

As a comparison of window arrangements, this study will consider the following terms:

U-value: In simple terms, the U-value is the measure of thermal transmission of heat through a material. Typically, the denser the material, the easier it transfers heat; for example, aluminium transfers heat very efficiently, glass reasonably well, and polystyrene not very well. A high U-value means that the heat is transferred quicker than by a material with a low U-value. A single piece of glass, for example, may have a U-value of 6, compared with an insulated glass unit (glass-air-glass), which may have a U-value of 1.65; meanwhile, a typical solid façade could have a U-value of 0.36. For the purposes of this study, all configurations are assumed to include non-glazed thermal performances consistent with each other: Changing the WWR rather than the U-value of the glass is more influential on the overall thermal transmission of the façade.

Effective shading co-efficient of facade: An effective shading co-efficient is the total shading provided by a façade. The variables are WWR, external shading and the solar performance of the glass. This last variable is referred to as a solar heat-gain co-efficient (SHGC) and is a measurement of the percentage of solar gains that a type of glass transmits. High-SHGC glass allows more solar radiation through it than low-SHGC glass; for example, a glass with a SHGC of 0.6 allows twice as much solar radiation through it than a glass with a SHGC of 0.3.

Visual light transmittance: This is the percentage of visible light transmitted (VLT) through a piece of glass. A high VLT (for example, 70%) will allow a high percentage



Figure 1: Schotten District Hospital, Germany, by woernerundpartner

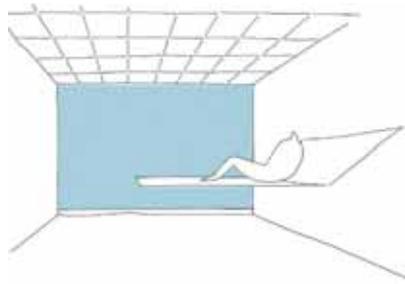
of light to be transmitted through the glass and, thus, allow a higher level of illumination from daylight to the inside space for the same area and location of window.

Room type: A single-bed arrangement has been chosen for this study based on several design studies, including: Davidson (1971);¹ Gardner (1973);² Kim (1987);³ Pegues (1993);⁴ Firestone (1980);⁵ and Janssen (2000).⁶ These demonstrate that the healing environment is improved by the provision of single rooms, which not only offer the highest levels of privacy and dignity but also reduce medical error and lower the rates of transmission of infection.

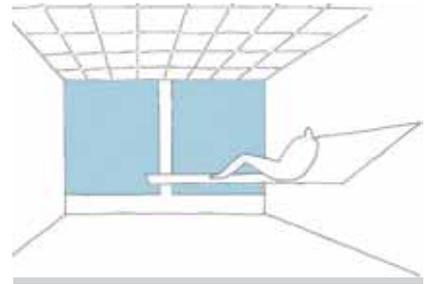
An argument against single rooms is socialisation; however, the single-bedroom layout proposed could be adapted to two-bedroom wards by the omission of a dividing wall.

Floor-to-floor height: The current design practice, based on a directive from our clients, is to design floor-to-floor heights of 4.5m. This includes a 2.7m ceiling height and 0.3m structural zone, which allows for a 1.5m services zone. This services zone is larger than required to house typical services; the rationale for this over-design being future flexibility of moving units within the healthcare facilities themselves and anticipating any future technologies that may be incorporated. This will have an impact on the WWR dependent on a floor-to-floor height of 4.5m, 4.2m or 3.6m, which will alter the façade costs. As glazing is typically more expensive than solid façade, the cost comparisons are lower for the 4.5m option as opposed to the 3.6m option. A sensitivity analysis has been conducted on the cost differences, which determines that the percentage difference between options is minimal (0.4%) and is inconsequential when comparing options; therefore, the current design trend of 4.5m floor to floor has been assumed.

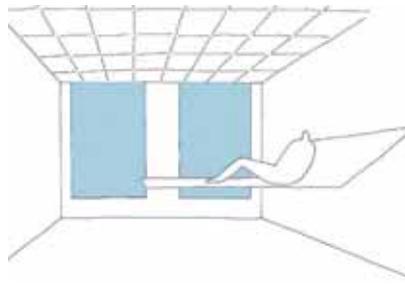
Façade configurations: The following façade configurations have been selected as representative of typical options that meet the requirements of section J. Options 1-4 are flat façades with varying WWR of 100% to 40%; options 5-8 are the same as options 1-4 with the addition of an external horizontal sunshade. Each option was tested for performance of daylight and glare on the north, east, south and west elevations. Vertical sunshades or internal



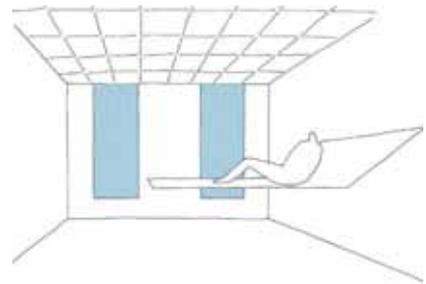
Option 1: 100% WWR with no external shading



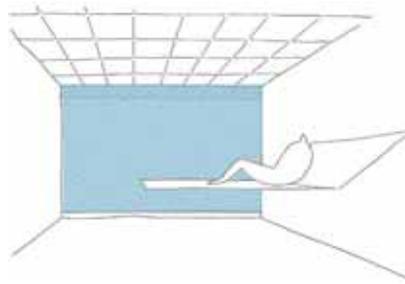
Option 2: 80% WWR with no external shading



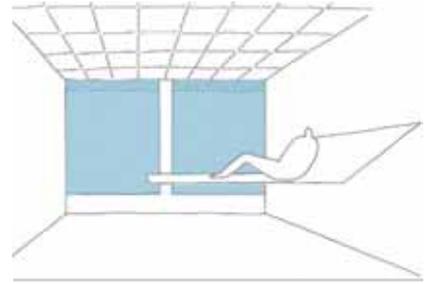
Option 3: 60% WWR with no external shading



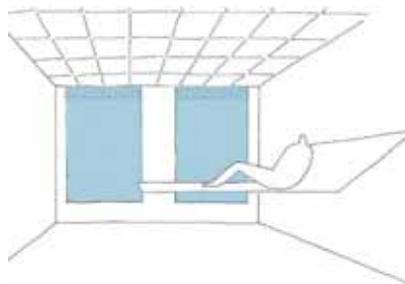
Option 4: 40% WWR with no external shading



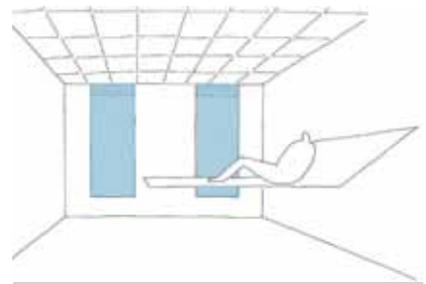
Option 5: 100% WWR with external horizontal shading



Option 6: 80% WWR with external horizontal shading



Option 7: 60% WWR with external horizontal shading



Option 8: 40% WWR with external horizontal shading

Table 1: Internal view configurations

blinds have not been included in this study as they are not recognised by the deemed-to-satisfy provisions of Section J.

From the perspective of the patient, the configurations look like the depictions shown in table 1 (previous page).

Façade capital costs: Based on feedback from façade sub-contractors in the market for Sydney, Australia, the capital costs of supplying and installing the façades have been approximated, so as to compare the likely cost differences between options. The façades compared are not exhaustive and have been chosen for their economy and durability. For ease of comparison, they have also been simplified to the following:

- windows: fixed aluminium-framed glazing with double-glazed unit glass;
- solid façades: composite aluminium-panel rain screen fixed to a steel frame with aluminium waterproofing and air-seal sheet, with insulation and internal plasterboard finish;
- sunshades: 600mm aluminium-framed horizontal sunshade. The sunshade is capable of taking abseil loading;

Façade operational costs – external maintenance: These costs were generated based on abseiling hourly rates for glass cleaning, solid façade cleaning, and sunshades based on a cleaning cycle of three times a year.

Façade operational costs – internal maintenance: These were generated based on rates for glass cleaning and internal wall surfaces (m²) based on a cleaning cycle of 52 times a year.

Façade operational costs – Heating, ventilation and air conditioning: Owing to basing the façade configurations on

minimum compliance with Section J – deemed-to-satisfy requirements, the operational energy of HVAC systems has been assumed as a constant.

Façade operational costs – Artificial lighting: Unless artificial lighting is controlled by individual users and is linked to a daylight dimming scheme, operating cost savings resulting from improved daylight access will not be generated. As the current approach in the Australian market is for ward lighting to be controlled from the nurses' station, this variable has been excluded from calculations at this time.

In relation to hospital operational costs, an average cost per bed of AU \$4500 a day has been assumed,⁷ along with an average staff cost of AU \$350 per day. These have been loosely based on figures derived from annual reports,⁸ but further clarification of these numbers is necessary for the substantiation of this paper.

Daylight modelling: This was conducted based on the protocol of the Green Building Council of Australia's healthcare daylight credit, using radiance software. This prescribes the modelling of a "uniform sky", which assumes the worst-case daylight condition of a fully overcast sky but does not take into account absolute availability of annual daylight for particular façade orientations. It is anticipated that future revisions of this study embrace a climate-based approach using a representative weather file to compare the variance in results between orientations.

Glare analysis: This was conducted using a methodology referred to as daylight glare probability developed by Wienold et al.⁹ This methodology, which uses a climate-based

approach with a representative climate file, has been shown to yield a much better correlation with actual user responses in two independent tests compared with previously developed methodologies, such as daylight glare index, visual comfort probability, unified glare rating, and the International Commission on Illumination's CIE glare index.

Literature review: Based on a literature review of evidence-based design studies that focused on quantifying either differences in patients' length of stay, condition and medication, or on quantifying staff satisfaction in relation to the impact design variables that can be influenced by façade design, the following summaries were used to test the façade configurations against. Using the methodology developed by Ulrich et al (2004)¹⁰ for assessing "rigour, quality of research design, sample sizes and degree of control", each paper was assigned a grading, shown in brackets after each summary, so that the results of the papers receiving an (A) grade are deemed to have a higher weighting than those papers scoring a (C) grade.

- Wilson, LM (1972): Delirium in an ICU was 40% for windowless, as opposed to 18% with a window, (B);¹¹
- Ulrich (1984): Patients with the window view of nature (trees) had shorter post-operative stays, took fewer potent pain drugs, and received more favourable comment about their conditions in nurses' notes, (A-);¹²
- Verderber (1986): Preference for views of nature, desire for control, preference for low sill heights, (B);¹³
- Verderber (1987): Patients were more negatively affected by 'poorly windowed' rooms, (B);¹⁴
- Ulrich (1991): Recovery from stress was faster and more complete when persons were exposed to natural rather than urban environments, (A);¹⁵
- Beauchemin, K (1996): Patients in sunny rooms in a psychiatric inpatient unit had an average length of stay of 16.9 days compared with 19.5 days for those in dull rooms – a difference of 2.6 days, (15%); (B);¹⁶
- Leather, P Pyrgas (1998): Sunlight penetration increased job satisfaction, reduced intention to quit, and improved general wellbeing. View of nature reduced job stress and intention to quit,

Table 2: Factors used for costing

<p>Inpatients' length of stay</p> <p>A DF >2.5% for 0% = no change in length of stay; a DF >2.5% for 60% = 20% reduced length of stay. As overnight stays for acute inpatients represent only 12% of patients,²³ this figure has again been reduced to 2.4%.</p> <p>Staff productivity</p> <p>A DF >2.5% for 0% = zero increase in productivity; DF >2.5% for 60% = 2% increase in productivity.</p> <p>Staff absenteeism</p> <p>A DF >2.5% for 0% = no change in absenteeism; a DF >2.5% for 60% = 0.5% reduction in absenteeism.</p> <p>For simplification, these staff metrics have been combined to estimate staff satisfaction.</p>
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- and increased general wellbeing, (B);¹⁷
- Eastman, C I (1998): Remissions of SAD – 61% morning, 50% evening, 32% placebo – were observed, (A);¹⁸
 - Friberg, TR, and Borrerg, G (2000): Diminished perception of ambient light was observed as higher in severely depressed patients – 66% severely, 21% moderately, 14% mildly, (B);¹⁹
 - Jana, M (2005): Of hospital design features as rated by staff, increased natural light ranked highest as being “very positive” for 43% of staff and received no negative feedback, (B);²⁰
 - Choi, Joon-Ho: (2011): An improvement of 16-31% in average length of stay between a higher illuminance ratio based on a window-to-wall ratio of 20%, a window-to-room ratio of 36%, and a VLT of 50.2%, (A-);²¹
 - Browning (2012): Staff productivity has been shown to increase by as much as 6-15% with the inclusion of biophilic design. Because this study only looks at daylight factor (DF), a 2% productivity increase, from 0% to 60%DF has been extrapolated, (C);⁷ and
 - Browning (2012): Absenteeism and presenteeism account for up to 4.4% of staff costs. Studies have shown a 10-25% reduction owing to biophilic design, while a 10% reduction can be attributed to the building design only. A 0.5% reduction in absenteeism and presenteeism has therefore been extrapolated, (C).⁷

The only paper that measured length of stay proportional to variances in window performance is that authored by Joon-Ho Choi.²¹ The only paper that cited an increase in staff productivity is that by Browning.⁷

These papers, however, are consistent with the results of the other papers referred to above. To make the calculations conservative, the reduced length-of-stay factors and staff-satisfaction assumptions (see table 2) have therefore been based on a conservative interpretation of the literature review.

Results

Values for achievable visual light transmission (VLT) under the section J requirements of the NCC are shown in table 3. The windows-to-wall ratio (WWR) and shading configuration result in a maximum allowable solar heat-gain coefficient (SHGC) as per the section J deem-

Table 3: Section J and visual light transmittance (VLT) results

Section	Elevation	Section J	Glass VLT %	WWR External	WWR Internal	Glaz m ²	Solid m ²
1		N = 0.23 SHGC E = 0.23 SHGC S = 0.45 SHGC W = 0.25 SHGC	N = 42 E = 42 S = 70 W = 45	48%	96% ≈100%	20.5	22.2
2		N = 0.28 SHGC E = 0.3 SHGC S = 0.5 SHGC W = 0.34 SHGC	N = 53 E = 57 S = 70 W = 57	40%	80%	17.0	25.7
3		N = 0.36 SHGC E = 0.4 SHGC S = 0.5 SHGC W = 0.47 SHGC	N = 63 E = 70 S = 70 W = 70	30%	60%	12.8	29.9
4		N = 0.53 SHGC E = 0.6 SHGC S = 0.6 SHGC W = 0.6 SHGC	N = 70 E = 70 S = 70 W = 70	20%	40%	8.5	32.2
5		N = 0.3 SHGC E = 0.28 SHGC S = 0.65 SHGC W = 0.31 SHGC	N = 57 E = 53 S = 70 W = 57	48%	96% ≈100%	20.5	22.2
6		N = 0.38 SHGC E = 0.37 SHGC S = 0.65 SHGC W = 0.41 SHGC	N = 63 E = 63 S = 70 W = 70	40%	80%	17.0	25.7
7		N = 0.49 SHGC E = 0.49 SHGC S = 0.65 SHGC W = 0.58 SHGC	N = 70 E = 70 S = 70 W = 70	30%	60%	12.8	29.9
8		N = 0.65 SHGC E = 0.65 SHGC S = 0.65 SHGC W = 0.65 SHGC	N = 70 E = 70 S = 70 W = 70	20%	40%	8.5	32.2

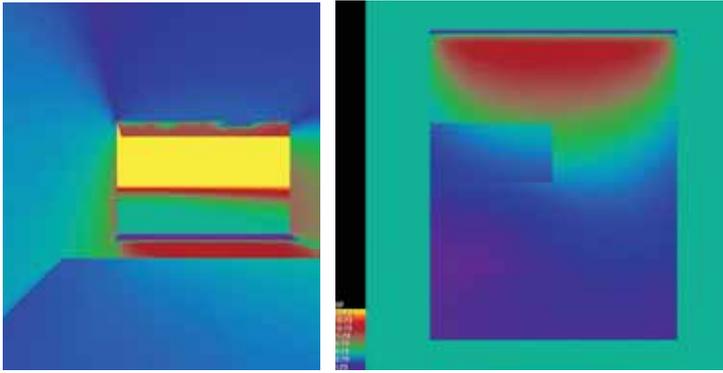


Figure 2: Daylight simulation results for option 5 (north); left: view from bed; right: plan

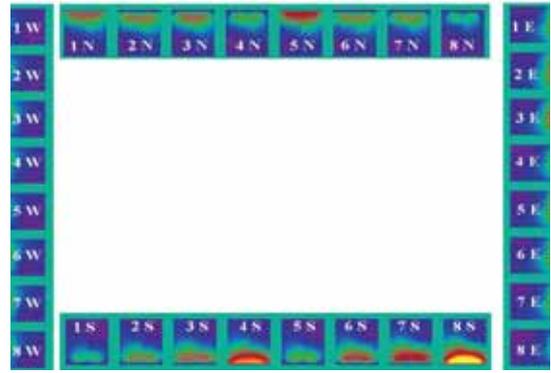


Figure 3: Daylight simulation results

to-satisfy calculator. SHGC values have been used to determine the VLT for each option by identifying commercially available glass products that achieve the SHGC at optimal transparency. Typically, the larger the WWR the lower the SHGC and VLT; for example, this results in a VLT of 48% for option 1 (north) compared with 70% for option 4 (north). The addition of a sunshade to option 5 (north) increases the allowable VLT from 42% to 57%.

Table 3 also includes the WWR (external), which is used to calculate external façade cleaning costs and capital costs, as opposed to WWR (internal), which is indicative of the patient experience of the façade and is used to calculate internal maintenance costs.

Daylight

On average, option 2 achieves the largest area of good daylight availability (DF >2.5%) of all options. The only orientation for which

it does not achieve the highest daylight availability is to the south, where option 1 achieves a higher DF owing to the larger WWR and the same VLT.

Glare

The glare analysis identifies four categories of glare experience based on the daylight glare-probability methodology for each hour of the year; these categories are 'imperceptible', 'perceptible', 'disturbing' and 'intolerable'⁹ (see figure 4). When comparing the options on their time percentage of 'intolerable' glare, the results show that, with the exception of option 4, the worst-performing configurations are options 1-6. The least amount of glare is received by option 8.

Results isolated for 21 June highlight that the glare peaks above the desired limit at around 8am and doesn't fall below this threshold until after 1pm. This is caused by the lower sun during the Australian winter. Between these times, the patient would need to shift their gaze away from the window, or close the blinds. As illustrated in figure 5, similar glare events (indicated by the red sections) would occur from May through to August.

Capital costs comparison

Table 4 illustrates that, owing to the typically increased façade costs of glazed windows compared with non-glazed facades, the options with a higher WWR are more expensive than those with a lower WWR. In all cases, the addition of a sunshade make the capital costs of options 5-8 more expensive than the corresponding options without sunshades.

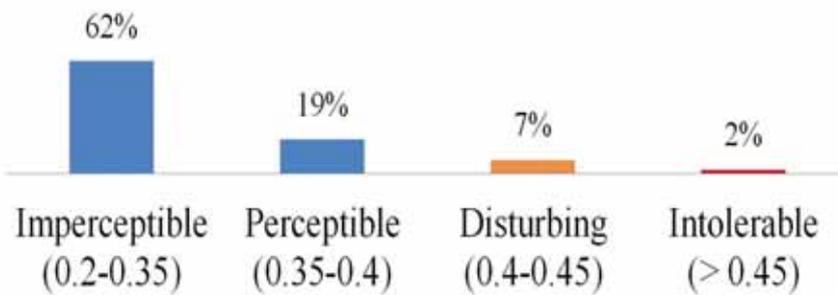


Figure 4: Example of annual glare-analysis legend

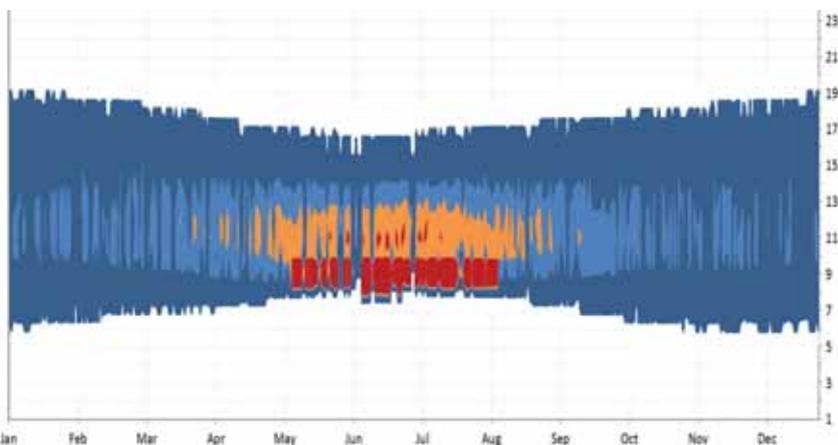
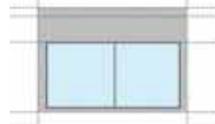
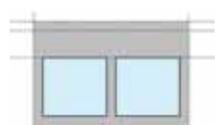
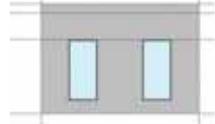
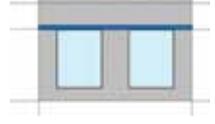
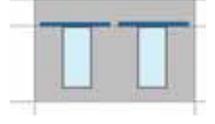


Figure 5: Annual glare analysis for option 7 (north)

Table 4: Capital and operational costs; daylight factor; glare-hour results; and life-cycle costing for reduced length of stay and staff satisfaction
 Percentages for daylight reflect the percentage of floor area that achieves a DF > 2.5%; the glare-hours percentage refers to the percentage of hours during which either disturbing or intolerable glare events occur.

	Section	Elevation	Capital	Operational cleaning (40yr)	Daylight %	Glare hours %	Length of stay – payback in years	Staff satisfaction – payback in years
1			\$646/m ²	\$3895/m ²	N = 48.8 E = 48.6 S = 64.7 W = 50.8 A = 53	N = 12.4 E = 8.2 S = 1.1 W = 18.5 A = 10	N = 0.97 E = 0.97 S = 0.77 W = 0.97 A = 0.91	N = 13.22 E = 13.18 S = 10.53 W = 12.8 A = 12.43
2			\$605/m ²	\$3462/m ²	N = 53.9 E = 56.0 S = 62.7 W = 55.9 A = 55	N = 16.4 E = 11.6 S = 0.2 W = 21.6 A = 12	N = 0.64 E = 0.62 S = 0.56 W = 0.62 A = 0.61	N = 8.71 E = 8.44 S = 7.65 W = 8.45 A = 8.31
3			\$601/m ²	\$2951/m ²	N = 51.4 E = 54.5 S = 54.6 W = 54.5 A = 53	N = 13.9 E = 9.9 S = 0 W = 20.6 A = 11	N = 0.33 E = 0.33 S = 0.32 W = 0.32 A = 0.33	N = 4.48 E = 4.44 S = 4.43 W = 4.43 A = 4.44
4			\$591/m ²	\$2412/m ²	N = 40.8 E = 40.5 S = 40.7 W = 40.7 A = 42	N = 7.7 E = 3.9 S = 0 W = 9.6 A = 5	Benchmark	Benchmark
5			\$757/m ²	\$3941/m ²	N = 49.4 E = 47.3 S = 56.3 W = 49.5 A = 53	N = 12.8 E = 8.1 S = 0.2 W = 16.5 A = 9	N = 1.01 E = 1.04 S = 0.92 W = 1.01 A = 0.99	N = 13.75 E = 14.19 S = 12.56 W = 13.73 A = 13.56
6			\$716/m ²	\$3508/m ²	N = 50.3 E = 50.4 S = 53.6 W = 53.8 A = 53	N = 13.4 E = 10.2 S = 0 W = 21.2 A = 11	N = 0.75 E = 0.72 S = 0.71 W = 0.71 A = 0.72	N = 10.2 E = 9.84 S = 9.7 W = 9.72 A = 9.87
7			\$712/m ²	\$2996/m ²	N = 45.5 E = 45.5 S = 45.5 W = 45.5 A = 48	N = 9.5 E = 6.6 S = 0 W = 12.9 A = 7	N = 0.46 E = 0.46 S = 0.46 W = 0.46 A = 0.46	N = 6.29 E = 6.3 S = 6.3 W = 6.29 A = 6.29
8			\$690/m ²	\$2458/m ²	N = 30.1 E = 29.8 S = 30.1 W = 30.2 A = 36	N = 2.3 E = 3 S = 0 W = 4.9 A = 3	N = 0.13 E = 0.13 S = 0.13 W = 0.13 A = 0.13	N = 1.72 E = 1.72 S = 1.72 W = 1.72 A = 1.72



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Operational costs comparison

Table 4 also shows the operational costs associated with façade maintenance. It illustrates that maintenance costs for both the external and internal finishes are less expensive when there are fewer external façade elements and a smaller WWR. The least operational cost is option 4 and the most expensive is option 5.

Discussion

The final two columns of table 4 also demonstrate that, owing to the operational costs required to service a bed in a hospital, the design variables of increased WWR or the addition of adding a sunshade are easily offset within a year from the lowest cost benchmark (option 4). The operating cost per bed includes the cost associated with staff. If, however, only staff-satisfaction factors are considered, the final column (staff-satisfaction payback) shows that the cost of installing an additional sunshade (comparing options 4 and 8) is paid back within two years.

The appropriateness of design studies that demonstrate benefits to the healing environment has been questioned, as clinical treatment has developed and overnight stays at hospitals have become less frequent. But these financial models assume that overnight stays only account for 12% of all patients²² and, even if the length-of-stay benefits were factored down a further

500%, the payback for a design such as option 5 compared with the benchmark option 4 would still only be five years.

The question is: how do we procure and operate healthcare facilities to take advantage of considered design that delivers life-cycle costing benefits and a more positive outcome for both patients and staff? The results from this study firmly suggest that reducing the capital cost of façades is not within the life-cycle costing benefit of a hospital if the funding model for health delivery is payment to the service provider per treatment, as opposed to length of stay.

Next steps

This study is by no means definitive and there are many assumptions that must be confirmed around operational pricing for hospitals. The daylight methodology should be updated to be climate-based, as opposed to a uniform sky, as this will produce results that are differentiated more by orientation.

This study has been simplified to basic design options for clarity purposes. More complex design variables that could increase the performance and amenity of hospital designs should therefore also be tested in future iterations. Such additions include: incorporating daylight dimming into the capital and operational costs to take advantage of reduced energy use via artificial lighting; thermal modelling

of the various configurations; and their impact on capital and operational costs of mechanical systems. The variable of mixed-mode ventilation with an electrical switch on the window linked to the mechanical system, should also be incorporated into this scenario.

Further issues to consider include: use of vertical sunshades; view quality of urban versus natural elements; comparison of the capital and operational costs associated with use of curtains, interstitial blinds within a jockey-sash, and operable interstitial blinds; how the colour of glass influences the healing environment; and the benefits of designing operating theatres that have access to daylight.

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Procurement models:

Australian project procurement models and their impact on achieving salutogenic outcomes

How are the five most commonly used procurement models in Australia perceived in terms of their impact on salutogenic outcomes? This study sought the views of a range of stakeholders

Kelvin Steel FRAIA, MAIPM, BArch (Hons), former project director, Aurecon

Between 1960 and 1995, the traditional lump sum (TLS) procurement model was the predominant template in use on all major capital projects (both health and non-health sectors) throughout Australia. But during the 1960s and 1970s, some large government-funded projects were also beset by major cost and time overruns, paving the way for the gradual emergence of alternative procurement models. A key driver behind the development of each of the new models was a different approach to the allocation of projects risks, particularly in relation to cost and time, compared with allocation under the TLS model. The key aim was the avoidance, or minimisation, of major contractual disputation between clients and building contractors, together with greater cost and time certainty.

The past 15 years have seen a rise in use of the managing contractor (MC) and

public-private partnership (PPP) models. The most regular use of the MC model in the public sector currently occurs in Queensland, with the approach enjoying the backing of both the Queensland Government and Queensland Health. A key reason for its popularity is that all of the major construction contractors and consultants in the state have a detailed understanding of the implications of the risk allocation in the Queensland Government's standard MC contract, and all parties view the allocation of risks to be, in general, fair and reasonable.

The PPP model currently in use in Australia (particularly in Victoria and in New South Wales) has evolved, in part, from the private-finance initiative (PFI) model, which originated in the UK in the 1990s.

Terminology

Throughout this article, reference is made to five procurement models, the definitions for which are set out at in table 6.¹ The

terms 'small', 'medium', 'large' and 'very large' are used to categorise projects by size of capital expenditure (capex), as follows:

- Small – up to AU \$80 million;
- Medium – AU \$80m to \$250m;
- Large – AU \$250m to \$800m; and
- Very large – Greater than AU \$800m.

There are currently 11 public-sector hospital redevelopment projects either under way or recently completed in Australia that fall into the 'very large' category. Of these projects, seven are being, or have been, delivered using the PPP model, and four are being delivered using the MC model.

For the purpose of this article, the terms "salutogenic design" and "good design" are considered to be largely synonymous. The central premise of 'salutogenic design' is that the quality of a building's environment plays a critical role in promoting health and wellbeing. The definition of "good design" is derived from the Office of the Victorian Government Architect, which describes it thus: "High-quality buildings and public spaces that are engaging, diverse and inclusive; are environmentally, economically and socially sustainable; promote confidence and wellbeing in the community; and are culturally rich and poetic."²

Objectives

The five key research objectives were:

- to assess the views of stakeholders in hospital redevelopment projects on the achievement (or otherwise) of salutogenic outcomes in relation to a range of recently complete or current Australian hospital projects. Views were sought on the following five procurement models: construction management (CM); design and construct (D&C); managing contractor (MC); public-private



Managing contractor procurement model: Lady Cilento Children's Hospital (formerly Queensland Children's Hospital), Queensland

partnership (PPP); and traditional lump sum (TLS);

- to assess the facilitation or stifling of innovation under the different procurement models;
- to assess the relative degree of 'buy-in' from key stakeholders, including hospital staff – in particular, during the project planning and design phases – under the different procurement models;
- to identify the three key lessons learnt for each model, which, if implemented, would improve the likelihood of achieving increased salutogenic outcomes on future projects; and
- to identify the key drivers that are most likely to influence the evolution of Australian hospital project procurement models over the next decade.

Methodology

The research methodology consisted of the following activities:

1. Identification of a list of hospital redevelopment projects undertaken in Australia over the past decade, in both the public and private/not-for-profit health sectors, with a focus on medium-sized, large and very large projects, and providing a spread across all five procurement models.
2. Preparation of a research survey questionnaire, which focused on addressing the five research objectives.
3. Distribution of the questionnaire to about 70 stakeholders involved in the projects identified, followed by structured interviews with 38 of these stakeholders. The number and percentage of respondents by category are shown above in table 1.

Results

1. Procurement preference

The respondents' general preference for the adoption of each model is shown in table 2 above. This preference is generally consistent across both the public sector and private/not-for-profit hospital sector.

While capex size is only one of a large number of criteria used to assess the suitability of a model for a project, a distinct pattern is evident in table 2. As projects move into the large and very large categories, use of the CM, D&C and TLS models declines, with the MC and PPP models being distinctly preferred on larger

Category	Number of respondents	Percentage of respondents %
Health department staff	5	13
Public hospital/agency CEOs and executives	2	5
Private/not-for-profit hospital/agency CEOs and executives	3	8
Public hospital staff	1	3
Private/not-for-profit hospital staff	1	3
Directors of infrastructure/facilities public hospitals (and universities)	3	8
Directors of infrastructure/facilities private/not-for-profit hospitals	3	8
Client project directors	2	5
Consultant project managers	4	9
Health-service planners	1	3
Architects, engineers and quantity surveyors	6	16
Construction contractors	6	16
PhD students	1	3
Total	38	100%

Table 1: Respondents by category

Procurement model	Project capex category			
	Small	Medium	Large	Very large
Construction management (CM)	P	N	NP	NP
Design and construct (D&C)	N	NP	NP	NP
Managing contractor (MC)	NP	P	P	P
Public-private partnership (PPP)	NP	N/P	P	P
Traditional lump sum (TLS)	P	P/N	NP	NP

Table 2: Preference of respondents for the adoption of each of the five different procurement models across projects of varying capex size (P = preferred; N = neutral; NP = non-preferred)

Procurement model	Project capex category			
	Small	Medium	Large	Very large
Construction management (CM)	H	M	L	L
Design and construct (D&C)	L/M	L/M	L	L
Managing contractor (MC)	L	H	H	H
Public-private partnership (PPP)	L	L/M	H	H
Traditional lump sum (TLS)	H	M	L	L

Table 3: Likelihood (as expressed by respondents) of each of the models facilitating salutogenic project outcomes (H = high; M = medium; L = low)

projects. Although this pattern is strongly evident in Australia, it is not the case in Europe generally, except for Great Britain.

2. Achieving salutogenic outcomes

Table 3 sets out the views of respondents on the likelihood of each model facilitating salutogenic project outcomes. The achievement of salutogenic outcomes was seen to be critically dependent on:

- the degree to which good design and the achievement of salutogenic outcomes are valued by the client;
- the production of a project brief that comprehensively documents the desired salutogenic outcomes for the project;

- the implementation of a project governance structure and decision-making process that supports the achievement of salutogenic outcomes at all levels; and
- a financial management plan that is centred on achieving value-for-money solutions, and which assesses lifecycle costs, as opposed to adopting a 'lowest capital cost' approach.

The pattern evident in table 3 is that only the MC and PPP models were perceived to have a high likelihood of facilitating salutogenic project outcomes on large and very large projects. The most common reasons stated for this view related to

Procurement model	Facilitation or stifling of innovation
Construction management (CM)	N
Design and construct (D&C)	S
Managing contractor (MC)	F
Public-private partnership (PPP)	F
Traditional lump sum (TLS)	N

Table 4: Respondents' assessment of the facilitation or stifling of innovation under each procurement model (F = generally facilitates achievement of innovation; N = neutral; S = generally tends to stifle innovation)

Procurement model	Degree of hospital staff buy-in typically achieved on a project
Construction management (CM)	M/H
Design and construct (D&C)	L
Managing contractor (MC)	H
Public-private partnership (PPP)	M/H
Traditional lump sum (TLS)	H

Table 5: Respondents' assessment of the relative degree of buy-in from hospital staff achieved under each procurement model (H = high buy-in; M = medium buy-in; L = low buy-in)

cost control, risk allocation and disputation, which were generally seen to be linked to, and more likely to occur under, the D&C, CM and TLS models on large and very large projects. Where this occurred, a reduction in project scope was likely, potentially leading to poorer salutogenic project outcomes.

3. Innovation

The respondents' assessments of the degree of facilitation or stifling of innovation under each procurement model are set out in table 4.

Views varied in relation to innovation. Some respondents, for example, expressed the view that the TLS and MC models were more likely to facilitate innovation through the continuous and iterative exploration of service delivery models and functional layouts during a project's design phases and, in particular, during the design developmental phase.

In contrast, respondents who had responsibility for delivering PPP projects, where the project brief was extremely robust and outcome-based, contended that the intense and highly competitive PPP bid phase brought out the best in terms of generating innovative ideas. In the author's view, innovation is facilitated on PPP projects, particularly during the bid phase; it can be stifled, however, during post-financial close, depending on the attitude of the construction contractor.

4. Achieving stakeholder buy-in

Table 5 sets out the respondents' views about the relative degree of buy-in achieved from project stakeholders – in particular, from hospital staff – under each model.

The procurement model that was most highly criticised in terms of achievement of hospital staff buy-in was the D&C model. The primary reasons given by respondents for rating the PPP model at a slightly lower

level than both the MC and TLS models in this area were:

1. when typically presented with three designs from which to choose, hospital staff do not feel that pointing out the areas of each design that do and don't work well, and then waiting for each bidder to revise those areas, is as satisfactory as working with a single consultant team to develop an excellent design and salutogenic outcome; and
2. even through extensive user consultation would take place post-financial close, construction contractors generally discouraged changes being made to the design as bid because of the cost and time implications involved in implementing those changes.

Key lessons learnt

Construction Management (CM)

1. Overlapping design with construction

The main reasons for adopting the CM model are where scope is relatively poorly defined (for example, on a hospital refurbishment project) and/or where an extremely tight programme deadline exists. The way in which the reduced programme length is achieved under the CM model is by overlapping design and construction. The most significant risk associated with overlapping design and construction is the potentially large amount of re-documentation required during construction, particularly in relation to the interface works between trade packages.

2. Managing scope change

Generally, the CM procurement model allows for scope change to occur during construction much more easily than with other models; for example, where substantial letting gains are achieved in the early trade packages, these savings can be re-allocated by the client to other parts

of the project ahead of when these later works need to be documented.

3. The client bears the cost risk

One upside of the CM model is that in a falling tender market (as currently exists across Australia) trade-package letting gains of around 10-15% are typical; in a rising tender market, however, the converse is the case. In each case, the client bears the cost risk, and this is something to which many clients in Australia are now averse.

4. The need for "reflection time"

Many respondents commented on the benefits to be gained from giving hospital staff adequate "reflection time" to review drawings and documentation. The time pressures inherent in the CM model often do not allow for this to occur, and this can result in built outcomes of lower quality.

Design and Construct (D&C)

1. Although often used in healthcare, the D&C model was generally perceived as not being as well suited to hospital projects as other models. The main reasons given to support this view were the general complexity of hospital projects, user consultation requirements, and demands on quality. Complexity and high quality also relate to the lifecycle performance of the building fabric and engineering infrastructure, which can be given a lower priority during the D&C process.

2. Impact of adopting a model that is mainly cost-driven

Because the D&C model is primarily cost-driven, ie aimed at designing a building that meets the brief at the lowest possible capital cost, the likelihood of producing a salutogenic and good design outcome is viewed as being slightly lower than the outcomes achieved using other models.

3. Building quality

Clients have felt let down in relation to the build quality achieved on some D&C projects, and a number of CEOs and directors of infrastructure commented on the slightly higher degradation of the built asset (especially 10 years, or more, post-completion), and the associated higher building-maintenance costs, for hospital projects delivered under the D&C model.

Managing contractor (MC)

1. The increasing adoption of the MC model
The growing use of this model on large and very large hospital projects in a number of Australian states was primarily attributed to:

- its successful application on projects of different types and size, including brownfield and greenfield developments;
- its ability to maximise the benefits from early contractor involvement (ECI);
- its ability to multi-stage a project, plus add or reduce scope cost-effectively;
- its incorporation of a GCS (guaranteed construction sum), providing cost certainty for clients;
- the ability for clients to take advantage of a flat tender market; and
- its provision of a shorter overall project timeframe than the TLS, PPP and D&C models, although it involves a longer timeframe than that of the CM model.

2. Timing of novation of consultants to the managing contractor

The point at which consultants are novated to the managing contractor is flexible under the MC model. Key points raised by respondents included the need for:

- consultant scopes of service, contracts and fees to be fully resolved prior to novation occurring;
- use of a tried and tested consultant novation contract; and
- inclusion of a "whistleblower clause" in the novation contract, which allows consultants to comment freely on any potential changes to the design intent observed during construction.

3. Adoption of MC model variants on tertiary education-sector projects

Many universities in Australia are adopting the design document novate and construct (DDNC) model on large university projects, largely because of the perceived risk-allocation benefits (which include the DDNC

contractor carrying the documentation risk, the cost risk via a warranted construction sum, and the time risk). The point at which consultant novation occurs is flexible, and can be as late as towards the end of the contract documentation phase. In this way, the client is able to maintain a direct contractual relationship with the architects and all consultants until the point at which they wish to shift that relationship to the construction contractor.

A guaranteed construction sum (GCS) with a shared-saving clause is a central element to most DDNC-model construction contracts.

Public-private partnership (PPP)

1. The evolution of the PPP model in Victoria
The PPP model is fundamentally different from the other four models, particularly in terms of project governance and contractual risk allocation.

While some of the early PPP hospital projects in Victoria did not, in the author's view, produce highly salutogenic outcomes, the progressive evolution of the model culminated in the Royal Children's Hospital Melbourne project, which, in 2012, won three awards from the International Academy of Design and Health. One significant way in which the PPP and MC models differ, for example, is that the former involves a GCS price to deliver outcomes, whereas the latter involves a GCS to deliver a schematic design.

2. Maintenance and facility management under the PPP model

Many respondents commented that the most significant benefit of the PPP model related to the maintenance and facility management (FM) outcomes for the hospital over the typical 20-year concession period. This occurred because the PPP model ring-fenced the maintenance and FM funding over the full concession period. It also defined the standard to which the hospital would be maintained, which significantly exceeded the 'standard warranty' benchmarks typically used on non-PPP projects.

3. The high cost of bidding

The high cost of bidding on PPP projects in Australia has been the subject of much industry discussion. On a typical PPP project with a capex of AU \$400-\$500m, three bidding consortia will each outlay typically between AU \$10-\$12m during the bid phase. A paper released in May last year by Partnerships Victoria Unit³ on proposed changes for future PPP projects recommended a reduction in the number of bidders from three to two, where appropriate, as a means to reduce costs.

4. Innovation and change management

A stated key aim of PPP model projects is the achievement of innovation. Some respondents (not including PPP project directors) commented that achieving



Public-private partnership: Sunshine Coast Public University Hospital, Queensland

innovation in the design development phase (i.e. post-financial close) could be difficult for two reasons:

- A construction contractor's primary aim post-financial close is, generally, to achieve the shortest possible delivery time. Therefore, minimising the number of changes to the schematic design assists with achieving this aim; and
- The process by which changes are approved under the PPP model is either via a state-mandated change or a consortium proposed change subsequently approved by the state. On most PPP projects, very few state-mandated or state-approved changes occur, even though hospital staff raise a number of suggested changes that could lead to an increased level of innovation during the design development phase.

The issue of managing scope change has also been addressed in the Partnerships Victoria paper; through the proposed introduction of a "scope ladder" on future PPP projects. This has the potential to deal with issues raised in point 2 above.

Traditional lump sum (TLS)

I. Poor document coordination

The biggest concern respondents raised in relation to TLS projects was the implications for a project associated with poor document coordination between consultants. In particular, there was a perception that this results in a requirement imposed on the client to pay for consultants' documentation coordination errors. This has resulted in many clients preferring to adopt a procurement model where the construction contractor bears the

documentation risk, as occurs in the D&C, MC, DDNC and PPP models.

2. Ongoing applicability to small projects

The majority of respondents commented that the TLS model was, and would remain for the foreseeable future, a preferred procurement model on hospital projects up to around AU \$80m in capex value.

The reasons for this are: when well managed, the TLS model results in high-quality projects being delivered on time and on budget; the model allows adequate consultation time (and client reflection time) during the design process; and it allows for scope changes during design and documentation while still maintaining the overall project budget and programme (provided that a value management approach is adopted).

Table 6: Procurement model definitions¹

Model	Design and construct aspects of model	Non-core services	Risk allocation
Construction management (CM)	Contractor is engaged to manage the construction works on behalf of the client	State / outsourced Typically outsourced services are based on input specifications	Client enters directly into contractual arrangements with suppliers – the contractor therefore carries little or no risk (except in relation to its own work)
Design and construct (D&C)	Detailed design and construction procured under one contract	State / outsourced Typically outsourced services are based on input specifications	As for the construct-only model but with the additional transfer of detailed design risk The contractor provides certain warranties over the design
Managing contractor (MC)	Contractor manages the design, documentation and construction on behalf of the state. Lump sum (consisting of the management fee and the cost of the work done under the component sub-contracts)	State / outsourced Typically outsourced services are based on input specifications	Construction quality and completion risk transferred Risks associated with poor service delivery are difficult to transfer using input specifications compared with output-specific model (eg PPP)
Traditional lump sums (TLS)	Design and construction separately procured	State / outsourced Typically outsourced services are based on input specifications	Construction risk transferred The state retains planning, latent conditions and site-condition risks
Public Private Partnerships (PPP)	A consortium contracts to build the project, finance it, and assume responsibility for facilities maintenance and asset replacement over a defined period (typically around 30 years). The state will pay a fixed fee In Victoria, this delivery model is subject to the Partnerships Victoria policy and guidelines PPP has real potential to deliver value for money where: <ul style="list-style-type: none"> - It is possible to clearly define requirement outputs - The project has complexity and there is significant scope for innovation - There are opportunities to transfer certain risk to the private sector; which it is in a better position to manage; it can therefore set a price lower than the cost to the state if the latter were to retain the risks The state's responsibilities for managing the project are very different to all other procurement models		The state becomes a purchaser of facility-based services that are paid for based on performance and such as the state frees itself of associated risks, locks in whole-of-life budgets and quality, and frees itself up to focus on its core business

3. Benefits of early contractor involvement

Many respondents highlighted the benefits of early contractor involvement (ECI) on traditional lump-sum projects. This can be achieved either through a formal arrangement, where a contractor is paid a fixed fee to review the project schematic design and design development reports, or via a less formal arrangement where a contractor would provide more limited comments on, for example, the buildability of the project design for no fee. Under these arrangements it is important the client does not preclude the ECI contractor from tendering on the project, and that the ECI report produced is made available to all parties bidding on the project.

Conclusions

The following conclusions are applicable to all five procurement models.

- Achieving a highly salutogenic and good design outcome requires:
 - clarity of vision, project objectives and desired project outcomes;
 - appointment of a highly skilled client project director and consultant project manager, and their respective support teams, each of whom need to have delivered a number of similar projects under that procurement model;
 - appointment of architects, engineers, quantity surveyors, construction contractors and specialist consultants who are prepared to adopt a genuine team approach to working with the client and with each other;
 - a comprehensive and robust service plan, model of care and project brief; and
 - strong consultation with, and buy-in from, project stakeholders and hospital staff at all levels.
- The achievement of innovation, in both service delivery and in design and construction, requires a project governance structure that encourages innovation and does not stifle its achievement. As service delivery innovation in hospitals often comes from the interaction between hospital staff and the project architects, barriers that restrict this interaction should be removed.
- The allocation of an adequate project capex budget is critical to the achievement of salutogenic and



Traditional lump-sum procurement model: Gold Coast University Hospital, Queensland

good design outcomes, and, where an inadequate budget is allocated, none of the procurement models are likely to be able to overcome this deficiency and produce a salutogenic project outcome.

- Clients' attitudes to what constitutes an adequate project capex budget are highly variable. A good starting point adopted by many clients is to benchmark the achieved end cost of a number of recently completed projects of a similar type, size and nature, and to set the target cost of a new project within that benchmark range. This is typically conducted during the preparation of the project business case, which evaluates a range of development options and their estimated investment return to the client. The business case factors in the cost of operating the health service, including the lifecycle facility cost, over a defined period, typically 20 years. The total recurrent cost of staffing and operating most new Australian hospital projects over a 20-year period is around 100 times that of the initial capital cost of construction.
- Effective scope change-management processes, which are also transparent to stakeholders, are critical to achieving salutogenic outcomes.
- There is no 'best' procurement model, only one that is more appropriate for a project than another model.

The following conclusions are applicable to each individual procurement model.

Construction management (CM)

The CM procurement model is likely to continue to be used mainly on small to medium-sized hospital projects with very tight completion deadlines, and also on those projects that involve predominantly refurbishment work where the scope of work is difficult to define at tender:

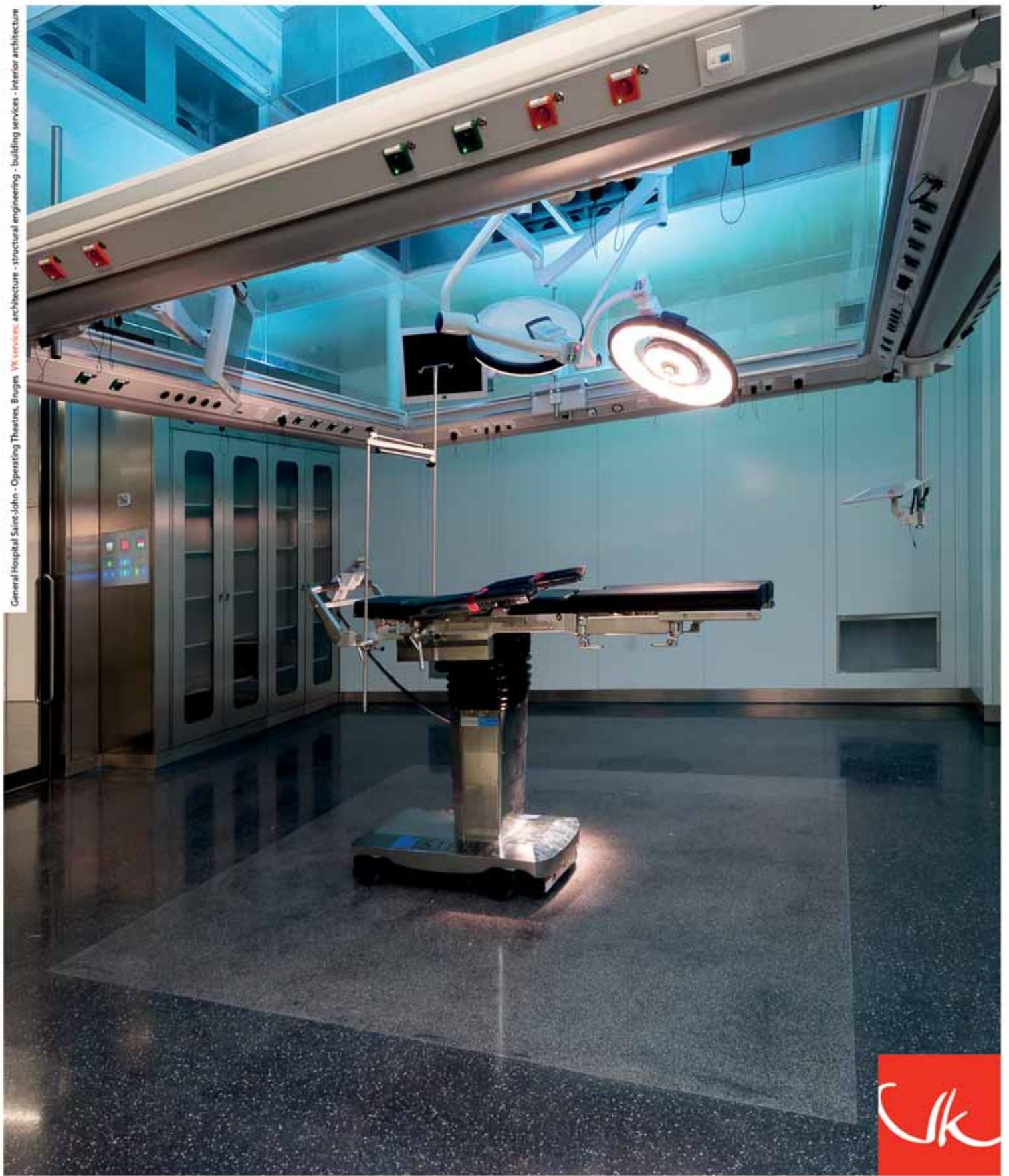
Design and construct (D&C)

Where a client determines that a hospital project needs to be driven primarily by capital cost, and where a more modest design outcome is acceptable to the client, the D&C model is appropriate. Achievement of highly salutogenic outcomes under this model is considered to be more problematic than under the other four models, and respondents also saw D&C as raising the likelihood of greater building maintenance being required over a 20-year period.

Managing Contractor (MC)

The MC model and the DDNC variant are likely to continue to be adopted on many large and very large hospital projects. Both models are attractive to clients for a number of reasons, including:

- the direct contractual relationship maintained with the architects and consultants up until the time of novation of the consultants to the managing contractor;
- the ability of these models to facilitate scope change;



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Traditional lump-sum procurement model: Flinders Centre for Innovation in Cancer, South Australia

- the documentation risk being borne by the construction contractor;
- cost and time risk allocation, combined with the provision of a guaranteed construction sum, with or without a share of savings, together with a fixed project completion date; and
- the high degree of stakeholder buy-in, innovation and salutogenic outcomes that are generally achievable under both the MC and DDNC models.

Public-private partnership (PPP)

The PPP model is highly sophisticated, fundamentally different from the other models, and is capable of producing highly salutogenic and good design outcomes – provided they are an integral part of the client's brief and allocated sufficient weighting in the bid assessment process. A key benefit associated with PPP is the generally higher standard of facility maintenance (both 'hard' and 'soft' FM) that occurs over the project concession period, which is typically 20 years in Australia.

The high cost of bidding on PPP projects, however, will continue to be an issue for unsuccessful bidders, and the construction industry in general, particularly where more than two consortia bid on a project. Many respondents interviewed saw this issue as being unsustainable in Australia over the next decade.

Traditional lump sum (TLS)

The traditional lump-sum model is likely to continue to be adopted on the majority of smaller hospital projects (i.e. up to around

AU \$80 million in value) in both the public and private/not-for-profit health sectors, particularly where the project is relatively straightforward in nature.

Salutogenic and good design outcomes are regularly achieved on TLS projects, especially those involving highly experienced consultant teams and construction contractors, plus experienced clients who encourage a team approach and who are committed and dedicated to achieving high-quality project outcomes.

The two key issues that require a high level of project management on TLS projects are the adversarial nature of the lump-sum construction contract, and the frustration many clients experience with paying for consultants' documentation coordination errors.

Future drivers for procurement models in Australia

The context for the evolution of procurement models on hospital projects over the next decade is: an average population growth rate of 1.7% a year, compared with total growth in the world's population of 1.1% a year; an ageing population; rapid change in medical technology; an ongoing increase in the proportion of day surgery and reducing average length of stay for patients in hospital; and changes in government policy and, in turn, service delivery models.

It is therefore considered likely that future procurement models in Australia will evolve progressively from current models and be founded on three core principles:

- models that facilitate (rather than stifle) good design, and which seek to deliver salutogenic project outcomes, will thrive;
- models that are seen to be well-balanced in terms of risk allocation between clients and construction contractors, and which are based on standard construction contracts, will also thrive; and
- models that embody both collaboration and sharing of knowledge between all key projects stakeholders, and which are built on a sound commercial, financial and legal base, will similarly see an increase in use. An important trend is the development of "full service partnerships", where private and not-for-profit hospital operators provide both public and private health services in health precinct-type facilities, which are financed, designed, built and operated by the private sector in partnership with the Government.

As one respondent succinctly put it when interviewed: "The days of procurement models that regularly cause disputation and lead to litigation are numbered. No one should be promoting a model where one party 'rips off' the other party."

In conclusion, the attitude of being tough but fair in commercial negotiations is embedded in the psyche and culture of most Australians – and so, too, is this likely to be embedded in project procurement models in the years ahead.

Author

Kelvin Steel is the former project director environment and advisory services for Aurecon which funded this study.

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The use of participatory models in the design of infill housing for seniors:

A holistic approach to designing for the elderly

This collaborative research project investigated the design of liveable, affordable and sustainable housing for seniors, specifically in infill areas

Phil Smith, Dr Claudia Baldwin, Caroline Osborne

All Australian cities have growth targets of at least 50% infill housing over the next 20 years, but few specifically address housing choice for the elderly population.

This project aimed to identify liveable, affordable and sustainable ways to accommodate older people in communities that are becoming more densely populated; significantly, it attempted to produce a more holistic approach than can be found in many existing reports and guidelines that deal with ageing, healthcare and housing.

What would a sustainable, affordable and liveable neighbourhood future look like for older people? Our participants hoped for a future in which inclusive, multi-generational communities would dominate in their towns and neighbourhoods, and where the contribution and presence of elders would be respected, valued and celebrated. They wanted to be able to move with ease from their universally designed home, along evenly graded, well-maintained and shaded walkways, which are safe from passing cars and cyclists, in a peaceful, green neighbourhood. As a time may come when they are unable (or choose not) to use their car, it was important that shops, services and a range of amenities were in close proximity. Human-scale environments were also important, so street-based shopping and services close to housing and public transport were strongly preferred.

Methodology

The project, which began in early 2011, used a case-study approach with two qualitative and participatory research methods: Photovoice and design charrettes. The researchers worked with two groups of seniors, 42 in total, from two locations in South East Queensland, Australia.

The Photovoice method engaged participants in a dialogue about images they had taken for two purposes: to identify desirable aspects of neighbourhood and home environments; and to identify challenging aspects of these places.

The project was split into two key stages, which focused on:

1. gaining understanding of older peoples' perspectives using Photovoice and developing principles to guide the design stage, during May and June 2011; and
2. applying the principles and embedding participants' perspectives in design typologies, using a two-phase design charrette process, during August and September 2011. This stage invited the research participants to work collaboratively with the design team.

Research that investigates seniors' preferences in urban environments and which involves older adults is relatively rare. A small but growing body of studies suggests that participatory research with older adults may help in understanding and addressing some of their complex health and social problems. Furthermore, with the growing emphasis on incorporating the preferences of elders in service delivery and public-policy decision-making, such approaches offer many benefits, including meeting needs more effectively, capacity building and empowerment.^{1,2,3}

Why use Photovoice and charrettes?

In the past, Photovoice has been used extensively in community development and health studies to influence decision-makers.^{4,5} More recently, it has been used to better understand community values and perspectives for input into planning processes.^{6,7} Photovoice involves participants taking photos according to a theme; they then discuss and aim to reach

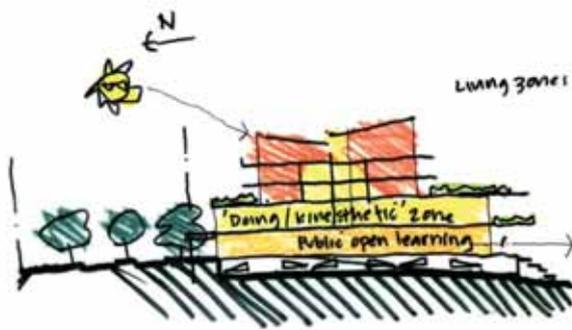
a consensus within a group about the message they wish to convey to decision-makers, using their photos and storylines. This 'participant-elicited data' provides a richer insight into often complex, contextual issues and puts the participants in control. Furthermore, visual data has been found to identify problems and strengths omitted from data gathered via other means;⁸ and a large sample is not as important as the quality of the participation.

The design charrette is also a participatory method. It is defined as a "time-limited, multi-party design event organised to generate a collaboratively produced plan for a sustainable community".⁹ It brings together key stakeholders, often with opposing views, to become members of the design team in an atmosphere of mutual respect, to create a design for a neighbourhood or complex. Charrettes are often run in staged workshops, over weekends or for several days. The designers then undertake further work, which is brought back to the larger 'team' for input. Charrettes create a common language for solutions; they are efficient and inexpensive; and they can reveal policy contradictions, as they did in this project.¹⁰

Charrettes have been used with entire communities, key stakeholders, children, design students, and people with disabilities. In a case in Atlanta, the goal was to design diverse communities that would provide better lifestyles for all generations, particularly the elderly. Taking place over nine days, it involved 1500 architects, urban planners, transportation and mobility professionals, health professionals, ageing and accessibility experts, developers, land owners and government officials. The participants developed a set of guidelines, based on the principles of new urbanism, which emphasised lifelong mobility, social interaction, healthy living, dwellings and services. It did not, however, directly involve



Figure 1: The charrette team explored the idea of a five-storey, mixed-use development on university land in a joint venture between the university, a not-for-profit housing provider and a commercial third party. Buildings included street-based retail; ground-floor university admin; learning space; second-floor 'kinesthetic teaching/learning zone' with communal green roof; and three levels of apartments.



seniors.¹¹ Similarly, charrettes were used to develop a sub-tropical design handbook for South East Queensland. Those charrettes involved creative teams of design experts working collaboratively, but not with the potential inhabitants of the dwellings.

Feedback from our participants on the methods used revealed that they felt valued, and learned a lot about their own needs as well as future options.

Stage one: Photovoice

Twenty-four people, aged 55 and over, participated in the Photovoice process on the Sunshine Coast, and 18 participated in Brisbane. While a mix of age groups and socio-economic backgrounds was sought, participants were neither targeted nor excluded on the basis of income or assets.

Over a two-week period, participants were given digital cameras to take up to 20 photos that illustrated their perceptions of the built environment, and which

provided answers to four questions. At a neighbourhood level, these questions were: what makes a neighbourhood or street a good place to live in?; and what are the barriers to having a good neighbourhood or street to live in? At the accommodation level, the questions were: what kind of housing design features (internal and external) will you need to support you as you get older?; and what are the barriers in the home environment as you get older?

These photos were then discussed in a workshop environment in Brisbane and the Sunshine Coast. Each group selected photos and attached captions to develop a visual narrative that illustrated their shared perspectives on preferred accommodation and neighbourhood concepts. The researchers then turned the narrative into slides, which were presented at the first design charrette. The Photovoice images, themes and dialogue were thus used as input to stage two of the research.

Meanwhile, the researchers thematically classified each photograph from the presentations in the context of its caption, according to the World Health Organization's 'Age-friendly cities' criteria.¹² The WHO criteria were developed on the basis of focus groups of older people, caregivers and service providers in 33 cities in developed and developing countries. A tally was recorded of the number of photographs in each criteria (or theme). In some cases, the photo and comments were not reflected in any of the WHO criteria and a new theme was created, eg private outdoor space. The themes were also tagged according to the three main project categories (sustainability, affordability and liveability). Each photo was coded to identify location (Brisbane – BNE or Sunshine Coast – SC), the question to which it responded, and to retain anonymity of participants. Thus, outcomes from each case-study location also provided a comparison between a city and a smaller

regional centre. The outcomes of this stage resulted in design principles to test with the participants during the charrettes.

Stage two: Charrettes

In Brisbane and the Sunshine Coast, two participatory design charrettes were held with seniors and design professionals, and were facilitated by the researchers. In the first design charrette, a representative of each 'design table' presented the group's selected photos by theme. Participants were then asked to work with the design team in groups to develop innovative housing designs for four hypothetical sites. The sites were selected to provide different opportunities to test typologies of varying scale and context.

On the Sunshine Coast, the rationale for each case-study site was as follows:

- a site near the University of the Sunshine Coast (USC) campus – to explore integration of older people in an intergenerational learning environment, adjacent to a future town centre;
- a cluster of four contiguous low-density housing sites – to explore a collaborative form of secondary dwellings in a neighbourhood of single-family detached housing;
- a central city site – to explore a location close to the centre of town, with good access to facilities and the beach; and
- a 7ha not-for-profit organisation's site in an emerging urban neighbourhood – to explore age-segregated independent living and higher care in an intergenerational 'campus' setting.

In Brisbane, the following case-study sites were chosen:

- an inner-city site near the Royal Brisbane Hospital in a higher-density urban renewal area;
- a cluster of four contiguous low-density housing sites in a middle suburb;
- a transit-oriented development (TOD) site in an inner suburb close to public transit and the Brisbane river; and
- locations in a middle suburb, typical of low-scale infill in the older suburbs.

In addition, participants were asked to complete a short preference survey to explore 'trade-offs' about themes such as density, shared communal space and parking. To gain further insight, participants ranked themes, identified in the Photovoice workshop analysis, according to importance.

Two weeks after the first charrette, the design team presented draft housing models to the participants in a second charrette. They asked further questions to test assumptions about the trade-offs older people might consider when deciding where to live. Following further dialogue, the designs were refined and presented to the forum for feedback. The participants also critiqued the housing designs against the draft principles for neighbourhoods and dwelling environments. Three months later, the participants re-assembled to review and comment on the typologies developed.

Design principles

The project's design principles addressed both the neighbourhood and accommodation scale. They drew directly on outcomes of the Photovoice workshops and were iteratively refined during the charrettes and afterwards, with the study participants, partners and design team.

At the neighbourhood scale, the design principles were:

1. walking paths and walkways;
2. proximity to services and facilities;
3. outdoor environment and use of green space;
4. public transport and connectivity;
5. pedestrian safety in neighbourhoods and towns;
6. safety for older motorists in neighbourhoods and towns;
7. sense of community; and perceptions of personal safety

At the accommodation scale, the design principles were:

8. density and visual amenity of the built form;
9. universal design;
10. sustainable design features;
11. private and shared outdoor space;
12. versatile spaces;
13. maintenance; and
14. security in the home.

Implications of designing for seniors in infill locations

A review of relevant design policies and guidelines highlighted the diversity in policies that address affordability, sustainability, and liveability. Yet it also revealed that not one of the documents was able to integrate all the principles we identified. The WHO's 'Age-friendly guidelines', for example, do not mention private open space; 'Healthy

spaces and places' does not refer to sustainable design features of buildings, or visual amenity; while the national 'Liveable design guidelines' focus on universal design. Few state or local government guidelines refer to private open space, maintenance, or security in the home. This research, then, is a way of consolidating those principles with greatest impact on seniors to highlight ways in which their needs can be addressed.

The project identified alignment between many widely accepted design principles and those advocated by the older people in our project. Examples included issues such as connectivity and access to services and facilities, which also contribute to safety, security, sense of community, and reduced social isolation; other examples were walking paths and proximity to public outdoor space, which positively influence health and wellbeing. Concerns that older people had with high-density living, such as noise, correspond with those of other age groups. If these issues are addressed through planning and design practice, seniors will be among those who benefit.

The published policies and guidelines do not, however, address all issues of importance to older people, or in a way that satisfies their needs. Our seniors attached importance to sustainability, visual amenity and outdoor private spaces. Designing for appropriate climatic orientation not only allows for better physiological comfort but minimises household costs in a sub-tropical environment. This reinforces broader research on high-density living and sustainable design in the sub-tropics.

Of greatest importance to the participants was the implementation of universal design. While relevant policies and guidelines exist, there is little consistent implementation, even by agencies that should be setting an example or directly meeting the needs of this client group. This issue also affects overall liveability for this demographic group to a significant extent.

In summary, some of the key points arising from the consideration of seniors' photos, their presentations and resulting principles include:

- infill development, unless managed carefully, will not deliver desirable neighbourhood outcomes, such as improved connectivity, security, adequate outdoor space, and sense of community;
- low-to-medium rise development and

Figure 2: Balanced approach (low rise) Type 4 – three-storey courtyard units



Description

- Compact apartment arrangement creating upper-level, naturally ventilated, shared courtyard space.
- Naturally ventilated, single-loaded apartments clustered in a balcony access from around an upper-floor courtyard.
- Can contain mixed-use at ground level.

Location

- Close to, or adjacent to, developments of similar types, such as mixed-use developments facing busy streets.
- Within three minutes walk (250m) from neighbourhood centres and public transport.

Lots size and description

- 1600m²; developed on two residential lots as a small-scale infill development.

Height

- Three storeys of apartments.

Dwelling size

- 14-17 units, each 80-110m².
- Apartments can be configured as three-bedroom units or two bedrooms, plus studio.
- Dual key allows a variety of ownership options for seniors (couples, singles, with carers).

Density

- 65-75 du/ha.

Suitability

- Relatively cost-effective solution with the cost of lifts spread between 12 apartments.
- Lifts allow good access to units for disabled.

Car parking

- Street-facing apartments or mixed-use screen on-grade car-parking areas behind.

Titling

- Units part of a community title scheme.
- Car parking may be separately titled to units.

- sustainable-design features need to give a viable financial return on investment; and
- when used in the neighbourhood, multi-dwelling complexes or the home, the natural environment contributes visual amenity, shade, privacy, noise reduction and a comfortable lifestyle in the subtropics. Physiological needs are the drivers for design that makes cost-effective use of natural light and air movement.

As communities become more consolidated and compact, planners, architects, developers and care providers need to be more proactive in striving to achieve these principles. Embracing principles is only a first step; the real challenge is in delivery. Local governments, in particular, have a strong role in ensuring that infill development is well managed.

The research project's final phase explored how to implement these principles through designs at both neighbourhood and accommodation levels. It identified planning constraints and possible approaches to meet the seniors' principles.

Ageing in neighbourhood

A key challenge of the research design brief for both participants and designers was how to increase density through infill while still retaining key elements of liveability. This dilemma was raised frequently during the Photovoice phase, and it forced the design team to examine trade-offs to meet this challenge. The majority of workshop participants were comfortable with lower-density housing options. While they accepted that some change would be required in the level of support or care necessary for a continuous quality of living

clustering of small numbers of units can facilitate relationship building and contribute to a sense of community and security, supported by design that enables opportunities for interaction;

- perceptions of visual amenity may be related to human-scale development and line of sight; and
- active seniors may eventually need to undergo transition to greater care, so

dwelling design needs to be responsive, flexible, and universal to support 'staying in the neighbourhood'. A range of infill options, which responds to the diverse spectrum of needs and preferences of individuals, at an appropriate density for the neighbourhood, will provide housing choice. More choice goes a long way towards 'future-proofing' a neighbourhood;

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Figure 3: Shared care Type I – garden house



as one aged, many participants did not necessarily equate this with a need for a change in their current housing situation. Most indicated they would prefer to modify their home before seeking out alternative housing options. It was understood, however, that not all seniors own their home and have the freedom to modify it, and that circumstances may change on the death or illness of a partner.

In response to the locations and settings provided in the charrette process, a range of low-medium infill housing options emerged and were evaluated against the principles. While higher-density housing in excess of eight storeys was not supported, medium housing densities were found to provide a range of amenities that could be effective in supporting the ageing process. To enable flexibility for future ageing, the participants preferred low-to-medium density housing with walkable access to public transport and human-scale shops and services within an age-diverse community.

The project team has coined the term 'ageing in neighbourhood' to describe the set of preferences expressed by participants. The term acknowledges that major change can occur during the ageing process, but that any corresponding stress experienced by seniors may be reduced if they stay in familiar surroundings and a 'whole of neighbourhood' approach is taken. The term implies that 'care' is not just a medical term but one that draws on the strength of co-located facilities and shared community concern, and necessarily includes the nature and structure of neighbourhoods.

The 'ageing in neighbourhood' concept implies that the elderly can access a range

Description

- 40.5m deep 'parent lots' are pooled in two or four; and subdivided to provide a rear communal lot of approximately 30x30m. The remaining lots are 25 to 35m deep.
- Communal housing at the rear of existing detached house lot, with two or four studios each suitable for seniors with care provided.
- Each has own bathroom and patio area with shared kitchen, dining and lounge facilities.
- Allows existing lots owned by seniors to be retained and equity leveraged for shared care.

Location

- Traditional residential suburbs, with high scenic amenity and strong property values.
- Within 400m of local shopping and greater distances from a neighbourhood centre.
- Simple infill dwelling form provides housing variety within detached housing precincts compatible with scale of surrounding houses.
- Possible mid-block. Ideally with street frontage.

Lot size and dimension

- 3000m² total parent lots; 900m² lot developed at the rear.

Height

- Single storey.

Dwelling size

- 32m² studios with own bathroom and patio area.

Density

- Typology only marginally increases density across neighbourhood.

Suitability

- Highly suited to seniors who need greater care but want to remain 'in neighbourhood'.

Car parking

- One parking space provided for each studio.

Titling

- Community title, reconfiguration or alternative design scheme required.
- Range of tenure, provider delivery and care options available, including live-in carer.

of housing options and amenities over an extended period of time and within a geographical area. This, in turn, offers significant advantages to seniors and is necessary to deliver a true 'community'.

Selected sites

Four sites in each of the Sunshine Coast and Brisbane were chosen to demonstrate

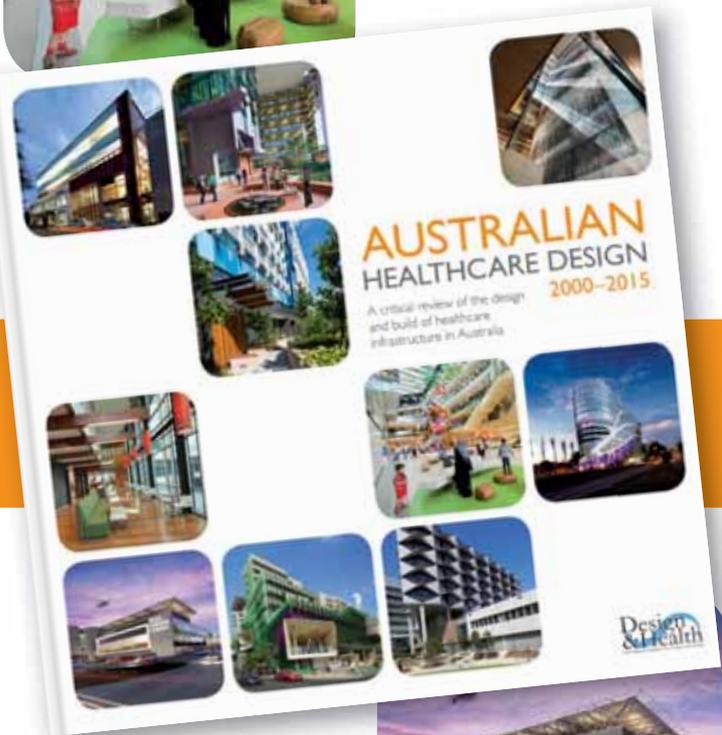
regional and metropolitan housing preferences in low-density middle suburbs and higher-density inner-city locations under pressure to densify. Although real sites were used for the design exercise with the senior participants, and they are only hypothetical scenarios, this report does not identify them in order to minimise concerns of local people about potential development.



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Age-friendly designs

Following the development of a range of site-specific designs, the design team and seniors reviewed the new three-dimensional models against the design principles derived from the Photovoice phase. The strategic impact that such principles have on the shape and configuration of housing is complex. The charrette process allowed the seniors to appreciate these complex relationships and choose design strategies that best suit an ageing client group.

A range of issues – including ownership, building height and character, mixed use, unit design, communal open space, access to natural light and ventilation, car use and accommodation, and solar power – were considered. Seniors then critiqued the resultant 3D models, and a series of building typologies for low-to-medium-density housing emerged. These typologies provide several integrated solutions for the challenges of infill development, as expressed by the senior participants.

While the initial designs were inspired by an individual site context, it should be noted that the project typologies are not specific designs for individual sites, and they should be regarded as generic housing models.

Each typology is rated on seven factors:

- maintenance refers to the requirements for individuals or a body corporate to maintain the site and buildings, and it is affected by building materials and the amount and size of common areas;
- proximity to services refers to how close the accommodation is likely to be to services and facilities. Ratings assume that a higher-rise building is more likely to be located in close proximity to services because of zoning provisions;
- private outdoor space refers to the inclusion of one or more adequately sized balconies or patios in the design, for private use by individual residents;
- sense of community reflects the number of units and their groupings in a complex;
- sustainable design represents how the building design enables residents to live with less reliance on active (generally carbon-intensive) energy systems. It also considers the embodied energy of construction materials and efficiencies of unit numbers;
- versatile flexible space refers to a floor plan that can accommodate over time a range of users or support services; and

- density and character refers to the number of units per site and the appearance and amenity of the building within its context (ie the street).

It is assumed that all typologies incorporate the principles of universal design, and two are included in this report as examples.

Typology 1 (see figure 3), the garden house, explores the concept of converting common backyards of four suburban house lots into a communal house. Parent lots, 40 to 50 metres deep, are pooled into groups of two or four to provide a rear communal lot measuring 30x30 metres. Two or four studio dwellings are provided with a common living and dining area. This approach allows seniors to retain their existing house and use the equity to access a shared-care service. The principal house retains direct access to the studios and can be rented for income generation or used by family members.

Typology 4 (see figure 2) is a three-storey set of units arranged around a central courtyard. This model explored low-rise medium-density housing on an inner-urban infill site. The design delivers flexible apartments in a dual-key format, which can be reconfigured over time as one, two or three-bedroom units. The double-loaded configuration allows for natural light and ventilation to penetrate both sides and delivers a central communal courtyard.

Conclusion

The 'ageing in neighbourhood' concept signals a profound shift in how we might design and create future communities.

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It also gives direction on reshaping our existing infrastructure into more liveable communities, which have the capacity to impact on the wellbeing and health of residents. The concept implies there is likely to be a shift in the way providers select sites and deliver services in future, focusing on existing communities with services and infrastructure already in place.

Acknowledgements

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Affordable excellence: The Singapore healthcare story

William A Haseltine

Ridge Books: Singapore; Brookings Institution Press: Washington DC, 2013

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ISBN: 978-0-8157-2416-2

This book, *Affordable excellence: The Singapore healthcare story*, provides a long overdue and comprehensive presentation of the Singapore healthcare system. Being informed on different experiences regarding healthcare policies can be instructive in times when even the largest economies strive to balance their healthcare expenditures and social expectations with financial reality. But it takes more than a disclosure of the bare facts to understand the intriguing case of the Singapore healthcare system. The oxymoronic flair of this book's title conjures up the implied question: how can you achieve excellence in healthcare that is also affordable? The author unveils the answer by meticulously combining the detailed information on how the system works with describing the much broader social, political and legislative environment in which it is conceived.

According to indicators, Singapore's healthcare system, rated sixth in the world by the World Health Organization, costs slightly under 4% of GDP (compared with 18% in the US, for example). The rising life expectancy and decreased newborn mortality rates confirm Singapore's status and the author goes further by adding other markers of efficiency, too.

The success story is apparently built on very simple foundations: a clear political vision; realism in setting goals and prioritising objectives; efficiency in operating the system; and the ability to consistently control the outcomes and introduce the necessary changes as required. The simplicity of the framework contrasts sharply with the elaborate details of this system. Throughout the book well-organised tables with statistical data support the arguments, while also serving as a reference point for future comparison and research.

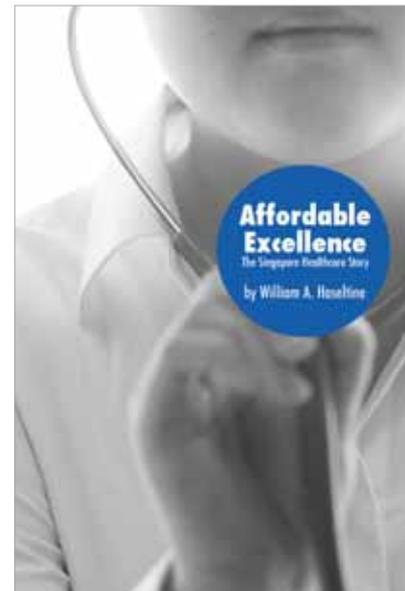
In this book we encounter distinctive local governmental systems, such as the Central Provident Fund (CPF) and Housing Development Board (HDB), as pillars of public welfare and health. But we also learn about their guiding philosophies as a means to understand their functions. The most fascinating part of this book, however, is the attempt to interpret clearly a number of specific characteristics; for example, the governmental micro-management of the free healthcare marketplace; public-private partnership; or even the need for diverse categories of hospital wards.

The author skilfully maintains impartiality when presenting even the most controversial of topics, which is of importance in gaining a true understanding of the system. Each of the system's components makes sense only if analysed against the broader socio-economic and political context of Singapore.

The panoramic shot of this healthcare system reveals elusive boundaries that overlap with other key industries important to Singapore's economy, such as tourism, retail, technology, construction and transportation. Future adjustments are also discussed, particularly in relation to the problem of an increasing elderly population, and are complemented with information on control and tweaking mechanisms, public-health initiatives, education and research. As countries' major decisions on future development rely on cutting-edge science and technology, the author introduces a range of bodies and agencies with influence over these issues.

Disappointingly, however, this presentation of the Singapore healthcare system lacks any mention of healthcare design and its associated research – despite the vital part these played. The topic is acknowledged only as relevant to the efficiency of the system. A few recent outstanding hospitals and design competitions for general, community and specialised hospitals testify that the creators of this "affordable excellence" recognise the system's dependency on implementation of advanced theories and concepts regarding healing spaces. It is hoped therefore that future editions of this book cover the design topic and illustrate, to the fullest, the realised visions of Singapore excellence in healthcare architecture.

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