

## TACTILE TOUCHES

Light-filled environments define Sydney's new Brain and Mind Research Institute



**ALSO:**

**Standpoint: Healthy Cities**

**Market reports: Africa & Australasia**

**Scientific Review: Infection control**

**Project report: Elderly Care**



# design

The currency of a smarter world.



RTKL is a planning and design firm internationally recognized for creating some of the world's foremost hospitals. RTKL has been in business sixty years and has offices around the globe. We understand the issues hospitals face worldwide, and we foster new ideas by combining our healthcare expertise with specialized knowledge in retail, hospitality, urban planning, critical technologies, and more. The result is distinctive solutions that set clients apart.

[rtkl.com](http://rtkl.com) | 888.337.4685

*an ARCADIS Company*

## Contributors

### Mindy Berman

High levels of real estate leased by health providers in the US are making hospital systems vulnerable to the upcoming changes in rules for leases in the country



### Morag Lee

The design of the new Fiona Stanley Hospital in Western Australia reflects both the natural environment in which it is set and its local population and culture



### Simon Ritchard

The size of Perth's skilled labour is limited when confronted by specialist construction projects, such as the construction of a large hospital



### Mardelle Shepley

Conducting credible practitioner-focused facility evaluations in private practice is not only feasible, it is the social responsibility of designers and architects



### Richard Hobday

The use of open-air treatment during the 1918-19 influenza pandemic may serve as a useful model for emergency planning for future pandemics



### Cover Image

The Brain and Mind Research Institute in Sydney, designed by BVN Architecture (see pp14-15)



## New and old frontiers

As economic doom and gloom continues to engulf Europe and North America, this issue focuses on two regions of the world where economic development is surging ahead. Political instability, war, corruption and the weak rule of law across Africa, leading to poor economic growth, social development and low levels of education and health had led the world to write off this still remarkable continent. But the Lion Kings are roaring again with growth rates in sub-Saharan Africa rising and Angola, Nigeria, Ethiopia, Chad, Mozambique and Rwanda leading the way. To ensure a sustainable development of African society and culture, however, significant investments need to be made in its healthcare infrastructure. This can only be delivered through a shared sense of responsibility that promotes a more participatory approach (pp24-31). Join us in Cape Town from 22-24 March to explore these issues at Design & Health Africa 2011 (pp20-21). Meanwhile, also boosted by the surging demand of China for its raw materials, Australasia has side-stepped the global recessionary problems of the richer world, and continues to make huge investments in its hospital infrastructure, whilst at the same time evolving its health policy to focus on health promotion and preventative approaches to address the challenges of lifestyle diseases, such as diabetes and obesity (pp34-41). We hope to see you at Design & Health Australasia 2011 in Melbourne, from 2-4 May to share knowledge on addressing these challenges (p33).

**Marc Sansom**  
Editorial director



# Contents

Editorial Director  
Marc Sansom MBA  
T: +44 (0) 1277 634 176  
E: marc@designandhealth.com

President  
Per Gunnar Svensson PhD

Director General  
Alan Dilani PhD  
T: +46 70 453 90 70  
E: dilani@designandhealth.com

Editorial Advisory Board:  
Chairman: Dr John Zeisel PhD, US  
Prof Clare Cooper Marcus, US  
Prof Jacqueline Vischer, PhD Canada  
Prof Young Sook Lee, PhD Korea  
Dr Eve Edelman PhD, US  
Prof Noemi Bitterman, Israel  
Mike Nightingale, UK  
Alice Liang, Canada  
Martha Rothman, US  
Prof Romano Del Nord, Italy  
Prof Mardelle Shepley, PhD, US  
Dr Ray Pentecost, DrPH, AIA, US  
Gunnar Ohlen MD, PhD, Sweden  
Prof Paul Barach MD, MPH, Australia  
Jain Malkin AIA, US  
Diana Anderson, MD, MArch, US  
John Wells-Thorpe, UK  
Mikael Paatela, Finland  
Dr Linda Jones, PhD New Zealand

Contributing writers  
Kathleen Armstrong, Veronica Simpson,  
Emily Brooks

Subscriptions and advertising  
T: +44 (0) 1277 634 176  
E: WHD@designandhealth.com

Published by:  
The International Academy for Design and Health  
PO Box 7196, 103 88 Stockholm, Sweden  
T: +46 70 453 90 70  
F: +46 8 745 00 02  
E: academy@designandhealth.com  
www.designandhealth.com

International Academy for Design and Health UK  
8 Weir Wynd, Billericay  
Essex CM12 9QG UK  
T: +44 (0) 1277 634 176  
F: +44 (0) 1277 634 041  
E: WHD@designandhealth.com

Design and production:  
Graphic Evidence Ltd  
www.graphic-evidence.co.uk

WORLD HEALTH DESIGN  
Volume 4: Number 1  
ISSN 1654-9654

Subscriptions:  
To receive regular copies of World Health Design  
please telephone +44 (0) 1277 634176 to place your  
order, or email WHD@designandhealth.com

Yearly subscription rates:  
1 year £80; 2 years £130; Single Issue £30  
World Health Design is published four times a year by  
the International Academy for Design and Health UK

No part of WHD may be reproduced or stored in  
a retrieval or transmitted in any form, electronic,  
mechanical or photocopying without prior written  
permission of the Editorial Director

Printed in the UK by  
The Magazine Printing Company  
www.magprint.co.uk

17



## OPINION

**03 NEW AND OLD FRONTIERS** Opportunities for investment in African and Australasian healthcare infrastructure are following economic growth, writes Marc Sansom

**08 ON THE BALANCE** Mindy Berman discusses how changes to rules for real estate and equipment leases will impact on healthcare providers in the US

**13 STRESS AND THE CITY** Researchers have discovered how life in a city can make us lose focus and the restorative effects of a verdant view, reports Scott Edwards



## BRIEFING

**06 DEADLINE NEARS FOR ACADEMY AWARDS 2011** The deadline to nominate projects for the 2011 Design & Health Academy Awards is fast approaching

**11 MASTERING DESIGN** A new internationally taught Masters programme in Design & Health will offer a unique opportunity for development

## EVENTS

**21 ON THE MOVE** Design & Health Africa 2011 in Cape Town will explore a new spirit of co-development in meeting the challenges of global health

**33 THE CHALLENGE AHEAD** Design & Health Australasia 2011 will explore how to reconnect hospital infrastructure investment with policies of health promotion

## MARKET REPORTS

**24 THE AGE OF ENGAGEMENT** Emily Brooks explores how governments around Africa are developing a more participatory approach to healthcare design

**34 SOUTHERN STARS** Kathleen Armstrong reports on efforts to improve both efficiency and service delivery in the Antipodean healthcare sector



## PROJECTS

**14** **TRANSLUCENT AND TACTILE** The Youth Mental Health Building at Sydney's BMRI provides a light, tactile environment for mental health patients

**17** **NEW HORIZONS** A new day centre in Benavente, Spain provides a comfortable, recognisable environment for people with Alzheimer's disease

**42** **AMONG THE BANKSIA** Morag Lee explains how the design of Western Australia's Fiona Stanley Hospital reflects the states unique local culture and environment

**48** **A HOME ISA HOME** Veronica Simpson finds vibrant interpretations of community in homes for the elderly



48



24

## SCIENTIFIC REVIEW

**63** **THE CULTURE WARS** John Zeisel argues that the culture of design needs to include the recognition that research is an integral part of evidence-based design decisions

**64** **PRACTITIONER-FOCUSED FACILITY EVALUATION** This study looks at the types of evaluations design firms can implement to obtain valid, objective results and the value they can bring

**73** **PLANNING FOR PANDEMICS** Richard A Hobday and John W Cason argue that temporary hospitals should be part of emergency planning for influenza pandemics



34

## SOLUTIONS

**58** **DESIGN SOLUTIONS** A round-up of recently completed projects and innovative products

## ARTS & CULTURE

**82** **HEALING SPACES** Prof Alan Dilani reviews a book that brings neuroscience and architecture together to explore how design impacts on health and wellbeing

## Deadline nears for Academy Awards 2011

The 2011 Design & Health International Academy Awards, the leading global advocacy programme recognising professional excellence in the research and practice of designing healthy built environments, has opened for entries. This year, the programme comprises categories across the key areas of international health delivery, including:

- Health Project (over 40,000sqm);
- Health Project (under 40,000sqm);
- Unbuilt Health Project;
- Research Project;
- Mental Health Design;
- Elderly Care Design;
- Sustainable Health Project;
- Healthy Community Design;
- Interior Design;
- Use of Art in the Patient Environment;
- Product Design for Healthcare Application
- Low Cost Project in a Developing Economy; and
- Lifetime Leadership Award.

The awards are open to international organisations in both the private and public sectors participating in either research or practice, including the planning, procurement, design, construction and management of healthy environments. They will be judged by a panel of experts from Europe, Asia, Africa, Oceania and the Americas, and presented on 9 July 2011 at a prestigious ceremony in Boston during the 7th Design & Health World Congress.

Submissions for this year's awards close on 1 March 2011. To enter or learn about projects that have won in previous years, visit [www.designandhealth.com](http://www.designandhealth.com) or e-mail: [awards@designandhealth.com](mailto:awards@designandhealth.com)



**Eb Zeidler of Zeidler Partnership Architects, winner of the 2010 Lifetime Achievement Award**

### USA: Design firms merge

Perkins Eastman and Ehrenkrantz Eckstut & Kuhn Architects have merged their practices, significantly strengthening both practices. With a combined international workforce of nearly 600 employees, the merger will expand capabilities and add client value. The firms will consolidate their New York, Washington DC, and China practices.

### UK: Incentivising wellness

A new report from Policy Exchange, called *Incentivising Wellness: Improving the treatment of long-term conditions* recommends new business models for managing long-term conditions such as diabetes which incentivise wellness, rather than treating sickness. The report calls for the introduction of the business models in the NHS in order to harness new diabetes technologies such as insulin pumps and telemonitoring.

### UK: First for cruciform wards

The newly-built Peterborough City Hospital is now open to patients. The 611-bed hospital has a full range of specialties including a cancer centre, cardiology

centre, a dedicated women's and children's unit, and adult and paediatric emergency centres. Designed by Nightingale Associates, Peterborough City is the first new-build hospital in the UK to feature Nightingale's innovative 'cruciform' wards.

### South Africa: HLMSV award

HLMSV's active support of the broad-based Black Economic Empowerment (BBBEE) codes, has resulted in its receiving a Level 2 award from the BEE Verification Agency CC. BBBEE is a South African government initiative to promote economic transformation in order to ensure the meaningful participation of Indian, African, Black and Chinese citizens including women, workers, youth, people with disabilities and people living in rural areas.

### Australia: World award for BVN

BVN Architecture has won the Health Category Award at the World Architecture Festival (WAF) for the Youth Mental Health Building at the Brain and Mind Research Institute (BMRI) in Camperdown, Sydney (see p16-17).

### Saudi Arabia: New hospitals

Saudi Arabia's Higher Education Minister has announced plans to establish medical colleges and hospitals at all of the Kingdom's 24 government universities.

### UK: 100% single rooms

Ysbyty Aneurin Bevan is the first publicly-funded new-build hospital in the UK to open with 100% provision of single bedroom accommodation. Designed by Nightingale Associates, the 107-bed community hospital is one of the first 'pathfinder' projects to be delivered via the 'Designed for Life: Building for Wales' procurement framework set up by the Welsh Assembly in 2006.

### USA: Fable Hospital 2.0 released

New research published in the Hastings Center Report suggests that large private hospital rooms with plenty of natural light and artwork may appear to be a luxury, but will pay back in the long run by reducing healthcare costs. Fable 2.0 is authored by Blair L Sadler, Leonard L Berry, Robin Guenther, D Kirk Hamilton, Frederick A Hassler, Clayton Merritt and Derek Parker.

# AIA AAH awards Presidential Citation to Prof Alan Dilani

Founder and director-general of the International Academy for Design & Health (IADH) Professor Alan Dilani has been awarded a Presidential Citation by the American Institute of Architects Academy of Architecture for Health (AIA AAH).

Awarded in celebration of the partnership between the IADH and the AIA AAH in the lead-up to the 7th Design & Health World Congress & Exhibition in Boston, which will take place 6-10 July 2011, the citation was presented at the AIA AAH update meeting during the Healthcare Design 2010 conference in Las Vegas this month.

The citation by the 2010 AIA AAH president, Dr A Ray Pentecost III, which was signed by all members of the board of directors, said: "Alan's heartfelt passion for the development of an international health design community, his unwavering commitment to excellence in design, his fierce dedication to the promotion of high-quality research have done more than stimulate an international dialogue on design research; his achievements demonstrate that championing intellectual honesty in research on the built environment and pursuing uncompromising professionalism in the planning of international gatherings for design researchers and practitioners foster better design, enrich communication and promote better health."

On the receipt of the award, Prof Dilani commented: "The citation is recognition of the strong commitment and support of the IADH by the AIA AAH and our common global effort to develop research and knowledge about the impact of architecture and design on human health, wellbeing and quality of life. I am extremely grateful for this recognition and the ongoing support of the AIA AAH in achieving our shared goals, as we build towards the 7th Design & Health World Congress & Exhibition in Boston."



Prof Alan Dilani receiving the AIA AAH Presidential Citation in Boston, USA from Dr Ray Pentecost III

## New corporate members sign up to support Academy values

Olympus, Britplas and HLM Architects are the latest companies to join the International Academy for Design & Health as corporate members. With membership packages tailored to suit their particular international marketing objectives, all three will support the work of the Academy in a range of ways. HLM Architects has agreed to sponsor Design & Health Africa 2011 which will take place in Cape Town in March. In addition, it will retain its sponsorship of the Mental Health Design category at the 2011 International Design & Health Awards.

Britplas, whose Safevent Window won the Product Design for Healthcare Application Award at the Design & Health Awards in 2009, and Olympus, whose EndoAlpha system solution has been recognised for its ergonomic approach to operating theatre design, have both agreed to sponsor Design & Health Australasia 2011. They will be joined by Australian architectural firm Silver Thomas Hanley which also recently agreed to sponsor the event. Design & Health Australasia will take place in Melbourne in 2-4 May 2011.



Chris Liddle, chairman of HLM Architects

All three of the new corporate members will be active participants at the 7th Design & Health World Congress in Boston (6-10 July 2011) to which a host of new companies have signed up recently as exhibitors. They include IBI, Graphisoft, Forbo, Altro Floors Mincey Marble.

## Three Harvard schools to collaborate at World Congress in Boston

The Harvard School of Public Health, the Harvard School of Design and the Harvard School of Business have all committed their support and faculty to the 7th Design & Health World Congress & Exhibition in Boston.



Prof Clayton M Christensen from the Harvard School of Business

Represented by Dr Julio Frenk, dean of the School of Public Health, Mohsen Mostafavi, dean of the School of Design, and Prof Clayton M Christensen from the School of Business, as well as Dr John Spengler from the School of Public Health, the presence of all three schools will provide a unique opportunity for interdisciplinary discussion and the exchange of ideas about the future design of health systems, services and facilities in the US and around the world.

The commitment to the World Congress was strengthened following lectures to all three schools presented by International Academy for Design & Health founder Prof Alan Dilani in November.



# On the balance

*Mindy Berman* reports on changes to the rules for real estate and equipment leases in the US and their impact on healthcare providers

Impending changes in the accounting treatment of real estate and equipment leases will have unique and significant impact on healthcare providers in the US. Released in August 2010 by the US Financial Accounting Standards Board (FASB), the proposed change will require organisations to recognise leases on the balance sheet. Although the rules affect all business sectors, hospital systems are particularly vulnerable to the upcoming change due to the substantial amount of real estate they are involved in leasing, both as landlords and as tenants.

In recent years, healthcare organisations increasingly have used leasing to expand clinical and office facilities as a way to access capital while maintaining high debt ratings. The new standard, which will be applied to for-profit and not-for-profit organisations, will substantially increase balance sheets and increase the reported expense associated with occupancy, placing additional pressure on operating margins.

The revamp of the three-decade-old lease accounting standard has been in the works for several years, driven by the perceived lack of transparency around off-balance sheet obligations and the complexity of current lease accounting. Although final details of the standard will not be issued until sometime around mid-2011, with a probable effective date no sooner than 1 January 2013, the basic elements of FASB's current proposal are unlikely to change.

Today, enterprises choose between two methods for classifying leases – as operating or capital leases. Under the new approach, organisations will recognise a liability for obligations to pay rent and a corresponding asset representing the right to use the underlying leased property. The lease obligation will be the present value of payments required under the lease, but consideration will be given to inclusion of renewal periods and estimates of contingent rent payments.

Placing the full lease obligation on the balance sheet and the resulting negative drag on earnings will have a dramatic impact on hospitals' perceived financial performance. The financial reporting process will become more complex and cumbersome. Healthcare organisations may re-evaluate their use of leasing in light of the financial reporting consequences.

The change is not expected to affect debt ratings. Credit rating agencies currently capitalise operating leases and adjust financial performance measures accordingly. Given the potential inclusion of renewal periods in lease liabilities, the rating agencies' capitalisation

techniques may do substantially less damage to the balance sheet than under the Generally Accepted Accounting Principles (GAAP).

On the lessor side, hospitals will be more heavily affected than most other for-profit corporations due to the common practice of leasing property to unrelated parties. There are several potential accounting treatments for lessors under the proposed standard – each with different reporting implications – and it is currently unclear which treatment hospitals will be using.



The new standards will impact on hospitals such as Jersey Shore University Medical Center (pictured above)

## What's changing?

- The distinction between operating leases and capital leases will be eliminated.
- Leases will go on balance sheets and rent will no longer be an operating expense.
- Leases will be capitalised based on the present value of estimated net lease payments over the expected lease term, discounted at the lessee's incremental borrowing rate.
- Capitalised value will include base rent, net of operating expenses, for the longest probable term of lease, counting renewal and termination rights, and the expected value of contingent rent and other payment amounts over the same period.
- Existing leases will be capitalised based on the remaining lease payments.



## Impact on healthcare

Hospitals are uniquely affected by the standard due to their current business and operating model. Leases of equipment and physician office space have become important vehicles for capital formation for fixed assets, preserving balance-sheet capital for other uses. In recent years, diminished access to tax-exempt bonds and other market pressures have impaired liquidity.

These unique considerations will affect hospitals in several ways that may be unusual or unique to the sector. Leases are likely to have longer terms and more renewal options for healthcare than for other business sectors, and this translates into a greater balance-sheet impact. The common role as a landlord or sub-landlord to physicians and clinicians will require hospitals to consider both lessee and lessor accounting. The use of ground leases and air rights to third parties on hospital campuses will need to be reported under the new standard, under more complex rules than currently exist. Sale-leasebacks may be easier to achieve and may offer immediate gain recognition on the balance sheet. Removal of current limits on the amount of subleasing to third parties is consistent with hospitals' operating model. Purchase options at fair value will be allowed. Finally, while build-to-suit rules are not fully determined, it is likely that leases with third-party developers, especially on-campus, will face less strenuous tests that better suit commercial objectives of all parties.

## Adjusting to the change

Although the transition date is not yet specified, companies need to begin planning for leasing strategies and system modifications immediately. It remains to be seen how the change will affect lease decisions. A knee-jerk response may be for companies to seek shorter term leases or favour ownership. A better approach is for companies to reassess and validate reasons for leasing, such as flexibility in occupancy and preservation of capital. Certain transactions, such as sale-leasebacks and build-to-suit arrangements, may result in better economic terms and better alignment with business objectives than current rules.

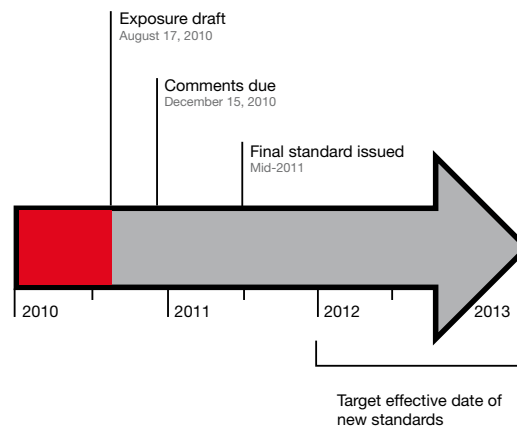
Hospital facility professionals and finance executives should evaluate the changes and their likely impact. For organisations with no or small real estate groups, the proposed changes may point to the need to upgrade the professional focus on real estate. Reporting requirements will become daunting for healthcare systems which have grown through industry consolidation and acquisition of physician practice groups.

Essential steps in evaluating processes are:

- Quantify the impact of negotiated lease terms on the balance sheet and in operating expenses.
- Discuss with corporate treasury and accounting the impact of the rules on future occupancy decisions and reporting needs.
- Update lease administration systems to capture additional data points.
- Reassess lease-versus-own decisions that may have been prompted by access to capital and liquidity.

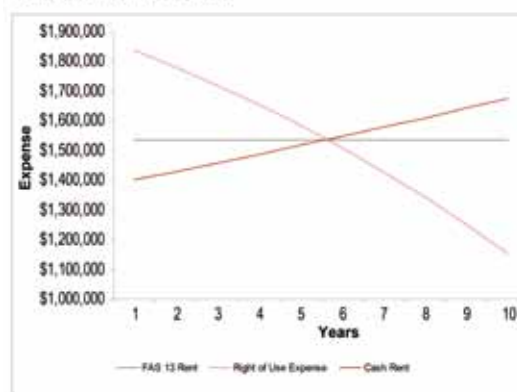
Sweeping changes in lease accounting will give healthcare organisations a valuable opportunity to bring into focus the fundamental business reasons for leasing. The value of access to real estate capital to support the growth initiatives of hospital systems will serve as an important reminder as organisations navigate through the undoubtedly challenging time ahead with new lease accounting.

**Mindy Berman is managing director, healthcare capital markets at Jones Lang LaSalle**



The new standards are likely to come into effect in 2013

Comparison of rent expense



Capitalised rent will include base rent, net of operating expenses, over the longest probably term of the lease

## What's the impact?

- Balance sheets will swell and companies will see increased debt loads.
- Total occupancy expense will be front-loaded over the first half of the lease, and typically 15-20 percent higher than today's straight-line rent.
- Financial covenants in bonds and credit agreements will need to be evaluated for possible violation on the effective date.
- Reported capital spending will be higher.
- Financial reporting will become more complex and cumbersome with added burden of continuous re-evaluation of assumptions.



YOUTH MENTAL HEALTH BUILDING  
BRAIN AND MIND RESEARCH INSTITUTE  
SYDNEY AUSTRALIA  
WINNER OF WORLD'S BEST HEALTH BUILDING  
2010 WORLD ARCHITECTURE FESTIVAL  
PHOTOGRAPH JOHN GOLLINGS



The International Academy for Design and Health is partnering with the University of Portsmouth (UoP) to offer a two-year internationally taught Masters programme, focusing on the impact of the built environment on health, wellbeing and quality of life. The MSc Design and Health\* will include contributions from internationally recognised academics, scholars and practitioners from around the world. Students will develop an interdisciplinary understanding of a range of fields, including public health, psychology, health management, architecture, design, economics – and the interactions between them. They will also learn to apply the knowledge and information they have gathered about human characteristics and behaviour to the built environment.



Alan Dilani, IADH

Tara Dean, UoP

# Mastering design

A new Masters programme in Design and Health will offer a unique opportunity for professional development that includes contributions from a range of international experts and residential sessions in the UK, Italy and Sweden

## Structure of the course

The two-year MSc programme will start in September 2011 and will include four core units covering: (1) health, wellbeing and quality of life; (2) design for healthy environments; (3) impact of design on health and economy; and (4) research methods in design and health. There will also be a final dissertation unit in which students will undertake a research project of their own choice in the field of design and health.

The course will provide a firm foundation of theoretical understanding, knowledge and skills in the principles and practice of research-based design, health promotion by psychosocially supportive design, the socioeconomic implications of design, and the value of design to individuals, organisations and society. Programme content will cover the health promotion impact of design in a full range of private, public and institutional settings, including healthcare, elderly care, housing, education, the workplace and urban environments.

The programme will be delivered both online and face-

to-face. This includes four one-week residential blocks in the UK, Scandinavia and Italy with specialist guest speakers, lectures, group work, seminars and site visits. Each unit will also include an interactive online teaching component providing access to further learning resources and activities, tutorials, discussion forums and a personal online tutor. All units will be assessed via coursework.

## Who should apply?

The Masters programme will offer professional development for individuals in a range of different sectors (health and allied professionals, architects, designers, urban planners and commissioners of building and design works) and settings (hospitals, care homes, schools, workplaces, housing and urban environments). Individuals interested in the application of design and health principles and research will also benefit. The programme will enhance career prospects by equipping participants with an interdisciplinary understanding of the research and design of healthy environments. Participants will be equipped to apply such understanding to their own endeavours in research-based design and in the evaluation and appraisal of other work in the field.

The minimum entry qualification is a Bachelor's degree with lower second class honours or equivalent qualification from a broad range of disciplines, including engineering, sciences, public health, design, industrial design, economics, architecture, psychology, medicine, nursing and allied health, construction, planning, business studies, environmental science and property studies. Applications from individuals with equivalent professional experience will also be welcomed.

## Fees, finances and how to apply

Tuition fees are £10,000 per year (for two years). This includes accommodation during the residential blocks, hospitality, site visits and online and face-to-face tuition. Students will need to cover the costs and make arrangements for their own travel for each residential block. The programme already has the full support of the American Institute of Architects, Academy of Architecture for Health and recognition is being sought from the Royal Institute of British Architects. For more information about the MSc Design and Health (course code: C2353P) and how to apply, see: [www.port.ac.uk/courses/postgraduate/howtoapply/masterscourses](http://www.port.ac.uk/courses/postgraduate/howtoapply/masterscourses) or e-mail: [sci-pgrad@port.ac.uk](mailto:sci-pgrad@port.ac.uk).

\* Subject to validation



Meyer Children's Hospital, Italy; University of Portsmouth, UK; Teleton Tampico, Mexico





*Entry  
Deadline  
1st March  
2011*

*9 July 2011  
Boston, USA*

**Design  
& Health**  
International Academy for Design and Health


# International Academy Awards

*Rewarding global excellence  
in research and practice*

[www.designandhealth.com](http://www.designandhealth.com)

Media partner

**WORLD HEALTH DESIGN**  
ARCHITECTURE | CULTURE | TECHNOLOGY



Images top to bottom: Centro de Rehabilitación Infantil Teletón, Tamaulipas (Mexico), designed by Sordo Madaleno Arquitectos; Jersey Shore University Medical Center (USA), designed by WHR Architects; Trillium Health Centre - The West Wing (Canada), designed by Perkins Eastman Black Architects.

For the first time in history, more people live in cities than in rural areas. According to the United Nations, the urban head count tallies up to more than half of the world's 6.7 billion people. While city life may offer many benefits, research does show that city life can have drawbacks. For one thing, it's hard on the brain.

A study conducted by University of Michigan researchers in 2008 found that simply spending a few minutes on a busy city street can affect the brain's ability to focus and to help us manage self-control. In that study, one group of participants strolled in a park, while another perambulated along busy city streets. After undergoing a battery of psychological tests, the people who walked the city streets scored significantly lower on attention and working-memory tests compared to those participants who ambled in the park. The researchers concluded that the stimuli of city life direct our attention to things that are compelling, but only fleetingly so, and that this alteration of focus can occur at a pace that leaves us mentally exhausted.

"If you're too fixated on something, you might miss a car coming around the corner and fail to jump out of the way," says Sara Lazar, PhD, a Harvard Medical School instructor in psychology and director of the Massachusetts General Hospital Laboratory for Neuroscientific Investigation of Meditation.

Some people might call these stimuli distractions, but as Lazar points out, they are actually vital pieces of information. Yet these stimuli do use up a lot of the brain's natural processing power. The result is something called directed attention fatigue, a neurological symptom that occurs when our voluntary attention system, the part of the brain that allows us to concentrate in spite of distractions, becomes worn down.

Fortunately, there are quick, easy fixes to help the brain restore its ability to focus. Studies show that spending a short period of time – even one as brief as 20 minutes – in a more natural setting can help the brain recover from the stresses of city life.

The benefits of a room with a verdant view can be found in studies involving hospitalised patients and residents of public housing complexes. Patients staying in hospital rooms that looked out on trees, for example, were found to recover more quickly than patients without an arboreal view. Similar results were found in studies involving women residing in public housing projects; those whose apartments overlooked grassy areas reported they could more easily focus on the tasks of daily life.

This nature-brain symbiosis may be the result of a concept known as attention restoration theory, which was developed by environmental psychologists Rachel and Stephen Kaplan in their book *The Experience of Nature: A Psychological Perspective*. According to this concept, people can concentrate better after spending time in nature or even after simply looking at pictures of nature.

Although Lazar's research does not specifically measure the neurological effects of urban stresses, she says her group's findings may help explain why urban life can affect our ability to hold things in memory. "If people are stressed about basic survival, they will have more cortisol and a smaller hippocampus, and thus potential difficulties with memory formation," says Lazar. "Moving to a quieter place could help reduce stress, which in turn can reduce cortisol levels and create conditions conducive to neuroplasticity [the brain's ability to form new neuronal connections to compensate for injury or changes in one's environment]."

**Scott Edwards is a medical and health writer**

This article first appeared in the Fall 2010 issue of *On The Brain* from the Harvard Mahoney Neuroscience Institute

# Stress and the city

Researchers in Massachusetts have discovered how city life can make us lose focus and how a verdant view can help the brain recover; reports **Scott Edwards**



Spending time in natural settings can help the brain recover from urban stresses





# Translucent and tactile

**W**inner of the Health Category at the 2010 World Architecture Awards, the BVN Architecture-designed Youth Mental Health Building at the Brain and Mind Research Institute (BMRI) in Sydney, Australia provides a light-filled, tactile environment for mental health patients, which also manages to complement the surrounding light industrial streetscape.

Part of the Faculty of Medicine of the University of Sydney, the BMRI focuses on research into mental health and clinical issues relating to the brain. The Youth Mental Health Building consists of two floors for consultation and patient interaction and two floors of research laboratories.

The research laboratories sit within a two-storey 'light box' above the original heritage façade. The 'box' is clad with translucent glass planks, ensuring diffuse daylight to the laboratories throughout the day and very low energy consumption. To maintain sun penetration to neighbouring houses, the building had to be stepped toward the north. This enabled the new glass box to 'slide' over the older building, creating a large-scale composition with smaller scale detailed elements at the conjunction of the forms.

At the street edge, the materials reflect the light industrial context of the area with steel, recycled timber and face concrete block. Internally, the floors are linked by an open stair and small atrium which form the social space of the centre. Meeting rooms and all facilities are accessible from this central space, with materials relating to the exterior – timber, steel and concrete – used at a more tactile scale.











In Association with Garwood-Jones & Hortham Architects

Juravinski Hospital / Hamilton, Canada

315 Queen Street West  
Toronto, ON, Canada M5V 2X2  
T:416-596-8300 F:416-596-1408  
www.zeidlerpartnership.com

**ZEIDLER PARTNERSHIP ARCHITECTS**

TORONTO . CALGARY . VANCOUVER . VICTORIA . WEST PALM BEACH . LONDON . BERLIN . BEIJING . SHANGHAI . CHENGDU . ABU DHABI

# New horizons

A winner at the 20+10+X World Architecture Community Awards, this delightful new day centre for people living with Alzheimer's disease translates, with respect to form, into two corridors with different widths to foster and support residents' sense of direction. Within the therapy area, these two corridors play a role as 'stay' rooms, as part of a determined and focused layout which optimises the operations flow of the facility. The key features in the interior are those which define the space and create a comfortable and recognisable space for residents. The classrooms, for example, provide spaces with different colours, while the lounge areas are distinguished by the large windows which connect the day centre with the distant horizon. The remaining land on the project site is a green area which, in collaboration with the green roof, helps to provide a connection with the surrounding landscape. ([www.worldarchitecture.org](http://www.worldarchitecture.org))

## Day Centre for People With Alzheimer's Disease, Benavente, Spain

Architects: Rubén García Rubio and Enrique Juanes Martín (Juanes+Rubio Arquitectos)

Collaborators: Miguel Martínez Monedero (architect)

Client: Asociación de Enfermos de Alzheimer de Benavente and Junta de Castilla y León

Location: Benavente, Spain

Site area: 1,616sqm

Project area: 1,274sqm

Project completion: 2012







Jacqueline Vischer, PhD



Ray Pentecost, PhD



Gunnar Öhlén MD, PhD



Lord Nigel Crisp



Dr Julio Frenk



Richard Jackson, MD, MPH



Mohsen Mostafavi



Derek Parker, FAIA



John Zeisel, PhD



Alan Dilani, PhD



Philip Mead, AIA



Mike Nightingale, RIBA



Martha Rothman, FAIA



Mardelle Sherpley, PhD



Jain Malkin, AIA



Michael Moxam, AIA



Paul Barach, MD, MPH



Tye Farrow, AIA



Tara Dean, PhD



Diana Anderson, MD, MArch, LEED AP

For sponsorship and exhibition opportunities  
email [info@designandhealth.com](mailto:info@designandhealth.com)

[www.designandhealth.com](http://www.designandhealth.com)  
[info@designandhealth.com](mailto:info@designandhealth.com)



# CALL FOR REGISTRATION

To download the Preliminary Program and Registration Form  
please visit [www.designandhealth.com](http://www.designandhealth.com)

The Marriott Copley Place, Boston July 6-10, 2011

# Design & Health

## 7<sup>TH</sup> WORLD CONGRESS & EXHIBITION



An international forum for continuous dialogue  
between researchers and practitioners

Media partner



THE AMERICAN  
INSTITUTE  
OF ARCHITECTS



Sunyani Hospital, Ghana  
designed by Nigimale Associates for IHG

Humanity for Children Paediatric Clinic  
designed by Sheikh Ahsan ulah Mojumder



# Design & Health Africa 2011

**22-24th  
March  
2011**

Global Perspectives. Local Identities.  
An International Symposium & Workshop

**Cape Town, South Africa**

[www.designandhealth.com](http://www.designandhealth.com)



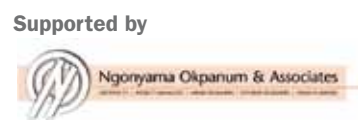
image courtesy of AMREF Uganda



CBF Women's Health Centre designed by FAREstudio



Bayelsa State Teaching Hospital, Nigeria designed by NOA





Rapid economic growth in Africa is welcome and creates an urgency for the development of a new spirit of international co-development and recognition of the role of design in improving global health, writes *Prof Alan Dilani*

# On the move

Africa's collective GDP in 2008 was \$1.6 trillion and is expected to rise to \$2.6 trillion by 2020. The continent's combined consumer spending of \$860 billion in 2008 will also rise significantly to \$1.4 trillion in the same period. Presently, 52 African cities have more than one million inhabitants, and by 2030, more than 50% of Africans will live in cities. These are the startling statistics provided by McKinsey Global Institute that support its conclusion that the 'Lions [are] on the Move'. Largely ignored by economists focused on the rise of the BRIC nations (Brazil, Russia, India and China), according to a recent analysis by the Economist, no fewer than six of the world's fastest growing economies were in sub-Saharan Africa. Angola, Nigeria, Chad, Mozambique and Rwanda all enjoyed growth rates of more than 8% over the last decade.

But with rapid growth comes new challenges and responsibilities. China's fast growing demand for Africa's raw materials and higher commodity prices have contributed to high growth rates but it is urbanisation, rising incomes and the development of a middle class that is fuelling growth in domestic consumer demand. The rapid movement of Africa's population to ever larger, multicultural, urban environments, creates great opportunities, but also an urgency to address continuing corruption issues, political instability, the weak rule of law and ultimately poor levels of health and education.

Eleven percent of the world's population inhabits sub-Saharan Africa, yet the African continent carries 24% of the disease burden in both human and financial costs, while benefiting from less than 1% of global health expenditure. At the same time, almost 50% of the world's deaths of children under the age of five still occur in Africa, and only a few countries in the region are able to spend the US\$35–\$50 per person per year that the World Health Organization (WHO) identifies as the minimum necessary to meet a population's basic healthcare needs. The International Finance Corporation estimates that over the next decade US\$25–\$30 billion of new investment will be needed in healthcare assets, including hospitals and clinics, to meet the growing demands of the healthcare market in sub-Saharan Africa, which is set to double, reaching US\$35 billion by 2016.

Chaired by Lord Nigel Crisp, Design & Health Africa 2011 will explore how richer countries can learn from poorer ones and suggest that, instead of talking of international development – where the rich help the poor – we should work towards co-development, each learning from the other. By bringing together interdisciplinary world experts to create a new vision for health in Africa, based on our interdependence, our desire for independence and on our rights and accountabilities as citizens of the world.



Keynote speakers will include (L-R): Lord Nigel Crisp (UK House of Lords), Dr Oliver Harrison (Abu Dhabi Health Authority, UAE), Dr Innocent Okpanum (Ngonyama Okpanum & Associates, South Africa) Mike Nightingale (Nightingale Associates, UK and South Africa)



Nursing staff enjoy the pleasant surroundings provided by the Sunyani Hospital in Ghana, designed by Nightingale Associates

## Design & Health Africa 2011: Global Perspectives. Local Identities Cape Town, 22–24 March, 2011

Design & Health Africa 2011 is an international symposium and workshop, which will explore global 'salutogenic' perspectives on the planning, procurement, finance, design, construction and operation of health and public infrastructure development in the region.

- The themes that will be presented will include:
- health policy and infrastructure development in Africa
  - health perspectives, theories and application
  - international health planning / models of care
  - design and architecture for health
  - infrastructure investment, finance and procurement
  - sustainability, climate change & global health
  - emerging technology & the patient experience
  - interdisciplinary approaches to research and evaluation



# Ngonyama Okpanum & Associates

ARCHITECTS | PROJECT MANAGERS | URBAN DESIGNERS | INTERIOR DESIGNERS | TOWN PLANNERS

Ngonyama Okpanum and Associates is dedicated to providing knowledge-based solutions to health care design.

Architecture has a strong behavioral influence on the community and society at large. Our approach to design is characterised by a focus on the interpretation of factors which impact on the built environment i.e. the social, architectural, spatial, philosophical, political and technological aspects of design; and their interpretation in the site-specific context.

Ngonyama Okpanum and Associates provides developmental, managerial and technical services in this respect, and within the context of human upliftment and the development of the built environment. Our architecture seeks to promote quality buildings with a strong recognition of the positive influence of architecture through the creation of pleasant therapeutic environments and well-designed spaces.



## JOHANNESBURG

T: + 27 11 463 9429  
F: + 27 11 463 6835

sibo@noact.co.za  
Unit J Block 2, 1st Floor  
Coachmans Crossing  
Office Park,  
8 Brian Street, Lyme  
Park, Bryanston, 2021

## CAPE TOWN

T: + 27 21 418 9224  
F: + 27 21 418 9229

info@noact.co.za  
Unit 21 & 22  
Foregate Square,  
Foreshire  
Cape Town  
8001

## EAST LONDON

T: + 27 43 743 8888  
F: + 27 43 743 8892

admin@noael.co.za  
13 Luken Road  
Selborne  
East London  
5247

## PORT ELIZABETH

T: + 27 41 582 2753  
F: + 27 41 582 2869

mail@noarchitects.co.za  
16 Clyde Street  
Trafalgar Centre  
Central  
Port Elizabeth  
6000

## BLOEMFONTEIN

T: + 27 51 447 8338  
F: + 27 51 447 8339

sibo@noact.co.za  
R3, 65 & 67  
Kaiser Park  
Suite 6 Kaiser Street  
Westville  
Bloemfontein, 9301

## MMABATHO

T: + 27 18 384 1568  
F: + 27 18 384 2788

sibo@noact.co.za  
Office 204, Mega  
City Shopping Centre  
Cnr of Sekame &  
Dr James Roads  
Mmabatho, 2735

## NELSPRUIT

T: + 27 13 755 3614  
F: + 27 13 755 3615

info@noact.co.za  
Suite 407  
The Medcine Building  
14 Hereshall Street  
Nelspruit  
1200

## FOURKWANE

T: + 27 15 291 4987  
F: + 27 15 291 5847

sibo@noact.co.za  
Standard Bank  
Building, 3rd Floor  
Cnr of Landross Mare  
& Thabo Mbeki streets  
Plokwane, 0699

## NIGERIA

Cell: +234 82 566 3650  
T: +234 806 263 5401

info@noact.co.za  
53 Lobito Crescent  
Wuse 11, Abuja  
Nigeria  
23400





# Ngonyama Okpanum & Associates

ARCHITECTS PROJECT MANAGERS URBAN DESIGNERS INTERIOR DESIGNERS TOWN PLANNERS

Email: [info@noact.co.za](mailto:info@noact.co.za)

Tel: 021 - 418 9224 Fax: 021 - 418 9229

## CANCER RESEARCH FACILITY



PROJECT: MOTHER AND CHILD CANCER RESEARCH INSTITUTE  
BAYELSA, NIGERIA

## PRIVATE HEALTH CARE



PROJECT: BELLVILLE HOSPITAL  
CAPE TOWN, SOUTH AFRICA

## INTERNATIONAL AIRPORT



PROJECT: ABUJA INTERNATIONAL AIRPORT  
ABUJA, NIGERIA

## REGIONAL AIRPORT



PROJECT: ENUGU REGIONAL AIRPORT  
ENUGU, NIGERIA

## COMMUNITY LIBRARY AND CLINIC



PROJECT: ALBOW GARDENS  
CAPE TOWN, SOUTH AFRICA  
COMPLETED 2000

## PRIMARY HEALTH CARE FACILITIES



PROJECT: OPOLLO HOSPITAL  
BAYELSA, NIGERIA  
COMPLETED 2009

## TERTIARY HEALTH CARE FACILITIES



PROJECT: CHRIS HANI BARAGWANATH HOSPITAL  
JOHANNESBURG, SOUTH AFRICA  
COMPLETED 2009

Rapid economic growth – real and predicted – means more investment than ever before in Africa's people, resources and infrastructure; and yet its health issues could threaten to derail the optimism and entrepreneurial spirit that defines the continent and are such a critical resource to the region.

Ideas about how Africa can release itself from poverty are being challenged, alongside a new appraisal of what the developed world can offer the world's poorest countries, and what it might gain in return. In his recent book<sup>1</sup>, former chief executive of the NHS Lord Nigel Crisp asks us to question whether the UK's healthcare system, burdened with 50 years of NHS bureaucracy, is as worth exporting as we like to think. He urges us to look more closely at those countries where there is less reliance on large hospitals – and an amazing resourcefulness borne of necessity – because they have much to teach. "Unconstrained by our history, they train people differently, create new sorts of organisations, involve families and communities

and concentrate more on promoting health rather than on just tackling disease," wrote Lord Crisp in *The Times* last year<sup>2</sup>. "They don't have our resources, or our baggage."

Architect Dr Innocent Okpanum of Ngonyama Okpanum & Associates touches on this in a recent paper<sup>3</sup> that calls for the reform of South Africa's design guidelines for accident and emergency facilities, unchanged since before the first democratic elections in 1994. He paints a picture of public hospitals as "frightening and unfamiliar... alienation, fear, hopelessness, loneliness, and dehumanisation often overwhelm patients", yet also points out that traditional African medical treatment approaches, with their emphasis on human interaction and access to family and friends, are similar to the holistic, patient-centred approach that many healthcare architects now take.

# The age of engagement

Partnerships – from governments pairing up with private investors, to a more participatory approach to healthcare design – are emerging as a key theme in African healthcare. **Emily Brooks** explores what this new sense of shared responsibility might bring

Both Okpanum and Lord Crisp are keynote speakers at this March's Design & Health international symposium in Cape Town, an opportunity to make real the partnership and communication that is seen as vital to progress on healthcare. It comes at a pivotal time for South Africa, which starts to roll out its own national health insurance plan next year: in support of this, the Department of Health is upgrading its five largest public hospitals with a multi-billion rand investment. A recent McKinsey Global Institute report<sup>4</sup> sees great opportunities for companies investing in Africa's infrastructure – a huge unmet need for healthcare services combined with a fast-growing economy means that demand falls desperately short of supply. People's spending on healthcare is expected to rise by 4.2% a year between now and 2020.

There is a tendency to see Africa as a whole instead of its distinct component countries, or to assume that what happens in South Africa is shorthand for activities elsewhere. "What I've picked up on is that not every country wants to take its lead from South Africa," says Chris Sherwood, director of international development for Nightingale Associates, which has had a Cape Town office since 2004. "Take Uganda – torn apart by civil strife, until recently there's been very little investment in infrastructure. Now, investment is starting to flow, but there are few consultants with experience of very large infrastructure projects – they may be very good architects and engineers, but they just haven't got the same level of experience that South African firms do. But there's that little bit of resistance in handing over those projects." Nightingale Associates currently has two South African hospital builds on site, but Sherwood admits that other projects have been slow to progress, despite successful tenders and bids. "We've been really successful with getting into consortia as architects, but when the jobs don't go ahead, it really affects us," he says.

Despite a suspicion that the South African government may be

**People's spending on healthcare is expected to rise by 4.2% a year between now and 2020**





## **Vryburg Hospital, Vryburg, Northwest Province, South Africa**

Completion date: 2009

Beds: 120

Client: Department of Public Works, Roads & Transport;  
Department of Health

Contract value (main hospital) R274,000,000

Architect: Bartsch Consult

Health planners: Leap Specialist Strategic & Planning Solutions

The overall plan of the hospital allows for an easily accessible main entry to the hospital administration, training areas and information and visitor facilities. This leads directly into the main hospital street allowing visitors easy access to the wards but bypassing all the main hospital departments. All the wards can be extended in the future to increase bed numbers without disrupting the daily working of the hospital and without increasing walking distances to each ward. A series of internal courtyards introduce natural light and ventilation, but also add a softer, more human scale. Regarding the wayfinding, the architects made use of pictograms on signage as far as possible, to take into consideration the fact that visitors to the hospital might not all be literate.



publicly supportive of public-private partnership (PPP) funding, but privately wary of it, a few such projects are coming to fruition: Netcare, the largest private hospital group in South Africa, has just delivered an upgrade to the Eastern Cape's Settlers Hospital in Grahamstown in conjunction with the local department of health. It is also leading the consortium for a major new public hospital for Lesotho, due to be finished this autumn.

The hospital it replaces, Queen Elizabeth II, is typical of many, suffering from a chronic lack of resources (heat, hot water; medical supplies, medicine and trained staff) and serving the needs of a poverty-stricken population, more than half of which live on less than US\$1 a day. Design priorities, here and elsewhere, relate to the need just to bring facilities up to modern standards; the need to cater for large amounts of infectious patients (with TB or AIDS-related infectious diseases) is another driver that distinguishes hospital design in Africa from elsewhere. Chris Sherwood expects other African countries to follow suit with PPP "because it works – it delivers infrastructure projects when other methods can't."

Investors target the growing middle classes in urban areas because that's where the returns are, but governments are also focusing on expanding rural services by building smaller clinics that fall somewhere between community health centres and small hospitals, putting some acute facilities within reasonable reach for the first time. Tanzania's Songambele Hospital, recently re-imagined by students from Texas A&M University (see case study), is typical of this trend.

Aid agencies, charities and other NGOs still provide significant support in rural areas, and they are devising some imaginative healthcare buildings that are socially responsible and give due attention to sustainable measures such as solar power and natural cooling systems not least because there is no other option. "This isn't a big flashy hospital that's a massive silo of energy that no one can afford to go to," says Texas A&M University's Professor George Mann about the Songambele Hospital project. "This is back to basics. It focuses on primary need."

Raul Pantaleo of Italy's tamassociati has worked on several hospitals for the charity Emergency, including Sudan's



Eastern Cape's Settlers Hospital, a major new public hospital for Lesotho





### **Salam Cardiac Surgery Centre, Soba, Khartoum, Sudan**

Project completion date: 2007

Client: Emergency, an Italian NGO

Built area: 6,000sqm

Total site area: 41,000sqm

Architect: Studio tamassociati

Italian NGO Emergency ([www.emergency.it](http://www.emergency.it)) has been working in Sudan since 2004, and in 2007 opened a free cardiac hospital on the banks on the Nile, about 20 miles from Khartoum, to serve not only Sudan but also nine neighbouring countries – an area the size of Western Europe. It approached Italian architectural practice tamassociati to design the hospital and its support buildings. tamassociati's design is a series of buildings around a peaceful courtyard, intended to inspire feelings of safety and respite. Materials are modest and in keeping with local building styles, such as the handmade woven screens that shade public walkways. The building is naturally insulated, ventilated and cooled wherever possible: the walls are 58cm thick, for example, with cavity walls and small windows. One thousand square metres of solar panels provide additional power to cool the water which lowers the air temperature in critical areas such as operating rooms, with two regular boilers as back-up. The air is filtered in a low-tech yet innovative way, passing through a labyrinth of tunnels to shake off the dust and dirt, before a fine spray of water lowers the temperature and removes the finest particles. Shipping containers used to transport equipment to the site were turned into staff housing and a cafeteria.

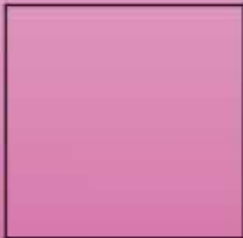




# HLM ARCHITECTS

HLM is a leading design practice headquartered in the UK and ranked 17th in the top 100 UK practices, offering a rare combination of design skills including Architecture, Landscape and Urban Design, Interior Design, Environmental Design and Masterplanning from eight offices in London, Guildford, Sheffield, Glasgow, Belfast, Cardiff, Plymouth, Pretoria South Africa, with a new office opening in Abu Dhabi March 2011. With over 200 staff, including 80 healthcare professionals, HLM is well positioned to deliver complex and challenging projects across the world, supported by state of the art IT systems, comprehensive BIM design facilities and video conferencing across all offices.

Our key sectors include Healthcare, Justice, Education, Defence, Residential and Commercial projects. We are widely recognised as one of the leading healthcare practices in the UK, with our international healthcare experience continuing to focus on major projects including Chris Hani Barragwanath Hospital, Soweto and Hopital Riviera Chablais, Switzerland.



Chris Liddle, Chairman  
Ground Floor  
46 Loman Street  
London  
SE1 0EH

T: 0207 921 4800  
[www.hlmarchitects.com](http://www.hlmarchitects.com)





Salam Cardiac Surgery Centre (see case study). He was chosen by Emergency not for his knowledge of healthcare buildings but for his specialism in participatory project planning, and this democratic approach has proved key to working successfully in extremely depleted areas. "The project is not just about the architect and the engineer, but the nurses, the local staff manager, the builder – the idea is that every person can have equal input into the process, and the architect is somehow like the conductor in the orchestra," he says. "When people see that you're just working honestly, working for them, their attitude changes completely."

There is, of course, plenty of homegrown talent that is just as committed to this holistic approach – the idea that hospitals can instil a sense of civic pride, and that they are a powerful expression of trust, is exactly what architects like Okpanum strive for. But there is a sense that governments must catch up with these ideas and put quality environments on an equal footing with services delivery. In the race to capitalise on Africa's economic potential, and the need to provide basic healthcare for all, this human dimension shouldn't be allowed to fall away.

**Emily Brooks is an architectural writer**

#### References

1. Crisp N. *Turning the World Upside Down: the Search for Global Health in the 21st Century*. London: Hodder Education; 2010.
2. Crisp N. Is This the Future for Britain's Health Service? *The Times*; 6 January 2010.
3. Okpanum I. *The Role of Design Guidelines for Accident and Emergency Facilities (DGAEF) in South Africa*; unpublished paper.
4. McKinsey Global Institute. *Lions on the Move: the Progress and Potential of African Economies*. June 2010. Accessed at: [http://www.mckinsey.com/mgi/publications/progress\\_and\\_potential\\_of\\_african\\_economies/index.asp](http://www.mckinsey.com/mgi/publications/progress_and_potential_of_african_economies/index.asp).

### Songambebe Hospital, Tanzania

Project completion date: TBC

Cost: US\$500,000

Client: Roads to Life Tanzania

Roads to Life Tanzania operates in the district of Bariadi in the north of the country, under the care of the Reverend Paul E Fagan, a missionary who has worked here for some 50 years. The organisation's on-site clinic/dispensary was recently given government permission to upgrade its facilities to a formal health centre, so patients will no longer have to go to the district hospital for treatments such as minor operations and blood transfusions. Students from Texas A&M University's College of Architecture created design concepts for the upgraded facilities: the brief required adding operating wards, x-ray and ultrasound buildings, admin buildings and staff housing. "Simple, low-cost, single-storey and made from local materials using local methods," explains Texas A&M's Professor George Mann of what the designs have in common. The most promising work is now being used to raise funds to realise the project.



# How do we use design as a catalyst for health?

Now that the cost of coping with chronic diseases has become unsustainable, we must design our way to health. All around us we see opportunities to re-think the built environment as a means to promote health rather than support illness. Let's work together to raise our expectations for design as a powerful catalyst for health.

[www.farrowpartnership.com](http://www.farrowpartnership.com)

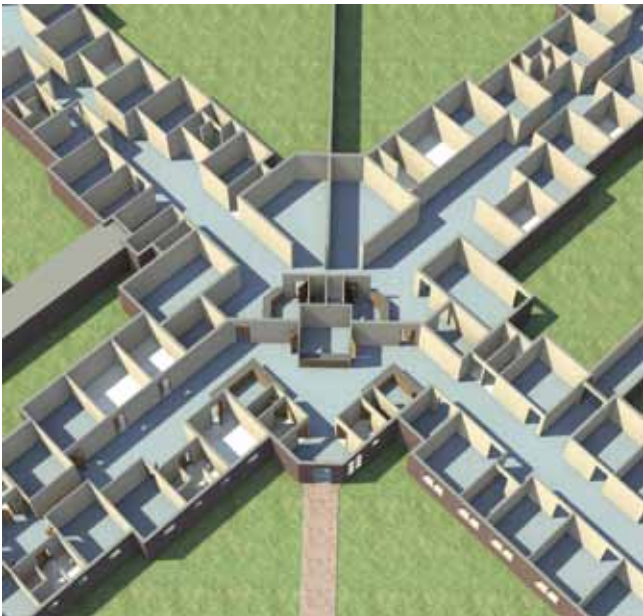
**Farrow**



**Free State Psychiatric Complex,  
Bloemfontein, Free State, South Africa**

Completion date: end of 2013  
Cost: TBC (currently out on tender)  
Client: Provincial Department of Health,  
Free State Province  
Architect: LEAPcc Architects  
Structural Engineers: Phethogo Consulting  
Landscape Architects: Greeninc

The Free State Psychiatric Hospital currently consists of a range of buildings dating back to the early 1900s, some of which are to be upgraded, others replaced. New buildings are provided for a chronic ward, adolescent ward, acute wards, forensic wards, sheltered workshops and therapies, a pharmacy, halfway houses and training facilities. The main design approach has been to consolidate the site by cutting off the activities not belonging to the psychiatric complex and to provide a new face to the complex, by changing the entrance to the southern side of the site so that it gives easy access to Kosmos (mentally handicapped), outpatients and administration. Therapies and communal facilities have been zoned centrally for easy access by all the different groups. Given that this is a mental health facility, it is particularly important for patients to feel a sense of safety and wellbeing.





Sustainable environments  
for health and wellbeing.

[WOODSBAGOT.COM](http://WOODSBAGOT.COM)

**WOODS  
BAGOT**

AUSTRALIA  
ASIA  
MIDDLE EAST  
EUROPE  
NORTH AMERICA



# The challenge ahead

Design & Health Australasia 2011 is an international symposium and exhibition dedicated to exploring global perspectives on enhancing health, wellbeing and quality of life

**T**he health status of people living in Australasia is one of the highest in the world, with rising life expectancies, falling mortality and morbidity rates, and reduced incidence of cardiovascular disease and many common cancers. At the same time, the region is presently benefiting from significant capital investment in hospital infrastructure, comparable with anywhere in the world.

Despite these successes, however, health systems across the region are facing similar challenges to the rest of the developed world, characterised by rising costs pressures, an ageing population and a rise in the level of lifestyle diseases, most notably diabetes and obesity. In addition, Australasia faces the challenge of addressing the inequities in health outcomes of its poorer socio-economic groups,

in particular its indigenous population and those living in more remote and rural areas. In recognition that a healthy population is the foundation for social development and economic growth, health reform in Australasia is undergoing a policy shift that is highlighting the need to redesign its health systems to embrace health promotion and embed a preventative approach based on better education, evidence and research. As health reform gathers pace, and major capital investments being made in healthcare facilities come to fruition, a new paradigm is required that values the designed environment as one of the most cost-effective and enduring approaches to addressing the public health challenges ahead.

Design objectives for enhancing human health must facilitate an active lifestyle, enable the successful management of physical, psychological and emotional stress and support the mental and cognitive processing of information by stimuli in a variety of environments. Central to this cause is the development of a scientific research base, which illustrates and explores the relationship between human health and the environment and, even more vitally, creates a case for the rigorous application of this knowledge in professional practice.

Well-designed healthcare facilities around the world are making a critical contribution to the process of healing and rehabilitation. Further, international research demonstrates how the quality of our public and private spaces is closely linked not only to health and quality of life but also to crime and poverty. The level of design quality in the built environment is also critical to the sustainable development of our neighbourhoods, towns and cities.

A 'salutogenic approach' to health and public infrastructure development, embedded at the core of a preventative health strategy, can change the focus of the strategy to create a more holistic understanding of healthy environments.

This and more will be discussed and debated at Design & Health Australasia 2011 with full delegate participation and interaction. For more information about the symposium, exhibition and gala dinner – and how to register – visit [www.designandhealth.com](http://www.designandhealth.com). We look forward to seeing you there.



The hospital in the city:  
the new Royal Children's Hospital, Melbourne

## Design & Health Australasia 2011 Global Perspectives. Local Identities Melbourne, 2–4 May 2011

Design & Health Australasia 2011 is an international symposium, exhibition and workshop, which will explore global perspectives on the planning, procurement, finance, design, construction and operation of public and health infrastructure. The symposium objectives are to:

- Evaluate different international models of care, and the latest health theories and perspectives
- Reflect on the socio-economic factors impacting on the design and development of public and health infrastructure in Australasia including demographic change, medical technology, patient choice and cost
- Report on case studies of healthcare buildings that are delivering real and measurable benefits in the region and globally
- Recommend actions and initiatives to improve the design quality and operational management of the health infrastructure
- Explore how to create a sustainable infrastructure that supports human health, wellbeing and quality of life and meets social, environmental and economic goals



Keynote speakers will include (L-R): Dr Christine Bennett, chief medical officer, BUPA Australia; Dr Liz Gale, consultant (Australia); John Cooper, John Cooper Architecture (UK); and Deborah Roundtree, Roundtree Visuals (USA)

Australia seems to have sailed through the global recession with hardly a bump. Its mining industry is booming, the dollar is strong and unemployment in most parts of the country remains low. A steady flow of immigration has changed the face of urban centres. In contrast, rural centres have seen populations deplete as young people move to the cities in the hope of being able to earn a better living. All this has put pressure on the health system to find ways to not only meet the needs of a diverse, growing urban population and a disparate, ageing rural population

but to also improve how healthcare is delivered – and in the most efficient way possible.

Efficiency and service delivery are under the spotlight in Australia and New Zealand as *Kathleen Armstrong* reports

# Southern stars

In New South Wales (NSW), according to Anthony Manning from Health Infrastructure, part of the NSW Health, projects fall into two camps: the creation of additional capacity and growth, centring principally around the development of cancer centres, and the replacement and/or reconfiguration of existing assets.

The way the department approaches the procurement and development of health assets is also undergoing a major rethink. “We are trying to focus on how to consult and increase transparency about what we want,” Manning says. “It used to be just about the lowest price, so designers often opted out. Now it is about value for money and smart design.

“We have done some work around creating a standard, ‘systematised’ design – a model that has

some flexibility in it for both acute and non-acute facilities. This ‘shell-and-core’ approach will allow us to standardise certain features across facilities and to get on site earlier.”

Another change in NSW is the replacement, in January 2011, of the eight area health boards by 17 local health networks which Manning says will become more active players in projects. The move is part of the national agreement for health reform which includes the establishment of local hospital networks throughout the country.

Dr Paul Barach is working with Manning and Health Infrastructure CEO Robert Rust to help achieve their vision, with a particular focus on creating and assessing value in health facilities design. “We want to create a process that allows meaningful feedback, knowledge and learning,” Barach says. “This includes not only engaging staff and users but also the local community. Indeed, outcome improvements in facility design and meaningful cost reductions are unachievable without active cooperation and acceptance of shared goals among all stakeholders.”

“We are hoping to have a number of ‘super user groups’ together by February to discuss best evidence, process and optimal engagement of clinicians, etc.,” Barach adds. “They would become a regular user group and sounding board. It is something that does not exist right now.”

The state has felt the repercussions of inadequate consultation with previous facilities, most recently with the development of Sydney’s Royal North Shore Hospital. In 2009 the plans were reviewed after staff complained that 16 of the 18 operating theatres would be too small for complex surgery. Recent plans to sell off some of the public land around the site has also come under criticism and, according to a report in the *Sydney Morning Herald*, “would leave the hospital, which has about 640 beds, with much less land than inner city hospitals such as Royal Prince Alfred and ignore the role open space plays in patient recovery”.

However, Barach is optimistic about the innovative changes that are proposed for the consultation and procurement processes in NSW and commends Manning and Rust on what they are trying to achieve.

## Public-private partnerships

As health planning adviser at Plenary Group, Jenny Richter works with consortia bidding for public-private partnership (PPP) projects. Richter says the use of PPP varies from state to state and is limited by the number of projects large enough to warrant PPP funding. The next major PPP for Victoria will be the

**This ‘shell-and-core’ approach will allow us to standardise certain features across facilities**





©Adrian Lambert - Acorn Photo

### Rockingham Hospital, Western Australia

Rockingham Hospital is a district hospital serving the rapidly expanding population south of Perth. Inherent in the design of the high dependency, emergency short stay and medical units is the perception that patients' ward rooms have a sense of individualism, with crafted views to the outside via the windows. Natural light fills the new ward and theatre block and large openings to the operating theatre level provide staff with views out to natural bushland. The architecture of the new mental health inpatient unit references modern domestic buildings, focusing on familiar materials, access to natural light and open space, as well as providing both stimulating and calming spaces, as required, for therapy.

Contract form: Managing contractor

Project completion date: Phase 1: September 2008;

Phase 2: September 2009; Phase 3: November 2010

Cost: AUD\$116m

Area: 32,500sqm

Client: State Government of Western Australia

Architects: Hames Sharley and Silver Thomas Hanley

Victorian Comprehensive Cancer Centre in Melbourne. The new facility is part of the government's strategy to increase the five-year survival rate for cancer by accelerating new discoveries and treatments for cancer. The centre will bring together a number of key institutions to create a purpose-built cancer centre that combines patient care, research and education. Bids were submitted prior to Christmas and are currently being evaluated.

While Victoria and NSW have used PPP for a number of projects, resource-rich states such as Queensland and Western Australia have in the past opted for more traditional routes. However, a call for expressions of interest for the long-delayed Sunshine Coast Hospital in Queensland is expected to be issued in early to mid-2011 – the first in that state to be funded in this way. And in Western Australia, the upcoming redevelopment of Midland Hospital is currently being funded through a PPP process – it will also have its services managed by a private operator/partner.

As in other states, in Western Australia the focus is on the improvement of regional hospitals, mental health and cancer services and the expansion of healthcare services in the capital Perth. This includes the AUD\$1.76bn development of Fiona Stanley Hospital (see also p42), financed through state funding, which is currently under construction. The 643-bed tertiary teaching hospital, which is being designed by the Fiona Stanley Hospital Design Collaboration (comprising architectural firms Hassell, Hames Sharley and SilverThomas Hanley), will have 83% single rooms and includes a 140-bed rehabilitation unit.

Also being constructed on the site is the AUD\$65m WA Medical Research Institute, designed by Hames Sharley. The Institute comprises both wet and dry labs and has been designed to be sustainable with in-built flexibility for future needs.

"We have received feedback that we are addressing the Institute's aim to meet the latest trends in the field," says Warren Kerr, national director of health projects for Hames Sharley. "There is also area for future expansion."

Hames Sharley and SilverThomas Hanley also worked on the expansion of Rockingham Hospital, which serves a rapidly growing population on the coast south of Perth (see case study). Expanding from 60 to 237 beds, the redevelopment of the hospital also includes a 30-bed mental health unit, part of the national strategy to provide mental health services closer to where people live.

In December 2010, the South Australian government announced the preferred bidders for the state's first PPP project, the AUD\$1.7bn Royal Adelaide Hospital. The team includes architects SilverThomas Hanley, DesignInc, Leighton Contractors, Hansen Yuncken, Macquarie Capital Group and Spotless.



Western Australian Institute for Medical Research designed by Hames Sharley

**The new facility is part of the government's strategy to increase the five-year survival rate for cancer**

Arup acted as project management adviser for the Royal Adelaide and, according to Katie Wood, the project provides a good model for planning. "They did the healthcare plan for the state first, to ensure the hospital fits in with the plan and brings with it health reform. They had a vision and they held onto that vision, writing true output specifications for the project and holding onto their idea for 100% single rooms." Financial close for the project is expected to be reached in the first quarter of this year.

### Addressing chronic disease

Arup has also worked closely with the Office of Aboriginal and Torres Strait Islanders (OATSIH) on the development of healthcare facilities that meet the needs of aboriginals and Torres Strait Islanders – a segment of the population that is disproportionately affected by chronic diseases such as cardiovascular disease, diabetes, cancer, chronic respiratory disease and chronic kidney disease. OATSIH's 'Closing the Gap' strategy aims to



## Calvary Mater Hospital Newcastle, NSW

The first public-private partnership (PPP) project between the NSW health administration and the NovaCare Consortium, the redevelopment of the Mater Hospital in Newcastle included three new 30-bed wards – for oncology, medical and surgical inpatients – a new emergency department, the expansion of the radiation oncology department, the haematology unit and the drug and alcohol toxicology and enabling unit, and the construction of a new 100-bed acute adult mental health facility. A major challenge was that the AUD\$180m project had to fit on a restricted city site, at the back of which was a heritage-listed convent.

**Contract form:** PPP

**Project completion date:** Officially opened August 2009

**Cost:** AUD\$180m

**Client:** NovaCare Consortium

**Architects:** Suters, in association with PTW

**Structural/civil:** Robert Bird Group

**Landscape architecture:** John Lock and Associates

**Mechanical/electrical:** Basset Consulting Engineers



combat the level of chronic disease through supporting healthier lifestyle initiatives and improving the delivery of healthcare to the indigenous community.

Addressing these issues has also been a focus of some of the work taken on by NSW-based Suters Architects. Suters designed, as part of a pro bono project in collaboration with Architecture without Frontiers, a dialysis clinic for the remote township of Kintore, which lies about 530km west of Alice Springs and has a population of around 450 people, 96% of whom are aboriginal or Torres Strait Islanders. The building, which was previously used as an aged care facility, was redeveloped into a dialysis unit with the capacity to dialyse up to eight patients a day. It also includes an accommodation unit for out-of-town patients, as well as a health education resource area to “help locals learn about their bodies and their health in culturally appropriate ways”.

Suters also worked on the redevelopment of the emergency department (ED) at the Alice Springs Hospital, where approximately 80% of the patients seeking treatment are indigenous. To help reflect their cultural beliefs and practices, a combined entry forecourt and gathering space was incorporated into the design. The two-storey, 1,731sqm ED also includes 35 treatment spaces and associated facilities and provides a “dramatic focus” to the hospital.

The firm has also worked on a range of regional hospitals and community health centres on the eastern seaboard, of Australia, including the recently completed Calvary Mater Hospital in Newcastle (see case study) which it designed in collaboration with PTW and which, in November, received the Hunter Development Corporation Large-Scale Development Award (Commercial/Industrial) at the Lower Hunter Urban Design Awards.

Development has also been very active in Queensland and BVN Architecture has been involved in a number of major projects in the state, including the redevelopment of the Robina Hospital (see case study). The hospital will complement the larger Gold Coast University Hospital, which is also currently under construction, providing a range of services to the local population. BVN Architecture also designed the Robina Health Precinct, a five-storey community health facility which will provide multidisciplinary outpatient health services and education. The Robina Health Precinct will be constructed adjacent to Robina Hospital and construction will commence in February 2011.

“The health precinct has more of a community feel,” says architect Mark Grimmer from BVN. Terracotta was chosen for the façade to create a sense of warmth – a “welcoming community service”. Articulations within the façade provide spaces for extra seating in the public corridors at each level as well as creating a lively, communal space for those who use it. The terracotta cladding of the health precinct both complements and contrasts with the colours used



Chatswood Community Health Centre, designed by DesignInc



on the hospital next door, reflecting the distinctive but complementary roles fulfilled by the two facilities in meeting the healthcare needs of the local community.

BVN recently won the top award for the health category at the 2010 World Architecture Awards in Barcelona for its design of the Brain and Mind Research Institute (BMRI) Youth Mental Health Building at the University of Sydney (see p14).

DesignInc is currently working on a new renal unit at Shellharbour Hospital, about 100km south of Sydney on the NSW coast. Because the unit sits near a morgue, DesignInc has commissioned a mural for one of the walls – a ‘spirit painting’, a request from aboriginal representatives to enable the facility’s aboriginal patients to enter the building. “We have also provided a lot of outside space and used a lot of earth colours – greens, blues, browns and beige – colours that are familiar to those who will use

the space,” Forbes says. “We have tried to make it bright and cheerful – a good place to wait.”

The firm also recently finished working on a community health centre in Chatswood, a suburb of Sydney. The centre has been designed as an indoor/outdoor centre using colourbond metal and natural stone, “characteristic of the natural environment”, Forbes explains. Primarily a GP clinic, the facility also includes mental health and child development services and is part of a strategy to bring primary care services together with allied health services. The federal government had hoped to see the establishment of 32 GP superclinics around the country, with a particular focus on rural centres, for which it would provide the capital. However, Forbes says, the initiative has not been taken up as quickly as the government had hoped and few have been taken up so far – although he is confident that the target will eventually be reached.

“There have also been some interesting experiments along the same lines in New Zealand, where nurse practitioners do a lot of what a GP does,” Forbes comments.

### Economic constraints

While the economy continues to boom in Australia, in New Zealand it is a different story. The financial crisis has had a significant impact, including reducing the amount of capital available for health infrastructure. The government has responded by looking for ways to improve efficiency in the healthcare sector: As part of this, in December 2010, the National Health Board issued guidelines for the assessment, prioritisation and



sequencing of capital investment proposals by district health boards (DHBs).

“Investment proposals need to be driven by future service requirements and put much greater emphasis on national and regional priorities,” said National Health Board chair Dr Murray Horn, when the guidelines were launched. “The configuration and mix of facilities, information systems and workforce investments also need to support changes in models of care that are necessary to lift health sector performance within the resources available.”

The first project scheduled to be developed under the new rules will be the NZ\$400m redevelopment of Christchurch Hospital on the South Island, says Darryl Carey from Chow Hill Architects which, in association with Thinc Health, drew up the revised masterplan for the 50,000sqm hospital. The redevelopment, strongly influenced by the need for existing buildings to meet the country’s stringent seismic standards, will include three levels of medical-surgical 96 beds, 12 operating theatres and a new emergency department.

Carey says the government is likely to be encouraging a new way of funding healthcare infrastructure projects, along the lines of PPP. It will be the first time this type of investment will be used in the healthcare sector. It is also likely that some district health boards will merge. There are currently 20 DHBs in the country, serving a population of just under 4.4m people.

While the economy may delay a number of new projects going ahead, Carey says “every hospital in the country has some long-awaited redevelopment work planned”. This includes the redevelopment of Waikato Hospital, designed by Chow Hill, Jasmx and MSJ Architects, which is due to complete in 2013; the ongoing redevelopment of Middlemore Hospital in Auckland, led by Klein Architects; a new inpatient building for Rotorua Hospital, topped off in September 2010; and the redevelopment of Taranaki Base Hospital which has been tendered and is awaiting final approval from the Minister.

So, while purse strings may be tight, healthcare remains a priority and in both Australia and New Zealand strategies are in place to improve the way it is delivered.

**Kathleen Armstrong is a healthcare writer**



Chatswood Community Health Centre has been designed in colours and materials that fit into the local environment

### Braemar Hospital, Hamilton, New Zealand

The redevelopment of Braemar Hospital in Hamilton saw the private facility move to a site adjacent to Waikato Hospital, which is also under redevelopment. Architects Chow Hill worked closely with ophthalmologists and other staff to create a design that would attract both surgeons and patients, providing state-of-the-art facilities and a hotel-like feel to the 100% single-room hospital.

Project completion date: April 2010

Cost: NZ\$26.5m

Area: 7,800sqm

Client: Braemar Hospital

Architect(s): Chow Hill

Project manager: Chow Hill

Main contractor: Mainzeal Construction

Structural engineer: Holmes Consulting Group

Landscape architect: Chow Hill





# Design & Health Australasia 2011

2-4th  
May  
2011

Global Perspectives. Local Identities.  
An International Symposium, Exhibition & Workshop

Melbourne, Australia

[www.designandhealth.com](http://www.designandhealth.com)

Royal Women's Hospital Melbourne, by Woodhead



Robina Hospital, by BVN Architecture



Royal Children's Hospital Melbourne, by Bates Smart



Supported by

Sponsors

Media partner







### Robina Hospital, Brisbane, Queensland

The AUD\$274.3m redevelopment of the Robina Hospital will enable the hospital to provide general medical and specialist surgical procedures for the local population, complementing the services provided by the nearby Gold Coast University Hospital, which is also under construction. The first phase, a new main entry, ward building, outpatients department, CSD and theatres, was completed in December 2010. "We tried to build on its presence on the Gold Coast providing vistas of the mountains on one side and the sea on the other from every part of the hospital," says architect Mark Grimmer. The rooms have large double-glazed windows with sunshades to keep the heat out in summer while enabling light to enter the rooms. Staff bases also have views out. "We wanted to create a place where staff want to work," he adds. Access to natural light has also been incorporated into operating theatres, recovery and CSD – and large photographs of the beach and/or rainforest have been applied to the walls to create a further sense of the outdoors.

Contract form: Managing contractor

Project completion date: mid-2012

Cost: AUD\$274.3m

Client: Queensland Health

Architect: BVN Architecture



# Among the banksia



The design of Western Australia's Fiona Stanley Hospital reflects not only the needs of the indigenous and migrant populations of the state but also the unique natural environment in which it is set, as **Morag Lee** explains

Within the architectural community at large there is still a preconception of the specialist healthcare architect as a planning guru, carefully piecing together a jigsaw of rooms to achieve functionality, efficiency and perhaps very little else – a plodding, logical thinker, deprived by

strict clinical requirements and restricted budgets of an environment which will allow them to express true architectural vision. Indeed, many hospitals produced in the late twentieth and early twenty-first century do little to dispel this illusion – but this is changing, and the days of functional, generic hospital models and standardised building templates are well and truly behind us.

The recognition of evidence-based design (EBD) and the now-accepted benefits of a nurturing healthcare environment have to an extent liberated the healthcare designer. While efficiency and affordability will always be prerequisites of the modern public hospital – and few budgets allow for grand architectural 'flights of fancy' – today's hospital architect has the opportunity, nay the obligation, to look beyond the functional. In doing so, they must be fully cognisant of the possible implications of their design choices and display a level of sensitivity above and beyond that required in many other spheres of the architectural profession. In creating a 'facility for health', they are obliged not only to display sensitivity to the building's users, but also to its environment and to the wider society it serves.

Designers are rising to this challenge and a new wave of exciting and distinctive public hospitals are being developed, each responding in a unique way to the very specific location and community they serve.



The development of the new Fiona Stanley Hospital (FSH) in Perth forms the cornerstone of a major healthcare reform programme currently being implemented in Western Australia (WA). Its brief is to facilitate the provision a patient-centric service delivering healthcare in the most user-friendly manner; whether that be through ambulatory or inpatient treatment, hospital in the home or through other regional facilities accessed by telemedicine. In collaboration with its counterpart servicing the northern suburbs of Perth, it is to act as a hub for state-wide tertiary services.

The brief for this project is no different from that of many public hospital developments worldwide – the replacement of facilities no longer able to support modern healthcare practices, the creation of a major tertiary centre serving a network of subsidiary facilities, the development of a virtual hospital network. But while the brief may be similar, the design for Fiona Stanley Hospital is unique. The facility is distinctly of Western Australia and for Western Australia, responding not only to its physical and climatic context, but also to the cultural and socioeconomic needs of its community.

The design team chosen for this project is a collaboration of three practices: Silver Thomas Hanley, Hassell and Hames Sharley. All three firms are internationally experienced with speciality knowledge in healthcare planning, workplace design and laboratory and education facility development. While fully conversant with global developments in these areas, perhaps just as crucial to the success of this project was that all three practices had a strong local base in Western Australia. As such, they were uniquely placed to fully investigate the context for this project and respond sensitively and respectfully to its needs and objectives. Through lengthy site visits and an extensive programme of consultation with staff, local community and other key stakeholders and reference groups, the project team and its designers developed a detailed facility masterplan. While responding functionally to the clinical briefs – this masterplan went further and addressed a wide range of issues specific to this project – the design response to these issues has had a fundamental effect on the final built solution.



Generic rooms allow for future flexibility

### The community culture

Traditionally, outdoor spaces play a vital role in the lives of West Australian people. A fortunate climate and spectacular natural environment have nurtured this philosophy. It was felt that in the design of this new facility, this cultural reference should be addressed and that the provision of usable outdoor areas, natural daylight and access to views should be key design drivers. This decision had a fundamental effect on the development of the architectural model. Instead of spreading out to maximise the footplate of the building on the site, the main hospital block rises in height and wraps itself around a large external public park area. This park reaches deep into the heart of the building facilitating light and views, as well as offering external areas for relaxation, exercise and rehabilitation. The lower podium floors of the building, which through clinical necessity are deeper planned, are penetrated by a network of landscaped courtyards and open-ended corridors. These fragment the building mass, offer external access and views and orientate the user within the footplate. The raised inpatient areas are able to capitalise on rooftop landscaping and views onto the public park and adjacent retained bushland.

Western Australia is made up of a diverse range of peoples, from the traditional aboriginal residents to a wide range of settlers of European, Asian and, more recently, Southern African descent. While each group has its own cultural needs, it is perhaps the local indigenous community who has the



Visitors to the cafe can enjoy views to the surrounding park area

most specific requirements and needs the most detailed consideration. Aboriginal people will be a significant patient and visitor group at the hospital; both the buildings and their landscape settings had to be specifically designed to respond to the cultural needs and sensitivities of the indigenous users. A specific reference group was set up to inform this process. This group discussed issues as diverse as departmental locations and layout, seating choices, landscaping options, graphics and colour selection. Some specific issues addressed were:

- provision of a range of outdoor spaces with indigenous planting as a cultural reference point;
- provision of gathering and waiting spaces for large family groups;
- location of key departments close to external areas; and
- location of bereavement facilities to respond to cultural sensitivities and rituals.

### The future

In the basic masterplanning of the site it was essential to allow for future growth. This was achieved by predicting the future healthcare scenario based on available data, designing the site to accommodate this, then paring the development back to reflect current requirements. The initial footprint of the hospital was therefore consolidated and zones were set up where future expansion could logically take place without causing major service disruption. The feasibility of this approach was reliant on the development of a simple and extendable internal circulation system. The basis of this system lay in the complete separation of the main horizontal public and service routes. On the lower ground level, a network of support corridors link the main facility management areas into dedicated vertical risers which feed into the rear of the clinical departments. On the entry level, a public atrium provides physical and visual access to main department entries and public lift cores. Both systems are fully extendable into the proposed expansion zones, while maintaining the purity of the traffic separation and avoiding any service disruption.

In addition to future development, it was recognised that there may be a requirement for internal reconfiguration of the original facility in the future. This was addressed in a number of ways.

- Future-proofing strategies were put in place to facilitate the expected expansion of heavily equipped areas such as theatres and imaging. These included: providing equipment access points and routes for future installations, reinforcing structure to support future equipment loadings, providing serviced shell spaces for immediate conversion, and making available expansion potential by collocation of soft office areas at the boundaries of critical departments.
- Generic rooms were adopted wherever possible and customisation was minimised to allow for easier service relocation.
- Departmental boundaries were deconstructed in favour of collocation of similar room types, thus allowing flexibility between clinical areas and more efficient facility usage.

*"We must acknowledge that WA is undergoing major demographic changes. Ongoing migration, supported by a resource-rich economy has seen the population increase more rapidly than any other Australian state. So in addition to the requirement to service its current patient base, Fiona Stanley Hospital had to be ultimately flexible to respond to future population needs."*

**Geoff Zimmer, director of project delivery, Fiona Stanley Hospital, Department of Health**



The final site plan allows space for future growth

### The site

The site for Fiona Stanley Hospital is unique – and this uniqueness brings with it a requirement for a high level of design responsibility. Located on an area of established native bushland, the hospital has to respond to its location sensitively while still achieving its functional objectives. An example of this was when early investigation of the site identified the presence of a protected bird species. This resulted in the requirement to preserve two large conservation areas on the site, linked through the centre of the proposed development



zone by a green corridor populated by local tree species. This specific requirement had a fundamental effect on the site masterplanning solution.

Through discussions with environmental consultants and public and cultural reference groups, it was agreed that the future landscaping of this hospital should not be structured and formal but instead reflect the nature of the site prior to development. To facilitate this, several activities were conducted prior to site clearance:

- salvage of mature trees;
- seed collection and storage; and
- cuttings of species suitable for propagation.

Informal gathering spaces, contemplation points and wander paths have been provided and populated with indigenous plants, creating a rich and unique sense of place.

The uniqueness of the site influenced not only the landscaping philosophy but also the aesthetic of the building itself – the imagery of the bushland and its native flora reflected in the differing strata of the elevational treatment; the strong vertical segmentation of the lower podium levels taking direct reference from the light and shade cast by the bushland tree trunks; the upper ward level paying playful homage to the imagery of the native banksia

shrubs which populate the site; and the projections of the window canopies mirroring the open banksia seedpod while cleverly providing passive shading to the bedrooms behind.

In the main atrium, the ceiling is perforated with random slitted apertures, allowing glimpses of light to filter through, echoing the effect of the tree canopy.

Internally, this reference to the building context continues. The site was analysed through multiple visits; existing colour and textures on the site generated a design palette that is unique to this region. These site references inform the internal fit-out – from material and colour selection to the detailing of areas such as reception desks and seating installations.

### The location

While the masterplan identified key areas of consideration to ensure that the design of this development was 'of its place', Perth's unique location had an effect on the design in other ways.

The remoteness of the city of Perth from other large Australian conurbations, has led to its becoming semi-autonomous in nature. In many spheres of industry and design, its relative isolation has

caused it to look for inspiration beyond its national cousins in the east, and this was the case with Fiona Stanley Hospital. When the state government looked to develop this particular project, it insisted that its project team was fully conversant with current international research and development trends. The project teams chosen for both the briefing and design of the hospital were locally based and highly experienced in healthcare development, but the scale of this project allowed these teams to recruit additional personnel with international experience and utilise the services of key specialist consultants. Taking references and drawing evidence from its international sources, the hospital project team was able to fully explore a number of important diverse design issues. Many of the issues reviewed were already known of in WA but the scale and importance of this project provided the first opportunity to fully review their potential.

### Fiona Stanley Hospital, Perth

Client: Government of Western Australia

Architects: The Fiona Stanley Hospital Collaboration (Silver Thomas Hanley, Hassell, Hames Sharley)

Cost: AUD\$2 billion tertiary hospital, including AUD\$255.7m for state rehabilitation service

Capacity: 643 acute hospital beds, 140 rehabilitation beds

Area: 150,000sqm gross area, excluding car parks

Schedule:

- Planning underway since 2004;
- Construction commenced September 2009;
- Completion of construction scheduled for December 2013;
- Opening scheduled for May 2014.



The natural landscaping reflects the vital role outdoor spaces play in the lives of West Australians



silver thomas hanley  
HEALTH ARCHITECTURE

T. +61 8 6363 9444 W. [silverthomashanley.com](http://silverthomashanley.com)

Realising visions,  
exceeding expectations

Leading Australian Health Care Design





*"The size of Perth's skilled labour is limited when confronted by specialist construction projects, such as the construction of a large hospital. As a result, the Fiona Stanley Hospital project procured mechanically efficient and off-site manufactured products, reducing labour-intensive systems and work procedures to attract Perth's best limited skilled labour in this specialist market. Brookfield Multiplex awarded multiple packages of similar disciplines to address the needs of the hospital's varied building elements, ensuring their timely completion and reducing the project risk. These trade packages were tailored to attract Perth's supply chain networks."*

**Simon Ritchard, Brookfield Multiplex project manager, Fiona Stanley Hospital Project**

For example:

- Professor Roger Ulrich's engagement allowed the full exploration of single-bed requirements for improved health outcomes and patient risk avoidance strategies. This led to a much higher percentage of single bedrooms than had ever previously been provided in WA public hospitals.
- The review of fit-out standards, advocated by the NHS, led to the development of new product types, with local manufacturers becoming actively involved in the development of innovative prototypes.
- A European engineering review led to the acceptance of 100% clean air usage and the take-up of chilled beam technology.
- Construction prefabrication methodologies from the UK public-private partnership (PPP) market were explored for implementation in both engineering and fit-out scenarios.

While not all issues explored were eventually accepted due to budget, locational supply practicalities, industry capacity etc, this project provided a unique forum for a review of issues, the outcomes providing an enhanced knowledge base which could be utilised in future healthcare project planning in the state. This concept of internationally enhanced local experience is prevalent in all constituents of the briefing design and construction and has led to a harmonious union of international issues and local priorities.

### The construction

In addition to fulfilling its many design criteria, the FSH must also, of course, be a financially viable and constructable building venture. Developing a project of this scale and complexity in a relatively isolated community such as Perth brings with it a whole new range of challenges for both the designer and contractor.

The implications of these constraints were identified early in the project's design phase. Brookfield Multiplex invaluable construction experience to guide the resolution of the design in conjunction with the design consultants. It was paramount a strong working relationship was forged early between the hospital's design team, managing contractor and WA suppliers, which led to customised solutions to resolve product availability constraints.

### Conclusion

Fiona Stanley Hospital is now under construction, and is due for completion in December 2013 and occupation in 2014.

It is a modern, efficiently planned facility, fully recognising budget, staffing and maintenance issues. Its brief and design have responded to many of the principles of evidence-based design and its project team has been awarded for its proactive approach to the environmental agenda. In addition, the design team, through careful and detailed study of its context and through ongoing engagement with its community, has developed a design solution which is unique, one which could not have been developed anywhere else and is perfectly aligned to the needs of Western Australia.

**Morag Lee is a senior health facility planner at Silver Thomas Hanley in Perth, Western Australia**



*"For the architectural collaboration it has, and continues to be, an exciting project to work on. We have been fortunate to work with a client, project team and contractor who all share the vision of taking this hospital development beyond the functional and creating an exciting piece of architecture – one which displays a level of sensitivity and humanity fundamental to this building type."*

**George Raffa, project director, FSHDC**



The entry-level atrium provides access to public circulation routes

# A home is a home

*Veronica Simpson* finds vibrant interpretations of 'community' at the forefront of new models of care and architecture for the elderly

features as well as art to clarify layouts and facilitate effective, independent, daily functioning as well as relationships with the outdoors. At best they include care programmes that enhance identity, self-esteem, contentment and community.

The size and style of these communities is still a subject for intense debate and scrutiny however. The prevailing ideal is to break down large populations into smaller communities, where a meaningful 'home-like' existence can be facilitated through both the design

and care model. This 'household' model has been fairly widely adopted across the globe, with regional variations according to what governments or care providers can afford. There is a tendency to hold up as exemplary those countries that can afford much smaller units, such as Scandinavia or Japan.

David Hughes, senior partner with Pozzoni Architects, recently returned from a fact-finding trip focused on elderly care architecture, which took in Australia, Japan, Scandinavia and Holland, among other places. He was impressed by the massive investment in Japan, for example, in small nine-person 'group homes' – over the last 10 years, the Japanese government has built 10,000 of them. However, Hughes was concerned that the economics of running these nine-person homes was already proving to be unsustainable.

Professor Richard Fleming, director of the Dementia Training Study Centre at Australia's University of Wollongong, is more concerned about the impact on carers who might be required to manage the demands of nine very differently abled elders singlehandedly. He says: "One of my issues with the Japanese experiment is how they cope with end stages

of dementia within smaller communities, where [one member of] staff might be expected to cope with the physically fit elderly as well as people who are dying. When I've asked this question... the response I've been given is that, when it's done well, it's extremely successful. I'm told the group forms a family network and supports each other until they die."

But he's still concerned that where the resident group has not gelled in this way, it places a huge burden on the care team. Fleming was an early proponent of the smaller group homes, he says, until he read research conducted by Dr John Zeisel around 2004, which highlighted the risks that smaller units can present in terms of

Most readers of this magazine would agree that there is now a widely accepted model of enlightened architecture and care for the elderly that has been proven to substantially enrich the lives of those who are lucky enough to inhabit the spaces that adhere to its principles.

Thanks to 25 years of research and evangelising by, among others, the Dementia Services Development Centre at Scotland's Stirling University, the US's International Association of Homes and Services for the Ageing, and the work of visionaries such as Dr John Zeisel who has done much to clarify the neuropsychology of dementia as it relates to design and care, there are a growing number of exemplary schemes dotted around the globe. At the very least, these buildings offer a range of multisensory orientation and wayfinding tools, using design



Halton Township's long-term care facilities near Toronto are designed by Ark, and create a family environment to help reduce isolation

**The carers are more like 'house mothers' who cook, plan activities and manage care**





## De Hogeweyk, Weesp, Netherlands

Client: Hogewey (Vivium)

Architect: Molenaar&Bol&Van Dillen Architecten

Cost: □ 9.3m

Size: 15,310sqm (of which 7,702sqm is landscaping)

Schedule: First phase completed April 2008; second phase December 2009

Interior and landscape architect: Niek Roozen

limiting social interaction and opportunities for stimulation and engagement. The difficulty, therefore, is to balance the opportunities for the intimacy and support of a small, household 'family' while maintaining engagement with the wider world.

One of the most impressive such facilities to manage this balance is De Hogeweyk, a 152-person elderly community outside Amsterdam. Hughes visited De Hogeweyk on his worldwide research trip (the fruits of which will be written up in a book to be published by Wiley in 2011, co-authored by Australia's HammondCare director Stephen Judd, called *Designing for the Aged*). Planned over a 10-year period, working closely with Molenaar&Bol&VanDillen Architecten, De Hogeweyk is built as a small village of 23 six-person houses, where the carers are more like 'house mothers', who cook, plan activities and manage the care requirements of the residents.

"What was particularly excellent was the relationship of each of these communities to external spaces," says Hughes, who praises the unity of vision between the directors at Hogewey (the operators) and its architects.

Hogewey (now absorbed within the Vivium care home group, though pursuing its own independent vision) evolved its ideas of elderly and dementia care nearly 20 years ago, when operating out of a standard nursing home building, albeit with modifications. The normalising of the environment, access to outdoor space, and the inclusion of activities and facilities that will attract non-residents were crucial to Hogewey management, who cites Dutch Alzheimer Association research that suggests nursing home residents in the Netherlands usually go outside for an average of 96 seconds per day (thanks to design or safety/staff-imposed restrictions) and 60% of them never receive visitors. At De Hogeweyk, safe access to the outdoors has

## De Hogeweyk, Weesp, Netherlands

The vision that drove the plan for De Hogeweyk was the idea of 'normal living for elderly dementia sufferers'. Abandoning government prescriptions for care home dimensions, De Hogeweyk is planned as a village community of 23 'normal' houses for between six and seven residents (total number 152), with between 16.5sqm and 20sqm space for each bedroom, two 12sqm bathrooms in each house, a separate disabled access toilet, and living rooms of between 65 and 95sqm. There is maximum access to the outdoors – around 50% of the site is given over to garden and outdoor recreation space, with the building acting as a safe, enclosing boundary.

The care model has been fine-tuned to maximise quality of life, even if it means harder work or a complete rethinking of task structures by staff, who facilitate a range of activities (living, wellbeing and care), rather than focusing on one task. Residents are allocated to each household according to seven 'lifestyle' groupings (their relevance and legitimacy confirmed by consumer consultancy Motivaction), to maximise harmony and mutual interest. Their lifestyle requirements include when and where they like to eat (socially, privately) and how they like to order their day, as well as the value they place on hobbies and political, professional or religious interests. These 'communities of interest' have influenced both the population and the plan of each house: for example, access might be public (front door) or private (back), and dining facilities vary (around the kitchen table or in a chair in the lounge) according to how much interaction and social organisation each resident wants.

A café, supermarket, restaurant and meeting rooms are placed by the entrance, thereby lowering thresholds to neighbour or visitor use, while ensuring privacy for residents, to the rear.

The building was one of six care projects selected by a jury (from 112 possible schemes) for a Hedy d'Ancona prize in 2010, a new Dutch architecture prize for buildings that support the highest standards of care.



been achieved by placing garden and leisure space at the centre of the scheme, with the building forming a natural barrier around it. Although De Hogeweyk is government funded, £.5m worth of additional features (for example, ponds, benches, outdoor lighting) were financed publicly by a dedicated fundraiser from the parent organisation Vivium.

Going the extra mile to 'normalise' dwellings, both in terms of care concept and appearance, clearly pays dividends. The founders of the Belong elderly accommodation schemes (whose Wigan project featured in 'Designing for Dementia', *WHD* January 2010) recently opened a new scheme in Crewe, which, according to David Hughes, is so attractive that "even partners of those needing care want to live there" – surely the ultimate aim for those who wish to 'normalise' conditions. With households of between 11 and 13 residents, non-uniformed staff facilitate cooking, cleaning and leisure/craft activities in which the residents are able to involve themselves, if they wish, as part of an enlarged 'family'. Apartments

are available for married couples within the complex, with care provided, as needed, up until the point when one or other partner might need to move into a 'household'. Belong, says Hughes, is "like the Virgin brand of the care home world", revolutionising what is deemed to be acceptable, through its people-centred model. Inspired by the success of its three existing homes, seven more homes are being planned over the next few years.

Tracy Paine, operations director for CLS, which owns Belong, comments: "We are aiming to provide a home for life, whatever the physical or mental condition. We get an awful lot more family visits because people are happy to come and spend time in our households." Having high-quality bistros or cafes in the complex adds substantially to the appeal for visitors, she explains.

It is operators like Belong and Hogeweyk that, Hughes believes, give cause for optimism about the future of elderly care. He says: "I think we're moving in the right direction. There are definitely organisations out there that are trying to do something differently."

It is illustrative, however, of the underlying funding and political structure that Belong

At Belong Crewe, designed by Pozzoni, "even partners of those needing care want to live there"

can only operate as a private development, while De Hogeweyk is largely government-funded. Clearly the format has to adapt to the prevailing economics, but, where there's a will, this can still be done with vision and imagination, even in the most unforgiving health framework.

For example, Laguna Honda in San Francisco is an Anshen + Allen (now part of Stantec) project which opened in December 2010 (featured in 'Designed to Last', *WHD* July 2009). A long-term care facility for low-income patients, including the elderly and those suffering from dementia, it manifests a radically transformed model of care and architecture from that which has traditionally been offered in the US public sector. A massive population of 1,200 has been broken down into 20 neighbourhoods of four 15-bed households, achieving a sense of both community and privacy. The relationship to the outdoors, through views and access to outstanding recreational facilities, and activities is key, according to senior principal Sharon Woodworth. In addition to the 11 therapy gardens (including kitchen gardens whose produce will be harvested and cooked by residents), there is a basketball court, therapeutic pools and fitness centres. Furthermore, Woodworth praises the quality of art in interior and exterior spaces: around US\$3.9m was raised in art enrichment funds for a comprehensive art programme, enhancing the environment and assisting in wayfinding and therapeutic goals.

Clearly, the insights and evidence of the past few years have come to fruition in these schemes, but they are still far from the norm. For example, in the US, says RTKL principal David Spahr, there are still hugely outdated

**We are aiming to provide a home life, whatever the physical or mental condition**





**Las Vegas VA Medical Center,  
Las Vegas, Nevada, US**

Client: Department of Veterans Affairs

Architects: RTKL and JMA

Size: 825,000sq ft

No of beds: 90 acute care, 120 long-term care

Completion: September 2011

**Las Vegas VA Medical Center, Las Vegas, Nevada**

A joint venture between RTKL and JMA, this entirely new hospital in Las Vegas, Nevada has been developed for the Department of Veterans Affairs. It comprises a 90-bed acute care facility, more than 23 specialty care clinics, a 120-bed long-term care facility, and offices for the Veterans Benefits Administration. Services include inpatient and outpatient care, behavioural health programmes, surgery, oncology, gastroenterology and adult day care.

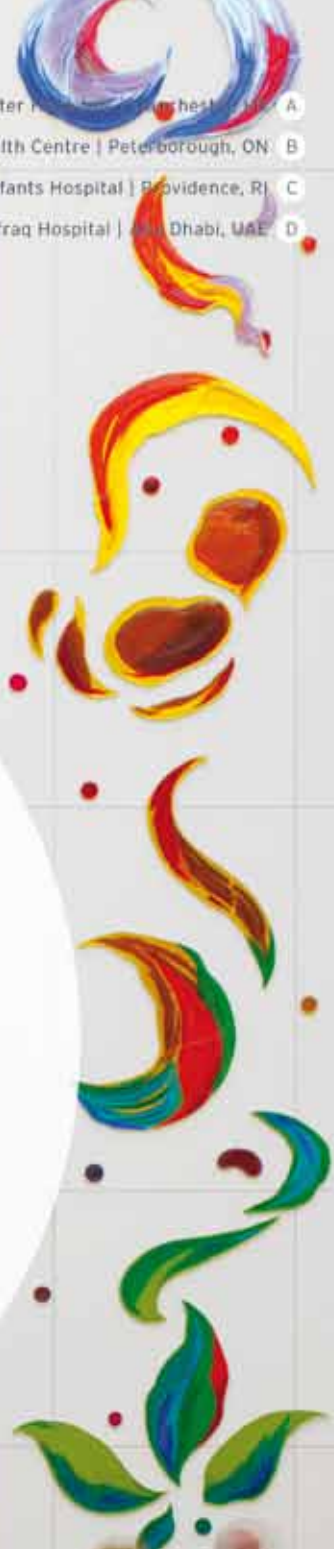
The 120-bed long-term care facility is designed to serve both senior and younger veterans with critical and long-term health problems. It is situated in its own discrete block, adjacent to the emergency department on level one and the mental health clinic on levels one and two. What was planned as a traditional 'nursing home' has been transformed from the initial brief into a 'community living centre', with clusters of 10 private bedrooms centred around their own living area.

This block is designed with maximum legibility and wayfinding cues, including contrasting wall and floor surfaces, lighting, colour and icons to identify each space. Each room is positioned to have a direct view to outdoor, landscaped, green spaces. "Each community has its own balcony or patio area that they can access directly," says Spahr.





Central Manchester | Manchester, UK | A  
Peterborough Regional Health Centre | Peterborough, ON | B  
Women and Infants Hospital | Providence, RI | C  
Al Mafraq Hospital | Abu Dhabi, UAE | D



## STANTEC ANSHEN+ALLEN & BURT, HILL TOGETHER

Three firms united as one  
to create a whole  
that is greater than the sum of its parts.

The combined strengths of our healthcare teams, our global expertise, and commitment to innovation will allow us to advance our shared mission to foster excellence in healthcare design. As one of the largest international healthcare design firms we will provide leadership in design, sustainability and research. With renewed vigour we will strive to deliver projects of significance and worldwide impact.







 **Stantec** ANSHEN+ALLEN BURT, HILL

One Team. Infinite Solutions.

### Victoria Heights, New Westminster, British Columbia, Canada

A glowing example of what thoughtful design and high standards of care can achieve without enormous budgets, Victoria Heights is a sustainable housing community which combines provision for assisted living and long-term care, as well as a day nursery, clinical and other facilities (hair and beauty salon, library, restaurant), open to residents and non-residents alike, knitting the surrounding urban neighbourhood into its social structure.

Stantec provided full architectural and engineering services, aiming to meet the agenda for the developer, BC Housing, to create the ultimate in budget-conscious sustainable housing as well as the demands for Good Samaritan Canada to provide an excellent standard of care to an ageing community without the wherewithal to pay for expensive private luxury care homes.

The footprint of each of the 59 one-bedroom apartments is small, at 650sq ft, but almost every flat looks onto surrounding greenery or onto the nearby Fraser River. Bedrooms, kitchens and bathrooms are designed for wheelchair and limited mobility so that residents can age in place.

As much natural daylight as possible is factored into the design, including a central dining space on the top floor, with an atrium roof.

One of the first of its kind to achieve LEED Certification, it includes a thermal labyrinth, high-efficiency boilers, fresh air ducted directly into the apartments with continuous bathroom exhaust routed to back rooftop HRV units, oversized opening windows with low-e argon-filled glazing units, solar shading, reduced construction waste, low VOC paints and adhesives.



### Victoria Heights, New Westminster, British Columbia, Canada

Client: Good Samaritan Canada

Architect: Stantec

Cost: C\$15,125,000

Size: 92,302sq ft

Completed: 2008





notions of what is acceptable elderly care. RTKL recently completed a facility for the Veterans Administration in Las Vegas, where a traditional 'nursing home' had been designed for senior and long-term care residents (a multi-bed ward with a large, centralised nursing station). Thankfully, due to RTKL's efforts and the support of enlightened management personnel, the scheme was changed to a more sympathetic, 'household' model, now called a 'community living centre', with clusters of 10 private bedrooms centred around their own living area (see case study). Spahr says: "There has been a major attitude shift in long-term care, particularly in the US but across the world. It's that these people are individuals and they are in various stages of needing assistance."

Gearing accommodation to meet the needs of the elderly has been the focus of ARK for over five decades. Workshops and consultations with the elderly and their families revealed that alienation, loneliness and isolation are their greatest concerns; the sound of children's voices was cited as the element most missed by residents in homes for the aged. So ARK incorporated a childcare facility into the long-term care facilities it designed for Halton Township near Toronto. "Embraced by both age groups, the children have built-in 'grandparents' for storytelling, holiday parties and performances; the elderly have a reason and purpose to their day and live in a place which represents the full spectrum of life, addressing their fears of alienation, loneliness and isolation."

Bearing in mind that any of the developments featured here may have been planned as much as 10 years ago, and are therefore products of the prevailing politics and budgets of that time, it's hard to say whether momentum will continue for the realisation of this ethos through similar care communities.

Striking a worrying note at the International Academy for Design and Health's 'Elderly Care by Design' conference in spring 2010, Dr Jane Hendy of Imperial College London waxed lyrical about the model of telecare in the home that was being proposed by the then UK government. Already in place for heart patients and diabetes sufferers, this telecare system will ultimately see the mentally frail elderly 'maintained' in their own homes with seemingly little more than webcam assistance from remote carers, as and when they master the technology sufficiently to operate them. At the same conference, Maria Parsons, a dementia care specialist, made this gloomy prediction for the UK: "Something in the region of 20% of people with dementia currently going into residential care won't be doing that in five years time. They will be assisted in the home. We won't be building residential care but hospice care for people in the final stages."

**The sound of children's voices was cited as the element most missed by residents**

Fleming also warns against assuming that the views of the enlightened are widely shared. "Looking at the Australian experience, I'm more pessimistic than I was a few years ago. In the 1990s there was a buzz and an energy, but I'm sad to say that in the last few years we seem to be following in the UK's path – providing environments that are striking at the point of entry and designed to impress the economic buyer (usually the relatives) but not designed to foster a full and rich life for the residents.

"The task really is one of knowledge translation. Put the information into the hands of the directors and managers who have a decent philosophy. You've got to get the information to the architects. But perhaps most of all, we have to get the information to the consumer."

While conferences among like-minded professionals are useful, he says, they are preaching to the converted. It's the general public, as end consumers, that needs to be informed, and helped to drive progress in the right direction. And for the nursing, psychiatric and architectural professions he advocates integrating dementia design and care modules into the curriculum.

"If you can put across these things to an undergraduate, they become part of their world view. Dementia is so prevalent that when people are designing for old people in any context they should be aware of the work that has been done to facilitate the best quality of life through design and care," Fleming says.

**Veronica Simpson is an architectural writer**



A home-like environment at Belong Crewe, designed by Pozzoni

# ELDERLY CARE BY DESIGN 2011

Designing environments  
for independent living



19 April 2011  
ARUP, London, UK

Childers Place, Texas, US, by Perkins Eastman

[www.designandhealth.com](http://www.designandhealth.com)



Belong Wigan centre, UK, by Pozzoni Architects



Victoria Heights, British Columbia, Canada, by Stantec



A Halton Township long term care facility, Canada, by Ark

An international symposium organised by

**Design & Health**  
International Academy for Design and Health

Supported by:

**ARUP**



**helen hamlyn centre**

Media partner

**WORLD HEALTH DESIGN**  
ARCHITECTURE | CULTURE | TECHNOLOGY



Following last year's success of Elderly Care by Design 2011, international experts in the fields of design and health will join together again to bring a new global perspective on how the design of environments for older people can support independent living, health and wellbeing

# The world grows grey

The world's population is set to increase by one third over the next 40 years, from 6.9 to 9.1 billion, but the demographic profile of our future world will be of a very different kind. In a recent report by *Foreign Policy* magazine, the world will be shaped not by plummeting birth rates, but by a huge increase in the number of elderly people. The global population of children under 5 is expected to fall by 49 million by 2050, whilst the number of people over 60 will rise by 1.2 billion.

With elderly populations around the world growing at such a rapid rate, simultaneously, attitudes and perspectives on ageing are changing.

A health conscious and well-educated generation with new and different points of reference is emerging. More prosperous societies are also creating opportunities for seniors to lead an active and rich life far into old age. This development is creating a demand for changes both in health and social care service delivery and in the design of physical environments for the elderly.

Incidences of dementia and related diseases are expected to rise to over one million in the UK in the next ten years. People with dementia progressively lose their coping abilities and perceive their environment as more stressful, resulting in anxiety and behavioural

syndromes that require constant supervision. If the environment fails to support their needs, the person may become disorientated, be unable to express their needs and show signs of agitated and disruptive behaviour.

Evidence shows that problematic behaviour in people with dementia is strongly related to the degree to which residential environments fulfil their needs. Treatments are needed to sustain their retained abilities and to reduce problems such as verbal and behavioural agitation, depression, and social withdrawal.

A combination of pharmacologic, behavioural, and environmental approaches could be the most effective treatment in improving health, behaviour, and quality of life for the elderly. Good design can have a therapeutic effect on the behaviour and quality of life for people with dementia.

Supported by Arup and the Helen Hamlyn Centre, Royal College of Arts, we invite you to join us at Elderly Care by Design 2011 on 19 April in London, to examine how investment in the design of environments for older people, from hospitals to residential facilities, nursing homes and facilities for the end of life, can support independent living, health and wellbeing.



HammondCare Horsley, Australia features six single storey timber frame cottages designed to a domestic scale

## Elderly Care by Design:

An international symposium  
Arup, London, 19 April, 2011

Elderly Care by Design 2011 is an international symposium organised by the International Academy for Design & Health that aims to explore how the design of environments for older people can support independent living, health and wellbeing

- Exploring how the built environment can support the delivery of high-quality, integrated health and social care services that support independence and promote good health
- Identifying the key design features of psychosocially-supportive environments for older people
- Reporting on international case studies of environments for older people that are delivering real and measurable benefits
- Identifying new technologies to support independent living
- Addressing issues of capital investment, service improvement, changing care pathways, cleanliness, social isolation, access to outdoors and nature, comfort and control, privacy and dignity, independent living, interiors, art and furnishings



Keynote speakers will include (L-R): John Cooper, John Cooper Architecture (UK), Dr John Zeisel, Hearthstone Alzheimer Care (USA), Damian Utton, Pozzoni Architects (UK), Prof Alan Dilani (Sweden)

## Round the curve

Fu Jen Catholic University has selected HKS, as design architect, along with TY Architects, as architect of record, to design the new Fu-Jen Catholic University Hospital in Taipei County, Taiwan. The 98,000sqm facility will become the new teaching hospital for the university's medical school, connected by an overhead bridge. "The building's design creates a memorable, recognisable identity for the hospital and school campus," says Alex Ling, senior designer with HKS. "The cross, integrated into the building's form, marks the terminus of the existing campus mall and celebrates the Catholic roots of the organisation. The sweeping, curved roof caps house energy-efficient solar collector panels, which contribute to the building's potential LEED silver level energy efficiency rating." The building also incorporates green roof gardens, interior gardens within designated waiting areas, exterior sun shading devices and low-E insulated glass. The project is due to complete in late 2014.



## In recovery

Glasgow's New Stobhill Hospital is an ambulatory care hospital which has been acclaimed for its clear, understandable layout and bright, calm, uplifting spaces, winning an International Academy Award in 2010. During construction, Reich and Hall was commissioned to design an extension for the hospital, comprising a 48-bed rehabilitation unit, a small education/seminar area, an additional outpatient clinic and a 12-bed, 23-hour day surgery support unit. As patients may stay in the building for weeks, the focus of the rehabilitation wards is on improving the experience of living in the building. Each bedroom has a window bay providing a view outside from the bed. Dayrooms are partially open to circulation to encourage social interaction, with views outside and natural timber finishes. In addition, corridor walls are used as a gallery from which patients can choose art for their own room.

## All wrapped up

The redevelopment of the £170m Walsall Manor Hospital in the West Midlands, UK, completed in late 2010, has provided the city of Walsall with a 21st century health campus with greater capacity and flexibility. Steffian Bradley Architects worked in collaboration with Skanska to create a facility based around a design philosophy of ribbons enveloping the existing estate – and concluding at the façade to create lanterns and emphasise the entrance in a dynamic timber nose. The building is organised around the entrance space from which all outpatient departmental entrances and waiting spaces are reached, highlighted and differentiated by colour, artwork and lighting. The facility also uses an innovative, number-based system for wayfinding – the first hospital in the UK to do so.







## Collaborative research

The new 12-storey, 440,000sq ft Methodist Hospital Research Institute on Texas Medical Center's north campus is a translational research facility designed to advance the study of diseases including cancer, heart and neurological diseases. Designed by Kohn Pederson Fox Architects (KPF) in collaboration with executive architect WHR Architects, the facility contains six floors of open research space and as well as a full complement of highly advanced core facilities, including a full imaging and molecular imaging suite and its own cyclotron. The objective of the design was to create a research facility that was clearly collaborative. "With the building design, we sought to provide well-designed, flexible labs, along with a range of gathering spaces for the hospital and research community," says KPF design principal Jill Lerner. "The architecture creates a dramatic presence along Bertner Avenue, with its curved façade, presenting a welcoming entry to the institute at the heart of the Texas Medical Center."



## Free parking

Latino Health Access Community Center and Park in Santa Ana will provide space for healthy community activities in one of the poorest areas of California. Working on the project with Latino Health Access (LHA) are healthcare architecture firm Taylor and the design/build team of McCarthy Building Companies. The park will include both recreational and educational space for free or low-cost health and educational programming provided by LHA and collaborating partners. The 2,500sq ft community centre has been designed to reflect the community it will serve. Multicoloured tiles help to define the entry lobby and the outdoor gathering space, the bright mix of colours serving as a visual metaphor for the diversity of the community. The building also contains many environmentally sustainable features with locally sourced and/or recycled materials, deep roof eaves and thermally efficient clerestory windows.



## River of light

The new acute care pavilion at the Rady Children's Hospital has brought a wealth of colour, light-hearted artwork and beauty to an important San Diego landmark. A collaborative effort between design firm Aesthetics, Anshen + Allen Architects and McCarthy Building Companies, the Pavilion is infused with mosaics, paintings, sculpture and murals by artists from San Diego County including floor inlays, ceiling paintings and custom, child-friendly sculpture throughout the building interiors, centred around the building's 'river of light' theme. "We looked at every corridor at Rady, every waiting room, every treatment room, every rest room, as an opportunity to light up a child's eyes and support his or her healing journey," says Aesthetics CEO Annette Ridenour. The new pavilion opened in October 2010.



The



The Window of Choice for Healthcare  
(Now being installed in Queensland, Australia)



## International Award Winners and Worldwide Distributors

### Safe and Secure

Britplas have installed over 10,000 Safevent® Windows on over 150 projects across the U.K. The windows simple design, bellies its strength and ensures very low maintenance (self cleaning glass). Tried and tested by trusts, is anti-ligature, anti-bacterial and prevents the passing of contraband. The window is multi award winning in the mental health environment.

#### • Safevent Windows

• Casements

• Door Systems

• Curtain Walling

• Aluminium, uPVC, Timber

• Many glazing options

• Timely and professional installations

• Approved by architects and contractors

### Environmentally Friendly

The Safevent® provides very high levels of natural ventilation (over coming the 100mm restrictions) without compromising safety and security. The variety of glazing options ensures all environmental performance levels (heat loss and gain) are achieved. 100% recyclable in aluminium, uPVC or timber frames.



## Britplas are pioneers, innovators and market leaders in healthcare fenestration

Providing pioneering solutions for the healthcare market. From bespoke design and guaranteed manufacturing quality through to timely and professional installations and ongoing maintenance services, Britplas have gained a reputation for excellence within this testing environment.

### Britplas Commercial Windows

Unit 2, Winstanley Industrial Estate, Warrington, U.K, WA2 8PR

**T** +44 (0) 1925 577801 [www.britplas.com](http://www.britplas.com) **E** [office@britplas.com](mailto:office@britplas.com)



# Map of light

The Zumtobel 'Map of Light' application has recently been added to Apple's iTunes store. The Map of Light app provides information on and impressions of more than 500 of Zumtobel's architectural projects and lighting solutions across the globe. It is a unique tool that provides access to current projects at any time – listed either according to application or according to the distance from the user's current location. To narrow down the search, one of Zumtobel's 10 application areas, ranging from art and culture to offices and communication or presentation and retail, can be selected. Another function allows searching for specific products or systems. Projects will be called up as pdf files and can be sent to business partners at any time using the forwarding function. A detailed picture gallery enables a realistic impression of projects. In addition, the 'around me' function can be used to locate projects in the immediate vicinity – including project details and address. You can also use the links to the products used in these projects to obtain further details and possible solutions. Using the 'favourites' function, the most interesting projects can be stored and called up at any time. The application also provides information about Zumtobel's latest products, from LED luminaires, spotlights and downlights to lighting management systems and emergency luminaires. The Zumtobel app is available in five languages: English, German, French, Italian and Dutch. As an additional service, the app provides addresses of Zumtobel contacts all over the world.

**[www.zumtobel.com](http://www.zumtobel.com)**



## In 3D

TruTops Visual 3D software allows time- and cost-efficient planning of operating theatres and intensive care units. It is graphic, quick and highly flexible and ensures that workflow is optimised right from the start of the process, helping the design team to use space to the best advantage, ensure the most ergonomic placement of equipment, identify bottlenecks and avoid planning errors. The software can also call in accessories from other manufacturers such as C-arms, infusion stands or anaesthesia equipment, and they can be easily imported. In addition, the program can insert virtual surgeons and nursing staff to create realistic work situations, allowing the consultant to get a good appreciation of workspace ergonomics and determine the ideal range of pendant arms needed for different procedures. The final 3D configuration is compatible with all major architectural and engineering CAD programs. "Every object can be displayed from any angle, placed anywhere, moved, adjusted and turned in real time until the best position and configuration is found." There's no time-wasting rendering involved," says Trumpf architect Luigi Cesca.

**[www.uk.trumpf-med.com](http://www.uk.trumpf-med.com)**

## Fence me in

Another innovative solution from Britplas, suppliers of the award-winning Safevent window system, the Safevent Security Fencing System, has been designed specifically for the sensitive care environment. The Safevent cloaking is designed to fit existing traditional fencing or can be erected from new, incorporating safe and secure gate systems. Strong, weatherproof, antiligature and anti-climb, providing privacy and preventing the passing of contraband, the fencing now comes with the option of large detailed print work designs that help create stimulating as well as secure environments. Suitable for most terrains and at any height, the fencing is available in any RAL colour, is easily cleaned and maintenance free.

**[www.britplas.com](http://www.britplas.com)**





Roseberry Park  
Design & Health International  
Academy Awards 2010



[www.medical-architecture.com](http://www.medical-architecture.com)

medical architecture

STRATEGIC CONCEPTS MASTERPLANNING HEALTHCARE DESIGN



## Design & Health Scientific Review

# The culture wars: to use the evidence or not?



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

Shepley and Watson ask: should evidence-based designers carry out the research to gather the evidence they need to design? One answer is: as long as their research presentations are transparent enough for others to assess quality, why not? If evidence-based research is to be truly embraced, architects, psychologists, sociologists, interior designers, landscape architects and planners all need to be involved. Limiting who can carry it out only limits implementation. As Jacqueline Vischer and I pointed out in the July 2008 issue of this journal (pp57-61), evidence-based

design is partly defined by the fact that designers who use the evidence decide what evidence they need, putting to rest the negative connotation of outsider judgment. Doctors use available research and evidence in making most decisions these days. Why would they, and why would architects want false or distorted information on which to base their decisions?

What is really needed is culture change among 'practitioner organisations' like the American Institute of Architects (AIA), the American Society of Interior Designers (ASID), the American Society of Landscape Architects (ASLA) and others throughout the world. If research in design is a 'social responsibility', these groups need to include in their culture – in all their contracts, conferences and client conversations – the reality that research is necessary to make good evidence-based design decisions. Only when the culture of the professions changes by setting standards for evidence-based design research, including a standard contract for carrying out research, will the evidence-based design movement flourish.

Hobday and Cason's article also ends with an implicit demand for culture change – one that emphasises nonpharmacological health interventions. They argue that all evidence points to not only fresh air but also other nonpharmacological interventions such as sunlight, scrupulous hygiene and reusable face masks as requirements for environmental treatment if a major global flu pandemic should present itself.

They imply that tents rather than buildings ought to be considered for emergency hospital expansion, not to save money but to provide fresh (rather than conditioned) air – a different way of thinking.

Whatever the evidence and whoever gathers it, only when research and design are carried out together do high-quality usable buildings (or tents) emerge that meet their users' health needs. To achieve this, the culture of the design professions must demand training to carry out research for evidence in design, contract documents that identify costs and standards for evidence-gathering research, and client access to this research so they can assess and see the wonderful job designers are doing to meet their needs.



64-71

### Practitioner-focused Facility Evaluation:

#### Design firm research on in-house projects

Mardelle M Shepley, BA, MA, MArch, DArch, AIA, ACHA (pictured left), Angela Watson, AIA, LEED AP



73-81

### Planning for Pandemics:

#### The open-air treatment of pandemic influenza

Richard A. Hobday, PhD (pictured left), John W Cason, PhD

## Practitioner-focused Facility Evaluation: Design firm research on in-house projects

This study looks at the benefits of conducting practitioner-focused facility evaluations and discusses the types of evaluations design firms can implement to obtain valid, objective results

*Mardelle M Shepley, BA, MA, MArch, DArch, AIA, ACHA, Angela Watson, AIA, LEED AP*

Practitioners and academics have questioned whether architectural firms are capable of conducting sophisticated facility evaluations. The primary objections to in-house assessment research have focused on: 1) the perceived inability of firms to maintain their objectivity when reviewing their own projects, and 2) the limited research skills of traditional professional staff. However, our perceptions of the role we play in generating new knowledge are shifting and the skill sets we employ as practitioners are expanding. In

light of this systemic evolution, this paper provides support for the notion that firms that implement evidence-based design (EBD) principles are fully competent to assess the effectiveness of their built work.

The following discussion begins by presenting a case justifying the appropriateness of evaluation research in professional practice. These practitioner-focused facility evaluations have the potential to serve as the core of knowledge-based design within design firms. Practitioner-focused facility evaluation (PFE) is the "practice-integrated analysis of the effectiveness of the physical environment relative to the needs of users with the

specific intention of understanding design outcomes and informing future design projects". A discussion of PFE naturally includes the relationship of this method to evidence-based design. PFEs are a type of research that readily supports EBD in that the results provide direct input into design decisions. PFEs can take place prior to the completion of a new facility (by evaluating the existing/predecessor facility) or after the new facility has been occupied. Ideally, researchers conduct both pre- and post-studies, as they provide information for the purposes of comparison. A pre-evaluation, when conducted in the early stages of programming can provide information for the current project. A post-evaluation can provide data for the future design of the facility-in-progress as well as for facilities in the future.

The second half of this paper discusses the type of PFEs that can be conducted within design firms and some of the benefits associated with this type of research. The document concludes with a discussion of the role of a standardised PFE survey and the relationship of that tool to objective, credible research. A standardised PFE is critical if a firm is attempting to conduct inexpensive, yet valid, building evaluation studies.

### Maintaining objectivity

Some have argued that evaluation research can only be objective if it is done in academic settings. However, academicians are also subject to bias. Admittedly, while the desire on the part of marketing staff, legal advisors and contributing designers to have positive outcomes is strong, the inclination to have results that support one's hypotheses is also compelling. In the case of academic research, data mining (detailed inspections of the data to determine patterns) may lend unbalanced support to the hypothesised outcomes.

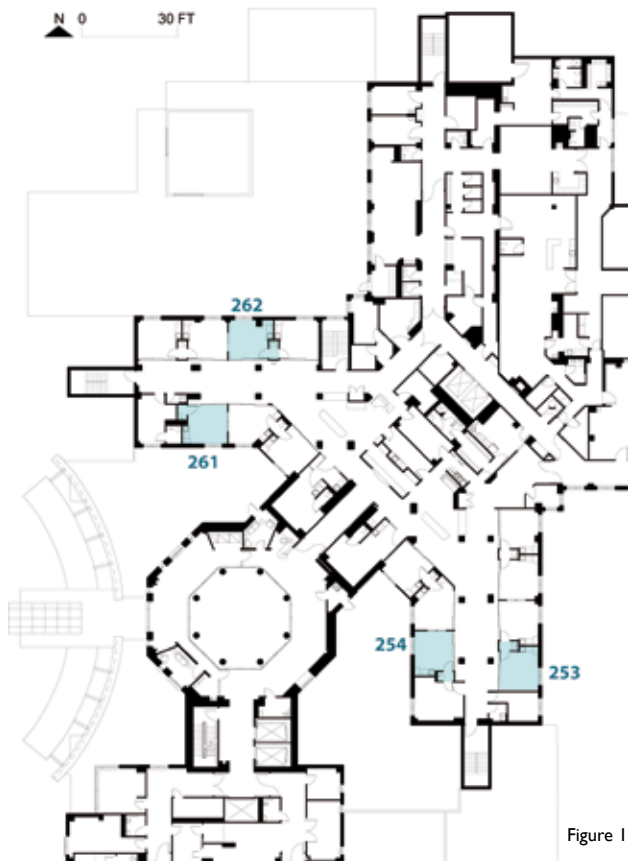


Figure 1: Old Concord Hospital ICU



Academics are aware of this potential for partiality and generate protocols for reducing it. These protocols include the identification of hypotheses and selection of statistical tests prior to data collection. As with academics, design firms can put protocols in place to assure that objectivity is maintained. There are three steps that will help firms maintain their objectivity:

1. Select individuals who did not participate in the design process to conduct the research. These researchers could be other staff members, a firm's design research director or individuals from outside the firm. Individuals from outside the firm could include students, representatives from other firms, staff from the facility under review or professional research organisations.

2. Work with a standardised evaluation protocol. If a firm develops a boilerplate survey format for conducting evaluations, employing this tool for all projects will help limit manipulation in support of desired outcomes.

3. Set the hypotheses during the programming phase. This is the most effective gesture toward maintaining objectivity. If the design/research goals (which are the equivalent of the hypotheses) are clearly expressed when the project is initiated and the firm commits to maintaining these goals, then objectivity is more likely.

**In-house expertise**

The number of architecture firms with research directors and staff has grown from a few a decade ago to dozens in 2010. In a recent survey of research staff in healthcare design firms, Hamilton, Peavey and Pentecost<sup>2</sup> noted that 53% of the respondents (N=17) had doctoral degrees in architecture, psychology, nursing, or marketing. According to the *Guide to Architectural Schools*<sup>3,4</sup>, the number of doctoral programmes (PhD in Architecture and DArch) increased from 22 in 2003 to 26 in 2008. Anecdotally, at Texas A&M University, it is increasingly common for doctoral students to return to practice rather than remaining in academia. All of this data suggests that the pool of individuals who are competent to enhance research in firms has grown.

For firms that cannot afford to have full-time researchers, alliances with universities are readily available. Universities in the USA with recent or incipient health-



Figure 2: New Concord Hospital ICU

related programmes include: Arizona State, Ball State University, Clemson University, Georgia Tech, Texas A&M University, Texas Tech University, University of Illinois, University of Kansas, University of Southern California, University of Texas Arlington, University of Texas San Antonio, University of Washington, University of Wisconsin and University of Detroit Mercy.

**Types of evaluation studies**

One of the motivations for conducting PFEs is linked to the uniqueness of healthcare facility assessments. Healthcare facility evaluations differ from the evaluations of other typologies stemming from the critical

nature of the data regarding:

- the impact on patients who may be frail and particularly susceptible to the physical environment;
  - the impact on staff and their ability to provide optimal care for patients;
  - the size and use complexity of facilities, particularly hospitals;
  - the impact of the results on public policy decisions; and
  - the potentially diverse objectives of stakeholders (system representatives, physicians, nurses, administrators, clerical staff, maintenance staff, patients, families and community members).
- The complexity of these environments

# We shape a better world



Medicover Hospital, Warsaw, Poland



Ysbyty Aneurin Bevan, Blaenau Gwent, UK



Kaiser Medical Center, California, USA



Richard Desmond Children's Eye Centre, London, UK



Tseung Kwan O Hospital, Hong Kong, China



Princess Alexandra Hospital, Brisbane, Australia

Whether we are creating comfortable environments, flexible integrated building solutions or sustainable business packages, Arup adds value to our global healthcare clients while ensuring a high level of quality on which they can rely.



contributes to the circumstance that there are multiple types of evaluations.

Among the multiple permutations of health facility evaluations are: 1) triangulated studies, 2) pre/post-occupancy studies, 3) programming-integrated evaluations, 4) extensive case studies and 5) multiple-site studies. The following section of this paper addresses examples of each of these study types, all of which were either conducted with the collaboration of practitioners or are so clearly structured that they could be replicated within a firm.

Examples of the first three of these study typologies (triangulated, pre/post, and programming) are: an ICU evaluation, a clinic study and an entry study. All three were conducted by a firm with an in-house research consultant. The example of the fourth study type (extensive case study) is a paediatric hospital and was undertaken by an academic organisation, but the design firm was intimately involved with the process. The last study type (multiple sites) is a hospital garden study and was conducted by academics who were sponsored by a health design research organisation, but is structured in such a way that the same tools could be employed by a firm wishing to conduct similar studies on its own garden projects.

**Triangulated studies.** Triangulated studies are PFEs that employ multiple methods in the data gathering process. A typical method

triad would be the combination of interview, survey and behaviour mapping techniques. Hospital records are another source of data that is often used in combination with other methods. The benefit of hospital records is that they are a ready source of longitudinal data. The Concord Hospital ICU study (see Figures 1 and 2) incorporated all four of these techniques: interviews, questionnaires, behaviour mapping and hospital records. The main objective of the study was to evaluate the impact of increased light levels and window views on staff attrition, sick leave and medical errors, and on patient length of stay and pain. A standard post-occupancy evaluation was also conducted as part of the process and, as such, is an example of both triangulated and pre- and post-occupancy evaluation.

Data was gathered in 2008 and 2009. Although there was no significant difference in patient pain levels between the new and old units, a significant relationship was found between pain perception and light levels regardless of the patient ICU. Staff attrition was statistically less in the new ICU and discretionary staff absenteeism in the new unit was 25% less. Researchers found a decrease in error filings in the new unit, although the difference was not statistically significant<sup>5</sup>.

This research project was conducted by a design firm that employed a research consultant, in collaboration with a

hospital vice president for facilities and an ICU physician.

**Pre- and post-evaluation studies.** The North Shore Hospital PFE (Figures 3 and 4) is an example of a pre- and post-occupancy evaluation process involving a single methodology – a survey. In this study (currently in progress), infusion suite staff are being asked to evaluate their experiences in their previous facility as well as their current facility. While ideally the evaluations would be more effective if the pre-evaluation had occurred while the space was occupied a year ago, the results will still be useful. Additionally, it is hoped that staff will be more consistent in their understanding of individual questions as the time between the two questionnaires will be minimal, increasing the reliability of the survey tool and resulting data.

**Programming-integrated evaluations.** When surveyed, most architects describe programming as a research activity because it involves interviews. In contrast, most researchers would not characterise interviews that take place during programming as research unless the process was highly structured and the results statistically analysed. However, there are legitimate occasions in the programming process during which a particularly thorny issue will arise that calls for a brief, well-crafted survey. The North Shore Hospital valet/entrance study programming sessions involved such a situation. The interview process revealed conflicting opinions regarding whether patients would utilise a valet service, and whether cancer patients would prefer a dedicated entrance that separated them from others entering the facility. To resolve the different perspectives, a two-page survey was crafted that was distributed to patients in the waiting rooms. The results (the valet system and shared entrance were preferred) were used to inform the design for the new hospital.

**Evaluation case studies.** Apart from Canter's study of the Royal Children's Hospital in the early 1970s<sup>6</sup>, the Hasbro Children's Hospital evaluation is the most comprehensive post-occupancy evaluation ever done at a children's hospital. Conducted by the Children's Environments Research Group at City University of New York<sup>7</sup>, researchers developed interview guidelines based on previous studies and input from architects Shepley Bulfinch, and



Figure 3: Old infusion suite

T R I B A L



**Tribal** can help you plan your way to a better future.

Our multi-disciplinary health planners employ **specialist knowledge** of planning and design, along with their **extensive experience** of managing health services and facilities, to help clients world-wide.

Our service delivery, advisory, and technology solutions are helping achieve **better healthcare** for all.

For further information please contact:

Craig Dixon, Director

T: +44 (0)7753 916 648

E: [craig.dixon@tribalgroup.com](mailto:craig.dixon@tribalgroup.com)

[www.tribalgroup.com](http://www.tribalgroup.com)



spent a week interviewing patients, parents and staff. As a result of these interviews, approximately 50 different questionnaires were developed for every patient care unit and every type of user. Approximately 450 questionnaires were returned. Respondents reported that the facility provided a family-centred environment and more than half felt the ambiance was stress-reducing. Staff were most critical in their opinions, with the lowest ratings coming from inpatient units, due primarily to the new nursing pod system. Patients and their parents tended to rate the facility most highly (see Figure 5). On a scale of 1-12, patients rated the hospital 10.8, parents rated it 11.3, nurses rated it 7.2 and doctors rated it 9.4.

**Multiple-site studies.** The Cooper Marcus and Barnes<sup>8</sup> hospital garden research project is a well-documented multiple-site study. The researchers surveyed four hospital gardens in detail using interview (N=143), behavioural observation and visual physical analysis techniques (design documentation, circulation patterns, views, microclimate, sensory qualities, opportunities for social interaction, opportunities for privacy and aesthetics). More observations were conducted at 13 additional sites. Eight hours of observations (2,140 data points) at each of the four main sites revealed patterns of traffic, activity, gender/age and user (patient, staff, visitor). Among other conclusions, Cooper Marcus and Barnes determined that 50% of respondents used the gardens one or more times daily. Relaxation was the primary motive for using the space (see Figure 6).

**Cultural and facility evaluation.** Several factors influence the integration of research into private practice, including: 1) the cultures of professional organisations, 2) firm culture and 3) the evaluation team. These three factors set the context for a range of benefits and impediments associated with evaluation studies.

Regarding research organisations, access to groups such as the Environmental Design Research Association (EDRA) is helpful regarding networking. Like EDRA, there are several academically affiliated organisations that have long supported building evaluations. However, concerning practitioner organisations, while most support the notion of PFEs, few have incorporated them structurally



Figure 4: New infusion suite

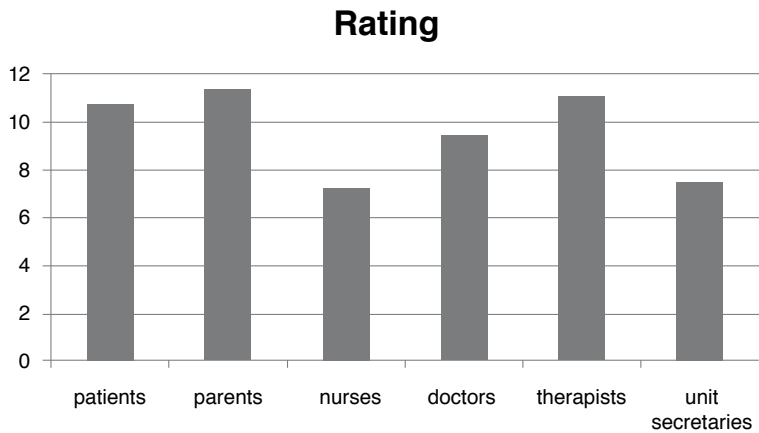


Figure 5: Hasbro Children's Hospital ratings

or operationally. For example, while the American Institute of Architects has addressed evaluations in its publications for at least 35 years (for example, Connell & Ostrander<sup>9</sup>), the organisation lacks contract documents that specifically address PFEs. Form B727-1988, the Standard Form of Agreement Between Owner and Architect for Special Services, and form C727-1992, the Standard Form of Agreement Between Architect and Consultant for Special Services, are not explicit with regard to the task of evaluation.

Regarding firm culture, the research

process is subject to attitudes towards inclusiveness, communication and objectivity. Inclusiveness refers to the degree to which a range of building users are surveyed as part of the evaluation process. Different firms have different attitudes regarding whom their research should include. Sometimes the evaluations are limited to administrators. A more effective evaluation will also include medical staff, maintenance staff, community members, patients and families, to name a few.

Communication addresses the degree to which a firm is willing to share the results of

HEALTHCARE

BUILDINGS

INDUSTRY

INFRA

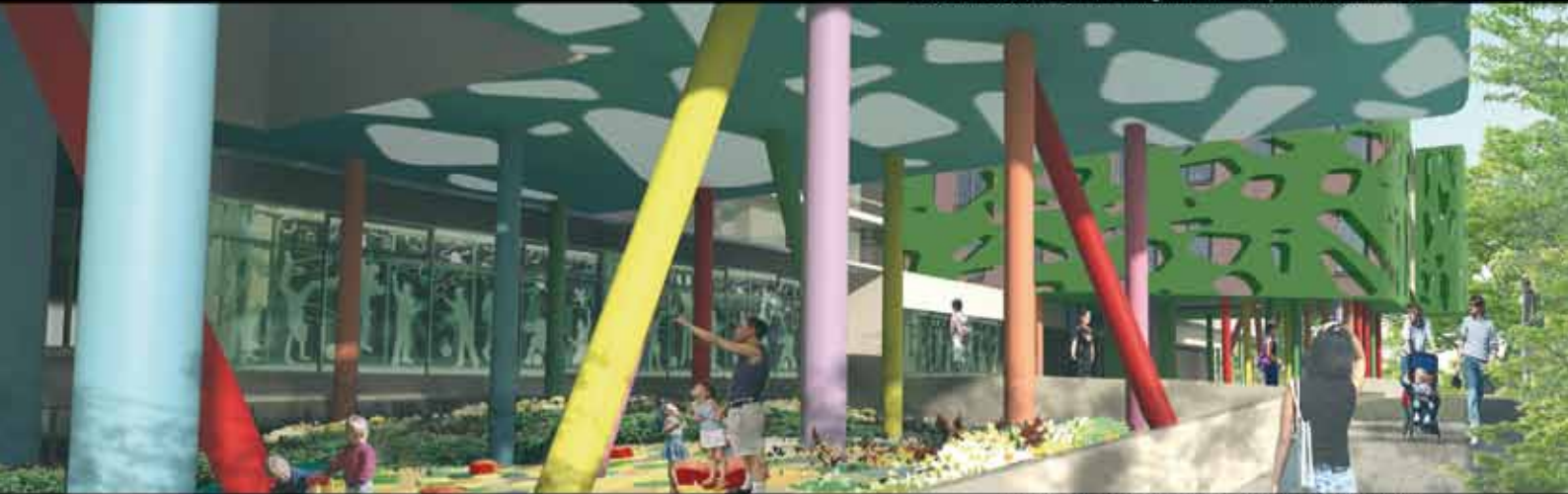


[www.vkgroup.be](http://www.vkgroup.be)

Value by design



MILITARY HOSPITAL In Brussels, Belgium European Reference Center for Burns treatment



PEDIATRIC HOSPITAL In Nha Trang, Vietnam competition won winter '09



AZ SINT-JAN HOSPITAL In Bruges, Belgium General Hospital



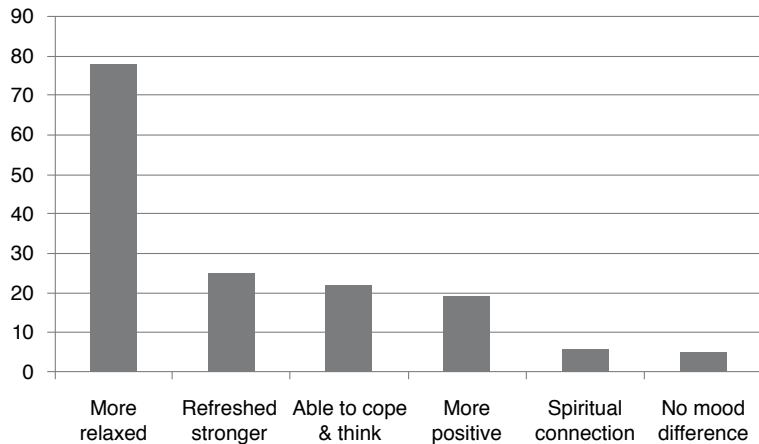


Figure 6: Percent of subjects reporting mood various mood changes (derived from Cooper Marcus & Barnes<sup>9</sup>)

its research. For some firms, the information is restricted to the firm or for team members only. Other firms are willing to publish the results and share the knowledge with the larger design community.

Objectivity refers to the degree to which a firm is willing to involve individuals outside of the design team in the development and analysis of the evaluation methodology. Based on our experience, most firms are strong in inclusiveness and objectivity and more reticent about communication.

Regarding the research team, the participation of appropriate participants, for example, facility representatives and independent firm representatives, is critical to the success of the process. More generally, the benefits of evaluations are multiple: improved fit, design feedback, operating cost reductions, competitive advantage, supporting change, and increased knowledge<sup>1</sup>. Impediments include: lack of funding, lack of expertise, quality

control, maintaining objectivity, differing perspectives, reluctance to be scrutinised, linking outcomes and environment, project-related issues and client attitudes<sup>1</sup>.

### Evaluation standardisation

One of the issues regarding whether quality evaluations can be conducted in private practice focuses on the topic of whether or not facility assessments can be standardised. Preiser and colleagues have developed a generic tool<sup>10</sup> for this purpose, which is excellent when healthcare entities wish to compare multiple facilities. There are several universal tools for measuring the effectiveness of building sustainability, including the Building Use Studies Survey (BUS)<sup>11</sup>, also effective for making group comparisons. In the latter case, there are several published studies that have used these tools, the results of which would provide a good database to which to compare subsequent projects.

Researchers would find it difficult to generate a universal PFE form that might address both the culture of the firms and the various design goals of all projects. As previously mentioned, each firm has a different attitude toward communication, inclusivity and objectivity. Additionally, projects can examine both project-focused themes (such as family-centred care) and firm-focused themes (such as enhanced wayfinding). However, regarding a standardised form for a single office, once a firm-specific methodology and process is in place, a boilerplate can be generated to facilitate the process.

We have recommended that firms initiate their commitment to PFEs by developing boilerplate questionnaire documents and interview protocols, and standardised behavioural observation methods based on firm culture and overarching design goals. Researchers, who are conducting an evaluation, should not be members of the design team that created the project that is being assessed. The hypotheses for the research should parallel the original design objectives and be identified during the programming phase. The resulting objectivity will increase the legitimacy of their research projects. Conducting credible PFEs in private practice is not only feasible, it is our social responsibility as designers and architects.

### Authors

Mardelle M Shepley, BA, MA, MArch, DArch, AIA, ACHA, is a professor and director of the Centre for Health Systems and Design in the Department of Architecture at Texas A&M University.

Angela Watson, AIA, LEED AP, is a principal at Shepley Bulfinch.

### References

1. Shepley M. *Healthcare Facility Evaluation: A Comprehensive Guide*. Myersville MD: Asclepion Publishing; 2010.
2. Hamilton D, Peavey E, Pentecost R. *Examining barriers to adoption of an evidence-based practice model*. Environmental Design Research Association – EDRA41 conference presentation. Washington, DC: EDRA; 2 June 2010.
3. American Collegiate Schools of Architecture (ACSA). *Guide to Architecture Schools*. Washington DC: ACSA; 2003.
4. American Collegiate Schools of Architecture (ACSA). *Guide to Architecture Schools*. Washington DC: ACSA; 2009.
5. Shepley M, Gerbi R, Watson A, Imgrund S. Patient and staff environments: the impact of daylight and

windows on patients and staff. *World Health Design* 2009; 2(2):68-73.

6. Canter D. Royal hospital for sick children. *The Architects Journal* 1972; 174:527-569.

7. Children's Environments Research Group(CERG). *Hasbro Children's Hospital Post-occupancy Evaluation*. New York NY: The Graduate School and University Center of the City University of New York; 1995.

8. Cooper Marcus C, Barnes M. *Gardens in Healthcare Facilities: Uses, Therapeutic Benefits, and Design Recommendations*. Concord, CA: The Center Health Design; 1995.

9. Connell BR, Ostrander ER. *Methodological Considerations in Post-occupancy Evaluation: An Appraisal of the State of the Art*. Washington, DC: AIA Research Corporation; 1976.

10. Preiser W, Rabinowitz H, White E. *Post-occupancy*

*Evaluation*. New York: Nostrand Reinhold; 1988.

11. Bordass A, Leaman A. Making feedback and post-occupancy evaluation routine. *Building Research & Information* 2005; 33(4):347-353.

### Further reading

Hadjri K, Crozier C. Post-occupancy evaluation: Purpose, benefits and barriers. *Facilities* 2009; 27(1-2):2-33.

Kelly J, Morledge R, Wilkinson S (Eds). *Best value in Construction*. London: Blackwell Publishing; 2002.

Tarricone P. The power of POE. *Facilities Design & Management* 1999; 18(6):52-54.

Zimmerman A, Martin M. Post-occupancy evaluation: Benefits and barriers. *Building Research & Information* 2001; 29(2):158-163.

Zimring CM, Wener R. Evaluating evaluation. In a special issue on the use of evaluation, M Kantrowitz & A Seidel (Eds). *Environment and Behavior* 1985; 17:97-117.

*design for quality of life*



## Perkins Eastman

115 FIFTH AVENUE  
NEW YORK, NY 10003

212.353.7200

[info@perkinseastman.com](mailto:info@perkinseastman.com)

[WWW.PERKINSEASTMAN.COM](http://WWW.PERKINSEASTMAN.COM)

Arlington	Guayaquil	Shanghai
Boston	Mumbai	Stamford
Charlotte	New York	Toronto
Chicago	Oakland	
Dubai	Pittsburgh	



## Planning for Pandemics: The open-air treatment of pandemic influenza

Richard A Hobday and John W Cason argue that temporary hospitals should be part of emergency planning for future influenza pandemics. They also suggest that other measures adopted during the 1918 pandemic merit more attention than they currently receive

Richard A. Hobday, PhD, John W Cason, PhD

Three influenza pandemics occurred during the last century: in 1918, 1957 and 1968. Each was caused by a novel type A influenza virus of avian origin. The H1N1 influenza pandemic of 1918–1919 is notorious because of the infectivity of the virus and the number of lives it claimed. Although the fatality rate was relatively low, the incidence of infection was so great that the number of deaths was high. No other pandemic in history killed so many in such a short time<sup>1</sup>.

Global mortality from the pandemic is not known because there are large areas of the world for which there is little information. In the 1920s, it was estimated that the disease had killed 21 million people. In 1991, this figure was revised to between 24.7 million and 39.3 million, and more-recent scholarship suggests 50 million to 100 million people may have died<sup>2</sup>.

Morbidity was high, at anywhere from 25% to 90%, and the fatality rate was between 1% to 3%<sup>3</sup>. However, some regions reported mortality rates for the entire population as high as 5% to 10%<sup>2</sup>. Most deaths occurred between mid-September and mid-December of 1918<sup>4</sup>. Unusually, many of those who died were young adults who normally have a low death rate from influenza. Another striking feature was the discoloration of the seriously ill, who often exhibited 'heliotrope cyanosis', which is characterised by a blue-grey tinge to the face and other parts of the body<sup>3,5</sup>.

Many victims died of pneumonia caused by secondary bacterial infections. Others succumbed to a condition similar to acute respiratory distress syndrome that could kill within days or hours<sup>5,6</sup>. Pleurisy, hemorrhage, oedema, inflammation of the middle ear, meningitis, nephritis, and pericarditis were among the many complications reported<sup>6,7</sup>.



1st Great Eastern General Hospital was mobilised on a Cambridge University cricket pitch in 1914

There were three waves of infection between 1918 and 1919. The first, in the spring of 1918, spread through parts of the United States, Europe and Asia. This was a fairly mild form of influenza and caused relatively few fatalities. The second wave, which spread around the world in a few months, was disastrous. In less than a year 220,000 influenza-related deaths occurred in Britain, and between September 1918 and June 1919 it proved fatal to at least half a million US citizens<sup>1,3</sup>. Death rates in Africa were comparable to or higher than those in North America and Europe<sup>8</sup>. Figures suggest that China was spared the worst of the pandemic, although this may simply reflect a lack

of accurate records. The mortality in India alone has been estimated at 18 million<sup>9,10</sup>. According to one estimate of the period, 800 of every 1,000 people who showed symptoms suffered from uncomplicated influenza.

This was more severe than the so-called 'three-day fever' of the spring of 1918, but no worse than ordinary influenza. The remaining 200 suffered pulmonary complications; of these, the mortality rate for those developing heliotrope cyanosis was 95%<sup>7</sup>.

With so many infected, and so many dying within a few weeks, the burden on medical staff and the funerary industry were immense, as was the accompanying

economic and social disruption<sup>1,3</sup>.

There was much debate about the origins of the illness and whether it was indeed influenza. The symptoms were so severe that there was speculation that it was some other disease such as 'trench fever', dengue, anthrax, cholera, or even plague<sup>1,3,11</sup>. Mortality reached alarming levels.

The pandemic arrived in Boston, Massachusetts early in September and by October 19 had claimed 4,000 lives out of a total population of less than 800,000<sup>12</sup>. At the peak of the outbreak, more than 25% of patients at an emergency hospital in Philadelphia died each night, many without seeing a nurse or doctor. The bodies of those who succumbed were stored in the cellar of the building, from where they were tossed onto trucks and taken away. Attempts at therapy for those still alive were described as "exercises in futility"<sup>13(p139)</sup>.

The demands of wartime meant that many doctors had been called into military service; those not in uniform were caring for the wounded in hospitals at home or inspecting potential recruits at medical boards. The shortage of nurses was even more acute: as they and other medical staff fell ill, patient care rapidly deteriorated<sup>1,3,14</sup>. Hospitals were turning patients away; mortuaries were overflowing, some handling 10 times their normal capacity.

Gravediggers, many of whom were ill, could not keep up with the demand for burials<sup>1,3,15</sup>. Early in October 1918, a delegate from a health department in the US Midwest went east to find out how best to combat the infection. Officials there offered the following advice:

"When you get back home, hunt up your wood-workers and cabinet-makers and set them to making coffins. Then take your street laborers and set them to digging graves. If you do this you will not have your dead accumulating faster than you can dispose of them."<sup>12(p787)</sup>

This was not meant to cause undue alarm; it was merely a practical solution to a problem that had to be addressed once the pandemic arrived<sup>12</sup>. In an attempt to prevent the infection from spreading, many cities banned public assembly, closed their schools, isolated those infected and mandated the wearing of surgical face masks<sup>1,3,6</sup>. Recent studies suggest that when such measures were introduced quickly – before the pandemic was fully established – and then

sustained, death rates were reduced<sup>16-19</sup>. Yet for those who contracted the disease and went on to develop pneumonia, the prospects were poor. Anyone fortunate enough to gain admission to an 'open-air' hospital, however, may have improved their chances of survival.

## The open-air regimen

By the time of the 1918–1919 pandemic, it was common practice to put the sick outside in tents or in specially designed open wards. Among the first advocates of what was later to become known as the 'open-air method' was the English physician John Coakley Lettson (1744–1815), who exposed children suffering from tuberculosis to sea air and sunshine at the Royal Sea Bathing Hospital in Kent, England in 1791<sup>20,21</sup>. Lettson's enthusiasm for fresh air attracted little support at the time and the next doctor to recommend it met with fierce opposition.

George Bodington (1799–1882) was the proprietor of the first institution that could be described as a tuberculosis sanatorium, at Sutton Coldfield near Birmingham, England. He treated pulmonary tuberculosis with a combination of fresh air, gentle exercise in the open, a nutritious, varied diet and the minimum of medicines. In 1840, Bodington published the results of his work in *An Essay on the Treatment and Cure of Pulmonary Consumption, on Principles Natural, Rational*

*and Successful*<sup>22</sup>. Bodington's essay includes accounts of six cases; one patient died, as he acknowledged, but the others were either cured or greatly improved. This was at a time when, he estimated, one in five people in England were dying of the disease and little was being done to prevent it. Tuberculosis was generally regarded as hereditary, noninfectious and incurable.

Bodington argued otherwise, objecting strongly to the use of blistering, bleeding, and the popular purgative drugs of the day as well as the practice of confining patients in warm, badly ventilated rooms to protect them from the supposedly harmful effects of cold air; "thus forcing them to breathe over and over again the same foul air contaminated with the diseased effluvia of their own persons"<sup>22(p2)</sup>. Bodington had noticed that people who spent their time indoors were susceptible to tuberculosis, whereas those who worked outdoors, such as farmers, shepherds and ploughmen, were usually free of the disease.

He reasoned that patients should copy the lifestyles of those who appeared immune to tuberculosis. They should live in well-ventilated houses in the country and spend much of their time outside breathing fresh air. According to Bodington:

"The application of cold pure air to the interior surface of the lungs is the most powerful sedative that can be applied, and does more to promote the healing



1st Great Eastern General Hospital (Images courtesy of [www.roll-of-honour.com](http://www.roll-of-honour.com))





Nurses and patients in a ward at 1st Great Eastern General Hospital (Image courtesy of [www.roll-of-honour.com](http://www.roll-of-honour.com))

of cavities and ulcers of the lungs than any other means that can be employed.<sup>122(p17)</sup>

It is not known when Bodington started treating tuberculosis in this way, but there is evidence that he was doing so by 1833. By 1840, he had taken the tenancy of the 'White House' at Maney, Sutton Coldfield to provide suitable accommodation for his tubercular patients. Bodington's tenancy of this seminal building was brief – only three to four years. *The Lancet* published a sarcastic review of his essay and methods, and he abandoned the White House to devote himself to the care of the mentally ill<sup>23,24</sup>. George Bodington had anticipated the principles of sanatorium treatment that were to become the main line of defence against the disease<sup>25</sup>.

By the 1850s, Florence Nightingale (1820–1910) was writing about the importance of sunlight and copious amounts of fresh air in the recovery of hospital patients<sup>26,27</sup>, but her ideas were slow to gain acceptance. And so it was in Germany that the open air regimen re-emerged, most notably at the Nordrach Kolonie in the Black Forest, a sanatorium established in 1888 by Otto

Walter (1853–1919). It was so well known that 'Nordrach' became the term for open-air sanatoria.

By 1908, there were at least 90 of them in Britain, many of which were enthusiastic imitations of Nordrach<sup>28</sup>. An open-air recovery school for tubercular children, founded in 1904 at Charlottenburg, a suburb of Berlin, was the first of its type and, as with Germany's open-air sanatoria, was widely imitated<sup>29</sup>. In 1884, Edward Livingston Trudeau (1848–1915) opened America's first sanatorium at Saranac Lake in New York State<sup>30</sup>.

The first open-air orthopaedic hospital was set up in the Shropshire village of Baschurch in England in 1907<sup>31</sup>. In the two decades before World War I, charitable associations, leagues and societies dedicated to preventing and eliminating tuberculosis among the poor flourished, as did sanatoria<sup>32</sup>.

### Treatment of the wounded

There is evidence that the open-air regimen may have improved the health of some tuberculosis patients. Records for the Dreadnought Hospital in Greenwich, one

of the first British hospitals in which such methods were adopted, appear to show that there were benefits to this approach. From 1900 to 1905, the overall mortality of consumptive patients in open-air wards was less than half that of those who received the orthodox treatment of the day. An improvement in their state of 'wellbeing' was also reported<sup>33</sup>. Later, during World War I, the use of open-air therapy extended to nontubercular conditions, and on a large scale. Temporary open-air hospitals were built to take casualties from the Western Front.

An early example stood on one of Cambridge University's best cricket pitches at the King's and Clare Athletic Ground. The First Eastern General Hospital, which was mobilised in August 1914, was originally designed to provide 520 beds and to be erected in four weeks. It proved so popular with the authorities, however, that within eight weeks its complement of beds more than doubled to 1,240. The hospital's wards were completely open to the south except for some low railings and adjustable sun blinds<sup>34,35</sup>.

In June 1915, the eminent scientist and

# A World of Experience

Since our founding more than 27 years ago, **Tsoi/Kobus & Associates** has planned and designed more than 10 million square feet for healthcare organizations, including academic medical centers, healthcare systems, proton therapy centers, specialty clinics, and community hospitals. We are a world leader in healthcare design and have been named a "Global Giant" by *Architecture* magazine.

With an approach that is innovative and pragmatic, we create spaces that support the delivery of compassionate healthcare, that accelerate discovery, and that enhance the quality of human interaction.



**TSOI / KOBUS & ASSOCIATES**  
ARCHITECTURE • PLANNING • INTERIOR DESIGN

One Brattle Square, Cambridge, MA  
617.475.4000 • [www.tka-architects.com](http://www.tka-architects.com)



Master of Christ's College, AE Shipley (1861–1927), judged the open-air treatment of sick and wounded soldiers at the First Eastern a success, particularly for those with pneumonia.

Some 6,600 patients had passed through the hospital, with a death rate of 4.6 per 1,000. Sixty patients with pneumonia had been treated and 95% of them recovered. Critics ascribed the low mortality at the hospital to the absence of 'bad cases', but according to Shipley, some convoys arrived from the trenches almost entirely made up of them.

In his opinion, the open wards produced much better results than closed ones. Instead of patients losing their bodily health and strength during the period of recovery from infections or wounds, they maintained their vigour and even improved it. The only people who felt the cold at the hospital were apparently the nurses, the patients having comfortable beds with plenty of blankets and hot-water bottles<sup>35</sup>.

Nearer the front, the British Army put its casualties in tents. As the military surgeon Lieutenant Colonel Sir Berkeley Moynihan observed in 1916:

"In the treatment of all gunshot wounds where the septic processes are raging, and the temperature varies through several degrees, an immense advantage will accrue from placing patients out of doors. While in France I developed a great affection for the tented hospitals. There is great movement of air, warmth and comfort; when a sunny

day comes the side of the tent may be lifted and the patient enjoys the advantage of open-air treatment."<sup>36(p337)</sup>

### Camp Brooks open-air hospital

When the influenza virus pandemic took hold in the United States in 1918, emergency hospitals were started in schools, halls and large private houses, and open-air hospitals were being 'thrown up' all over the country<sup>1</sup>. In the harbour of East Boston 1,200 out of 5,100 merchant sailors on board training ships had contracted influenza.

The seriously ill were too numerous for local hospitals to accommodate. The Massachusetts State Guard responded by building the Camp Brooks Open Air Hospital at Corey Hill in Brookline, near Boston<sup>37,38</sup>. The hospital comprised 13 tents, 12 of which were occupied by one or two patients each and the other by the head nurse. The State Guard took seven hours to erect the tents, make sure the site was properly drained and provide running water, latrines and sewerage.

Portable buildings were then set up for the medical staff and nurses. From the time the camp opened on 9 September 1918, until its closure a month later on 12 October, a total of 351 victims of the pandemic were admitted, one-third of whom were diagnosed with pneumonia. In total, 36 of the 351 sailors received at the hospital died<sup>37</sup>.

The treatment at Camp Brooks Hospital took place outdoors, with "a maximum

of sunshine and of fresh air day and night"<sup>37(p1747)</sup>. The medical officer in charge, Major Thomas F Harrington, had studied the history of his patients and found that the worst cases of pneumonia came from the parts of ships that were most badly ventilated.

In good weather, patients were taken out of their tents and put in the open. They were kept warm in their beds at night with hot water bottles and extra blankets and were fed every few hours throughout the course of the fever. Anyone in contact with them had to wear an improvised face mask, which comprised five layers of gauze on a wire frame covering the nose and mouth.

The frame was made out of an ordinary gravy strainer, shaped to fit the face of the wearer and to prevent the gauze filter from touching the nostrils or mouth. Nurses and orderlies were instructed to keep their hands away from the outside of the masks as much as possible. A superintendent made sure the masks were replaced every two hours, were properly sterilised and contained fresh gauze<sup>38</sup>.

Other measures to prevent infection included the wearing of gloves and gowns, including a head covering. Doctors, nurses and orderlies had to wash their hands in disinfectant after contact with patients and before eating.

The use of common drinking cups, towels and other items was strictly forbidden. Patients' dishes and utensils were kept separate and put in boiling water after each use. Pneumonia and meningitis patients used paper plates, drinking cups and napkins; paper bags with gauze were pinned to pillowcases for sputum. Extensive use was made of mouthwash and gargle, and twice daily, the proprietary silver-based antimicrobial ointment Argyrol was applied to nasal mucous membranes to prevent ear infection<sup>37</sup>.

Of the camp's medical staff – 15 doctors, 45 nurses and aids, 20 sanitary corps men and 74 sailors acting as orderlies – only six nurses and two orderlies developed influenza. In five of these cases, exposure to the virus was reported to have taken place outside the camp. A few medicines were used to relieve the patients' symptoms and aid their recovery, but these were considered less important than were regular meals, warmth and plenty of fresh air and sunlight<sup>37</sup>.



Baschurch open-air orthopaedic hospital (Image courtesy of Robert Jones and Agnes Hunt Orthopaedic and District Hospital NHS Trust)

#1 Healthcare Design Firm  
2004-2010\*



CONTINUUM OF CARE HEAL, CARE, WORK **BETTER.**<sup>™</sup>

**HDR**

[www.hdrarchitecture.com](http://www.hdrarchitecture.com)

Architecture • Engineering • Interior Design • Consulting • Medical Equipment Planning • Landscape Architecture  
Wayfinding Planning and Design • Sustainable Design Consulting • Product Design • Laboratory Planning

\*Modern Healthcare survey of U.S. architecture firms





Patients at Baschurch Hospital (Image courtesy of RJAH Orthopaedic and District Hospital NHS Trust)

### Ventilation and sunlight

The curative effects of fresh air were investigated at length by the physiologist Sir Leonard Hill (1866–1952) in the years following World War I. He reported favourably on the effects of sun and air when judiciously applied, particularly for tuberculosis<sup>39,40</sup>. In 1919, Hill wrote in the *British Medical Journal* that the best way to combat influenza infection was deep breathing of cool air and sleeping in the open<sup>41</sup>.

Whether the patients at Camp Brooks or other temporary hospitals were spared the worst of the influenza pandemic because they slept in the open is uncertain. The apparent success in reducing the number of infections and deaths reported at this open-air hospital may simply have been caused by patients and staff experiencing levels of natural ventilation far higher than in a conventional hospital ward.

Significantly, the minimum amount of ventilation needed to prevent the spread of infectious diseases such as severe acute respiratory syndrome (SARS) and tuberculosis is unknown.

Much more fresh air may be needed than is currently specified for hospitals, schools, offices, homes, and isolation rooms<sup>42-44</sup>.

The patients at Camp Brooks recovered in direct sunlight when available. This may have kept infection rates down, because laboratory experiments have shown that ultraviolet radiation inactivates influenza virus and other viral pathogens and that sunlight kills bacteria<sup>45-50</sup>. In addition,

exposure to the sun's rays may have aided patients' recovery because sunlight is known to promote healing in other conditions such as septic war wounds<sup>35</sup>.

There is evidence that heart attack victims stand a better chance of recovery if they are in sunlit wards<sup>51</sup>. Depressed psychiatric patients fare better if they get some sun while hospitalised, as do premature babies with jaundice<sup>52-55</sup>. In one study, patients in hospital wards exposed to an increased intensity of sunlight experienced less perceived stress and less pain and took 22% less analgesic medication per hour<sup>56</sup>. One advantage of placing patients outside in the sun is that they can synthesize vitamin D in their skin, which they cannot do indoors behind glass. Rickets, the classic childhood disease of vitamin D deficiency, has long been associated with respiratory infections; it has been hypothesised that low levels of vitamin D may increase susceptibility to influenza<sup>57,58</sup>.

The surgeon general of the Massachusetts State Guard, William A Brooks, had no doubt that open-air methods were effective at the hospital, despite much opposition to the therapy.

Many doctors felt that patients would get the same benefits if the windows of a conventional ward were open or the patients were put in a hospital 'sun parlour'. Brooks, however, held that patients did not do as well in an ordinary hospital, no matter how well ventilated, as they did outdoors.

Patients in indoor sun parlours were not exposed to direct sunlight all day as they were when outdoors. He reported that in one general hospital with 76 cases, 20 patients died within three days and 17 nurses fell ill<sup>38</sup>. By contrast, according to one estimate, the regimen adopted at the camp reduced the fatality of hospital cases from 40% to about 13%<sup>12</sup>. Brooks wrote that: "The efficacy of open air treatment has been absolutely proven, and one has only to try it to discover its value."<sup>38(p750)</sup>

Coincidentally, in 1918 a British soldier, Patrick Collins, reached a similar conclusion. When Collins developed the first signs of influenza, he dragged himself and his tent up a hill away from his regiment. There he sweated, shivered and was delirious for several days, sustained only by his rum ration. He was one of the few survivors of his regiment<sup>59</sup>.

### Discussion

The seeming success of the medical team who confronted pandemic influenza on Corey Hill in 1918 was in stark contrast to others' experience of the infection.

The high standard of personal and environmental hygiene upheld by staff at the camp may have played a large part in the relatively low rates of infection and mortality there compared with other hospitals. Significantly, the outbreak of SARS in Hong Kong in 2003 showed that basic infection controls, such as those employed at Camp Brooks Hospital, can help to contain the spread of a virulent respiratory infection<sup>60,61</sup>.

Of the measures introduced to combat pandemic influenza at the hospital, the use of improvised facemasks – including their design and the frequency with which they were changed – is noteworthy. Another is the fresh air the patients enjoyed. When Major Harrington, the medical officer at Camp Brooks, discovered that sailors from the most poorly ventilated areas of the ships in East Boston also had the worst cases of pneumonia, he put his patients outdoors.

Sailors, such as those on board the ships at East Boston, were particularly vulnerable to influenza infection, because the influenza virus is readily transmitted in confined quarters. In 1977, for example, an influenza outbreak on board a commercial airliner with deficient

ventilation resulted in an infection rate of 72%. The aircraft was grounded for over four hours with the passengers on board and the ventilation system turned off<sup>62</sup>.

There is still much uncertainty surrounding the transmission and epidemiology of influenza. As yet, the proportion of influenza infections that occur by the airborne route is not known<sup>63</sup>, nor is there any evidence to support the idea that fresh air helps those infected to recover. Given the threat to public health posed by the avian influenza virus, both merit further study. So too does the part played by sunlight in preventing the spread of the virus.

Solar radiation may retard its transmission by directly inactivating virions and by increasing immunity to them. A combination of outdoor air and sunlight could also reduce the likelihood of secondary respiratory infections.

The current H5N1 avian influenza virus has high virulence and lethality but as yet is not readily transmitted from person to person<sup>64</sup>. We do not know how virulent

the next type A pandemic will be, but should it prove to be as pathogenic as that of 1918, there could be 180 million to 360 million deaths globally<sup>65</sup>. Vaccines, antiviral drugs and antibiotics may be effective in controlling avian influenza and dealing with secondary infection; however, for much of the world's population, access to them will be limited. In many countries, the only viable strategy would be to disrupt the transmission of the virus by banning public gatherings, closing schools, isolating infected people and wearing surgical masks, as was the case during the 1918–1919 pandemic<sup>66,67</sup>.

Epidemiological studies show that the wearing of masks in public places in Hong Kong and Beijing during the SARS outbreak was associated with a lower incidence of infection<sup>68,69</sup>. However, no controlled studies have been undertaken to assess the effectiveness of surgical masks in preventing influenza from passing from one host to the next<sup>70</sup>. In addition, it is uncertain whether transmission of the

influenza virus from person to person is chiefly by large droplets or aerosols.

If droplets are the main mode of transmission, the isolation of patients in private rooms and the use of ordinary surgical face masks may suffice<sup>63</sup>. If airborne transmission is significant, reusable respirators could be pivotal in preventing infection, because surgical masks do not offer reliable protection from aerosols<sup>71,72</sup>. Also, measures that prevent the influenza virus from spreading through buildings would assume greater importance. Improvements in air handling equipment, portable filtration units and the introduction of physical barriers in the form of partitions or doors may offer some protection<sup>73</sup>.

However, more might be gained by introducing high levels of natural ventilation or, indeed, by encouraging the public to spend as much time outdoors as possible. It might also be prudent to stockpile tents and beds, because hospitals in the UK, the US and elsewhere are not prepared for a severe pandemic<sup>74–80</sup>. Temporary

## References

- Crosby AW. *America's Forgotten Pandemic: The Influenza of 1918*. 2nd ed. Cambridge UK: Cambridge University Press; 2003.
- Johnson NP, Mueller J. Updating the accounts: global mortality of the 1918–1920 'Spanish' influenza pandemic. *Bull Hist Med* 2002; 76:105–115.
- Johnson N. *Britain and the 1918–19 Influenza Pandemic. A Dark Epilogue*. Oxford UK: Routledge; 2006.
- Barry JM. The site of origin of the 1918 influenza pandemic and its public health implications. *J Transl Med* 2004; 2:3.
- Morens DM, Fauci AS. The 1918 influenza pandemic: insights for the 21st century. *J Infect Dis* 2007; 195:1018–28.
- Barry JM. *The Great Influenza: The Epic Story of the Greatest Pandemic in History*. London: Penguin; 2005.
- French H. The clinical features of the influenza epidemic of 1918–19. In: *Great Britain Ministry of Health. Reports on Public Health and Medical Subjects No. 4: Report on the Pandemic of Influenza, 1918–19*. London: His Majesty's Stationery Office; 1920: 66–109.
- Patterson KD. The influenza pandemic of 1918–19 in the Gold Coast. *J Afr Hist* 1983; 24:485–502.
- Mills ID. 1918–1919 influenza pandemic: the Indian experience. *Indian Econ Soc Hist Rev* 1986; 23:1–40.
- Cheng KF, Leung PC. What happened in China during the 1918 influenza pandemic? *Int J Infect Dis* 2007; 11:360–364.
- Tognotti E. Scientific triumphalism and learning from facts: bacteriology and the 'Spanish flu' challenge of 1918. *Soc Hist Med* 2003; 16:97–110.
- Anon. Weapons against influenza. *Am J Public Health* 1918; 8:787–8.
- Starr I. Influenza in 1918: recollections of the epidemic in Philadelphia. 1976. *Ann Intern Med* 2006; 145:138–140.
- Carnwath T. Lessons of the influenza pandemic 1918. *J State Med* 1919; 27:142–57.
- Schoch-Spana M. 'Hospital's fullup': the 1918 influenza pandemic. *Public Health Rep* 2001; 116(suppl 2): 32–3.
- Markel H, Lipman HB, Navarro JA et al. Nonpharmaceutical interventions implemented by US cities during the 1918–1919 influenza pandemic. *JAMA* 2007; 298:644–54.
- Hatchett RJ, Mecher CE, Lipsitch M. Public health interventions and epidemic intensity during the 1918 influenza pandemic. *Proc Natl Acad Sci USA* 2007; 104:7582–87.
- Bootsma MJ, Ferguson NM. The effect of public health measures on the 1918 influenza pandemic in US cities. *Proc Natl Acad Sci USA* 2007; 104:7588–93.
- Halloran ME, Ferguson NM, Eubank S et al. Modeling targeted layered containment of an influenza pandemic in the United States. *Proc Natl Acad Sci USA* 2008; 105:4639–44.
- St Clair Strange FG. *The History of the Royal Sea Bathing Hospital Margate 1791–1991*. Rainham, UK: Meresborough Books; 1991.
- Jones ER. Lettsom and the Royal Sea Bathing Hospital. *Trans Med Soc Lond* 1973; 89:285–7.
- Bodington G. *An Essay on the Treatment and Cure of Pulmonary Consumption, on Principles Natural, Rational and Accessful*. London: Simpkin, Marshall, Hamilton and Kent; 1906.
- Cyriax RJ. George Bodington: the pioneer of the sanatorium treatment of pulmonary tuberculosis. *Br J Tuberc* 1925; 19:1–16.
- Keers RY. Two forgotten pioneers – James Carson and George Bodington. *Thorax* 1980; 35:483–9.
- McCarthy OR. The key to the sanatoria. *J R Soc Med* 2001; 94:413–7.
- Nightingale F. *Notes on Hospitals*. 3rd ed. London: Longman, Green, Longman, Roberts and Green; 1863.
- Nightingale F. *Notes on Nursing: What It Is and What It Is Not*. New York, NY: Dover Publications; 1969.
- Smith FB. *The Retreat of Tuberculosis 1850–1950*. London: Croom Helm; 1988.
- Connolly C. Pale, poor, and 'pretubercular' children: a history of pediatric antituberculosis efforts in France, Germany, and the United States, 1899–1929. *Nurs Inq* 2004; 11:138–47.
- Mera FE. History of the sanatorium movement in America. *Chest* 1935; 1:8–9.
- Carter AJ. A breath of fresh air. *Proc R Coll Physicians Edinb* 1994; 24:397–405.
- Dormandy T. *The White Death: A History of Tuberculosis*. London: Hambleton Press; 1999.
- Cook GC. Early use of 'open-air' treatment for 'pulmonary phthisis' at the Dreadnought Hospital, Greenwich, 1900–1905. *Postgrad Med J* 1999; 75: 326–7.
- Anon. A military open-air hospital. *Br Med J* 1915; 1:1015–16.
- Shiple AE. *The Open-air Treatment of the Wounded (the First Eastern General Hospital)*. 2nd ed. London: Country Life Library; 1915.
- Moynihan B. An address on the treatment of gunshot wounds. *Br Med J* 1916; 1:333–39.
- Anon. Influenza at the Camp Brooks Open Air Hospital. *JAMA* 1918; 71: 1746–47.
- Brooks WA. The open air treatment of influenza. *Am J Public Health* 1918; 8: 746–50.
- Hill AB, Hill B. The life of Sir Leonard Erskine Hill FRS (1866–1952). *Proc R Soc Med* 1968; 61:307–16.
- Hill LE, Campbell A. *Health and environment*. London: Edward Arnold & Co; 1925.
- Hill LE. The defence of the respiratory membrane against influenza, etc. *Br Med J* 1919; v1:238–40.
- Li Y, Leung GM, Tang JW et al. Role of ventilation in airborne transmission of infectious agents in the built environment – multidisciplinary systematic review. *Indoor Air* 2007; 17:2–18.
- Tang JW, Li Y, Eames I, Chan PK, Ridgway GL. Factors



accommodation would be required to deal with the most seriously ill, just as it was in 1918.

The Camp Brooks open-air hospital might serve as a useful model.

### Acknowledgments

This article was originally published in the *American Journal of Public Health: Am J Public Health* 2009; 99:S236-S242. doi:10.2105/AJPH.2008.134627 and reprinted by permission.

### Author

At the time of the study, Richard A Hobday was with the School of the Built and Natural Environment, University of the West of England, Bristol.

John W Cason was with the Department of Infectious Diseases, King's College London School of Medicine, London, UK.

RA Hobday originated the study and led the writing. JW Cason assisted with the study and analyses. Both authors conceptualised ideas, interpreted findings and reviewed drafts of the article.

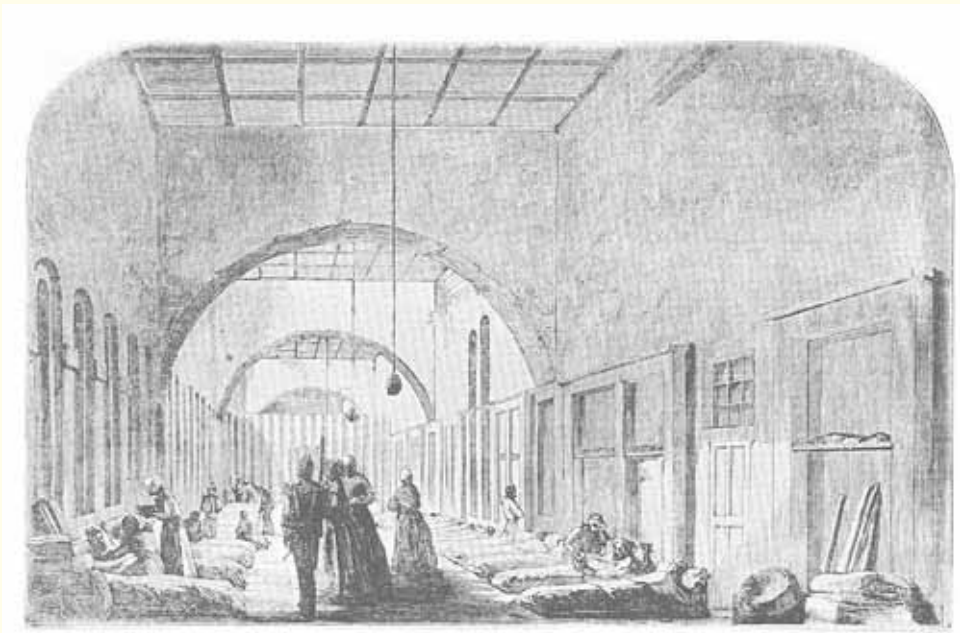


Fig. 160. An improvised ward in the barracks hospital of Scutari, 1854.

### A Florence Nightingale ward in Scutari, Turkey

involved in the aerosol transmission of infection and control of ventilation in healthcare premises. *J Hosp Infect* 2006; 64: 100-14.

44. Escombe AR, Oeser CC, Gilman RH *et al*. Natural ventilation for the prevention of airborne contagion. *PLoS Med* 2007; 4:e68.

45. Hollaender A, Oliphant JW. The inactivating effect of monochromatic ultraviolet radiation on influenza virus. *J Bacteriol* 1944; 48:447-54.

46. Tamm I, Fluke DJ. The effect of monochromatic ultraviolet radiation on the infectivity and hemagglutinating ability of the influenza virus type A strain PR-8. *J Bacteriol* 1950; 59:449-61.

47. Jensen MM. Inactivation of airborne viruses by ultraviolet irradiation. *Appl Microbiol* 1964; 12:418-20.

48. Jakab GJ, Knight ME. Decreased influenza virus pathogenesis by infection with germicidal UV-irradiated airborne virus. *Environ Int* 1982; 8:415-18.

49. Sagripanti JL, Lytle CD. Inactivation of influenza virus by solar radiation. *Photochem Photobiol* 2007; 83: 1278-82.

50. Hockberger PE. A history of ultraviolet photobiology for humans, animals and microorganisms. *Photochem Photobiol* 2002; 76:561-79.

51. Beauchemin KM, Hays P. Dying in the dark: sunshine, gender, and outcomes in myocardial infarction. *J R Soc Med* 1998; 91:352-54.

52. Beauchemin KM, Hays P. Sunny rooms expedite recovery from severe and refractory depressions. *J Affect Disord* 1996; 40:49-51.

53. Benedetti F, Colombo C, Barbini B, Campori E, Smeraldi E. Morning sunlight reduces length of hospitalisation in bipolar depression. *J Affect Disord* 2001; 62:221-23.

54. Dobbs RH, Cremer RJ. Phototherapy. *Arch Dis Child* 1975; 50:833-36.

55. Barss P, Comfort K. Ward design and jaundice in the tropics: report of an epidemic. *Br Med J (Clin Res Ed)* 1985; 291:400-1.

56. Walch JM, Rabin BS, Day R, Williams JN, Choi K, Kang JD. The effect of sunlight on postoperative analgesic medication use: a prospective study of patients undergoing spinal surgery. *Psychosom Med* 2005; 67:156-63.

57. Hobday RA. *The Light Revolution: Health Architecture and the Sun*. Forres UK: Findhorn Press; 2006.

58. Cannell JJ, Vieth R, Umhau JC *et al*. Epidemic influenza and vitamin D. *Epidemiol Infect* 2006; 134:1129-40.

59. Moriarty KJ. The 1918 influenza pandemic: a survivor's tale. *BMJ* 2006; 332:889.

60. Chan WF, Wong TK. Preparing for pandemic influenza: revisit the basics. *J Clin Nurs* 2007; 16:1858-64.

61. Seto WH, Tsang D, Yung RW *et al*. Advisors of expert SARS group of hospital authority. Effectiveness of precautions against droplets and contact in prevention of nosocomial transmission of severe acute respiratory syndrome (SARS). *Lancet* 2003; 361:1519-20.

62. Moser MR, Bender TR, Margolis HS, Noble GR, Kendal AP, Ritter DG. An outbreak of influenza aboard a commercial airliner. *Am J Epidemiol* 1979; 110:1-6.

63. Oshitani H. Potential benefits and limitations of various strategies to mitigate the impact of an influenza pandemic. *J Infect Chemother* 2006; 12: 167-71.

64. Gambotto A, Barratt-Boyes SM, de Jong MD, Neumann G, Kawaoka Y. Human infection with highly pathogenic H5N1 influenza virus. *Lancet* 2008; 371: 1464-75.

65. Osterholm MT. Preparing for the next pandemic. *N Engl J Med* 2005; 352:1839-42.

66. Toner E. Do public health and infection control measures prevent the spread of flu? *Biosecur Bioterror* 2006; 4:84-6.

67. Low DE. Pandemic planning: nonpharmaceutical interventions. *Respirology* 2008; 13(suppl 1):S44-S48.

68. Wu J, Xu F, Zhou W *et al*. Risk factors for SARS among persons without known contact with SARS patients, Beijing, China. *Emerg Infect Dis* 2004; 10:210-16.

69. Lau JT, Tsui H, Lau M, Yang X. SARS transmission, risk

factors, and prevention in Hong Kong. *Emerg Infect Dis* 2004; 10:587-92.

70. Bell DM, World Health Organization Writing Group. Non-pharmaceutical interventions for pandemic influenza, national and community measures. *Emerg Infect Dis* 2006; 12:88-94.

71. Tellier R. Review of aerosol transmission of influenza A virus. *Emerg Infect Dis* 2006; 12:1657-62.

72. Weiss MM, Weiss PD, Weiss DE, Weiss JB. Disrupting the transmission of influenza A: face masks and ultraviolet light as control measures. *Am J Public Health* 2007; 97(suppl 1):S32-S37.

73. Morse SS, Garwin RL, Olsiewski PJ. Next flu pandemic: what to do until the vaccine arrives? *Science* 2006; 314:929.

74. Bartlett JG. Planning for avian influenza. *Ann Intern Med* 2006; 145:141-4.

75. Toner E, Waldhorn R, Maldin B *et al*. Hospital preparedness for pandemic influenza. *Biosecur Bioterror* 2006; 4:207-17.

76. Menon DK, Taylor BL, Ridley SA. Modelling the impact of an influenza pandemic on critical care services in England. *Anaesthesia* 2005; 60:952-54.

77. Sobieraj JA, Reyes J, Dunem KN *et al*. Modeling hospital response to mild and severe influenza pandemic scenarios under normal and expanded capacities. *Mil Med* 2007; 172:486-90.

78. Giacomet V, Tarallo L, De Marco G, Giannattasio A, Barbarino A, Guarino A. Preparing for an influenza pandemic in Italy: resources and procedures in paediatric hospital units. *Euro Surveill* 2007; 12:E7-E8.

79. De Cauwer HG, Mortelmans LJ, d'Orto V. Are Belgian hospitals prepared for an H5N1 pandemic? *Eur J Emerg Med* 2007; 14:204-6.

80. Brundage JF. Interactions between influenza and bacterial respiratory pathogens: implications for pandemic preparedness. *Lancet Infect Dis* 2006; 6:303-12.

**Healing Spaces: The Science of Place and Well-being**

Esther M Sternberg, MD  
Belknap Press, 2010  
US\$16.95/£12.95/□ 5.30



Esther Sternberg is a rare medical doctor who has written an informative book which explains how design factors affects people’s health and wellbeing. *Healing Spaces: The Science of Place and Well-being* looks through the eyes of both neuroscience and architecture to see how design enhances health and how an active lifestyle can enable both the successful management of physical, psychological and emotional stress and support the mental and cognitive processing of information by stimuli in a variety of built environments.

Sternberg has a deep, interdisciplinary understanding of human health. Her strong belief in the impact of design on health shows up clearly throughout her book. Beautifully written, it describes her personal experiences of design and health, as well as presenting major scientific research on the topic, mainly from the USA, in a way that is accessible to a broad readership.

Neuroscience explains how our sensory organs receive stimuli from the world around us and how the cells and molecules of the brain combine these signals into perception. How we perceive our surroundings and its features, such as light and dark, sound, smell, temperature, colour, shape and space, feed into the brain through all our senses and trigger the brain’s emotional centres, which forms our reactions and behaviours. According to Sternberg, these emotional centres release nerve chemicals and hormones that change how immune cells fight disease and we begin to heal. Through this, we begin to understand how the spaces we design can provide positive psychosocial stimuli for our emotional reactions and thereby improve our health and wellbeing.

The brain is constantly exposed to the demands of physical environments, matching them to images that sit in our memory. Sternberg suggests that there is a region in the brain that specialises in recognising buildings as landmarks. In cities, she says, architects know that people have two ways of navigating their way around – one involves using landmarks, the other using grids. Most people use both to find their way around. Rome and Paris are examples of landmark cities; Manhattan is a grid. People find their way around Rome by moving from one landmark to another; while in Manhattan and many other American cities, people need to count the number of streets they have crossed.

**There is a region in the brain that specialises in recognising buildings as landmarks**

It is differences in buildings, especially architecture such as that designed by Frank Gehry, that make them stand out in a cityscape. Gehry understood how to create features that maximise the brain’s ability to recognise, respond to and remember difference; something that is different will be both exciting and anxiety-provoking and as a result will also be memorable. These qualities are the characteristics of landmarks that arguably should be considered to be the intellectual capital of the city.

However, while the author can be commended in the way that she examines nature and its impact on our health, one criticism of the book may be her neglect to mention the work of Kaplan and Kaplan on attention restoration theory (ART), as explained in their book *The Experience of Nature: A Psychological Perspective*. According to this concept, people concentrate better after spending time in nature because watching a beautiful sunset or the nesting of birds in a tree does not demand the same level of attention that filtering a multitude of competing stimuli on a busy city street does.

However, that is a small criticism of a book that may prove to be one of the valuable contributions to the dissemination of knowledge on how design can improve our health and wellbeing. I would strongly recommend this very enjoyable book to anyone who would like to find out about this important topic.



**Professor Alan Dilani, PhD is a public health architect and director-general of International Academy for Design and Health**



# WHR Architects creates architecture with research and healthcare in mind



The Methodist Hospital Research Institute  
*in association with KPF*



The Methodist Outpatient Center

WHR and Genesis continue to create award winning world-class research and healthcare facilities across the globe. Recently completed projects, such as the Methodist Outpatient Center and The Methodist Hospital Research Institute, are bringing the finest minds in research and healthcare to the Texas Medical Center. Let WHR and Genesis show you how we can create architecture and medical technology planning with **people** in mind for your facility.

## WHR ARCHITECTS

Architecture with People in Mind®

Learn more about WHR Architects  
[www.whrarchitects.com](http://www.whrarchitects.com) | 1.713.665.5665

## GENESIS PLANNING

Technology Planning for Healthcare & Science

Learn more about Genesis Planning  
[genesis-planning.com](http://genesis-planning.com) | 1.713.297.7500

Introducing the most  
advanced workplace  
for surgeons

ENDOALPHA

**ENDOALPHA provides utmost support of workflow and documentation – integrating state-of-the-art technologies for improved communication, ergonomics and efficiency in the OR, hospital and beyond.**



ENDOALPHA features cutting edge imaging solutions such as HDTV 1080 and NBI. The systems integration approach provides high-end video networking, professional case documentation and allows the surgical team to control both medical and peripheral OR equipment from one central panel.

Olympus provides comprehensive expert services – from initial planning through operation.

Maske International Hospital  
Hong Kong

**OLYMPUS**

Your Vision, Our Future

Visit our Website:  
[www.olympus-europa.com/endoalpha/](http://www.olympus-europa.com/endoalpha/)