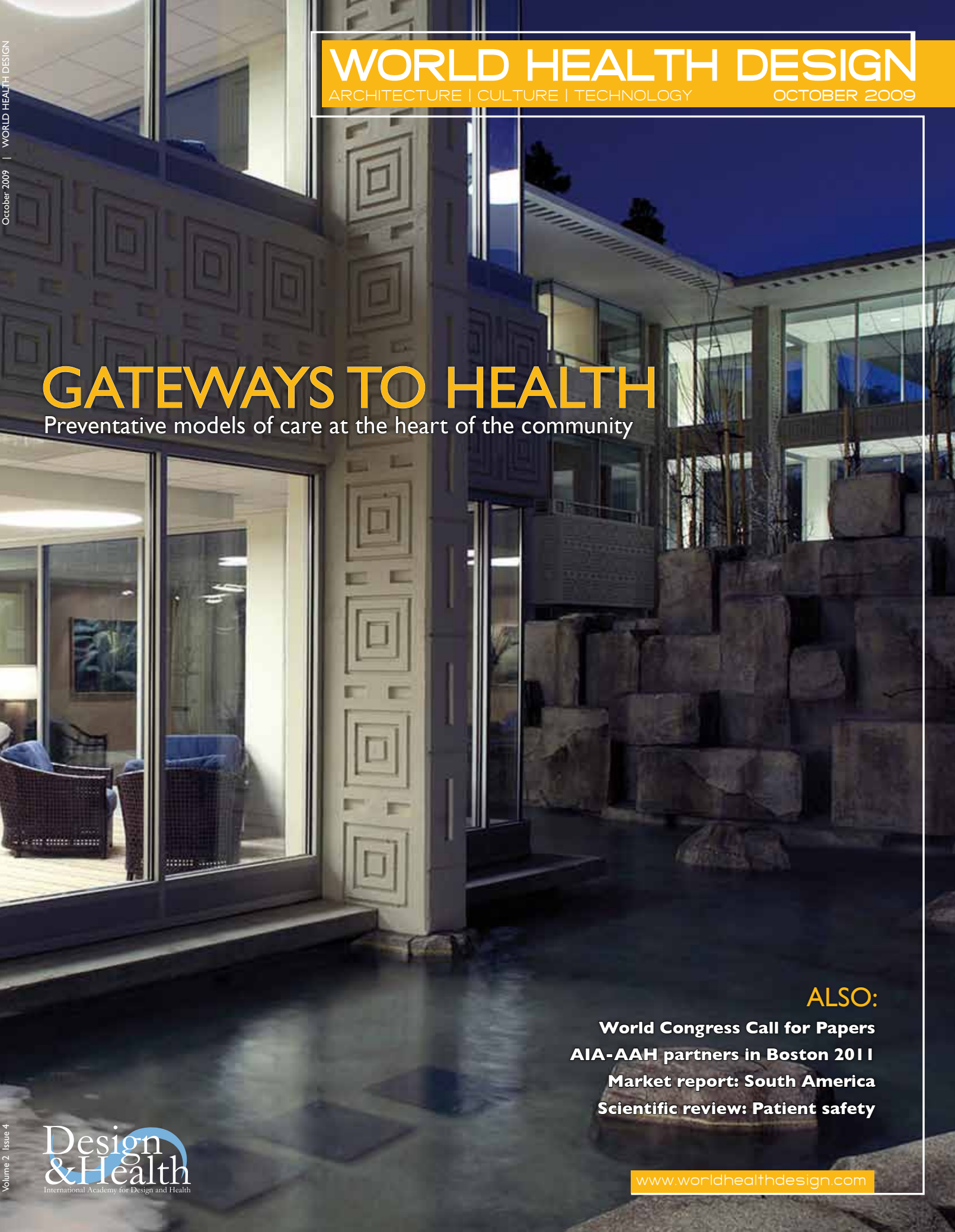
WORLD HEALTH DESIGN
ARCHITECTURE | CULTURE | TECHNOLOGY
OCTOBER 2009



GATEWAYS TO HEALTH

Preventative models of care at the heart of the community

ALSO:

World Congress Call for Papers

AIA-AAH partners in Boston 2011

Market report: South America

Scientific review: Patient safety

Design & Health
International Academy for Design and Health

www.worldhealthdesign.com

Volume 2 Issue 4

Re-imagining the Hospital

Farrow

Farrow Partnership Architects
www.farrowpartnership.com

RTKL

design

The currency of a smarter world.

RTKL creates distinctive solutions that set clients apart. As an international planning and design leader, we know the issues impacting health institutions worldwide. In business sixty years, with offices around the globe, RTKL fosters new ideas through the cross pollination of our healthcare expertise with specialized knowledge in retail, hospitality, urban planning, critical technologies, and more.

rtkl.com | 888.337.4685
an ARCADIS company

Architecture | Interior Design | Equipment Planning | Technology Systems Design | Data Center Planning + Design | Urban Planning | Strategic Facilities Planning
Sustainable Design | Landscape Architecture | Branding + Wayfinding | Simulation Modeling | Facility Transitioning | Translational Research Planning

Contributors

Susan Rodiek
A study by Susan Rodiek and Chanam Lee explores how well-designed external environments can benefit the health of older adults in long-term residential care

Greg Penoyre
Good design can contribute to faster recovery rates and in turn bring significant cost benefits to the health system, says Greg Penoyre

John Cole
The dynamic chief of Northern Ireland's health estate speaks about how design can help shape care in the community, despite budget constraints

Jacqueline Vischer
With so many books on Evidence-based design now being published, critical review is crucial to distinguish their relative value to practitioners

Jacques Mizan
Designers need to educate the health world about the danger of short-termism and the real potential for design to shape our health through the environment

Doug Wignall
Architects have a responsibility to consider all the ways in which the facilities they design can facilitate better care and support patients to heal

Time for change

The debate over health reform in the US has captured the world's attention. The leading cause of bankruptcy in the US is medical debt, while its health system costs substantially more per person than almost all other nations. But the challenges of cost containment and quality are not exclusively the territory of the US. Healthcare is global. We must all take heed and engage in this debate.

The announcement that the American Institute of Architects – Academy of Architecture for Health will partner with the International Academy for Design & Health in the organisation of the 7th World Congress, to be held in Boston from 6-10 July in 2011 (pp 8-13), provides a perfect opportunity for the rest of the world to join the debate and identify how design can ensure it is to the fore of policy in addressing health system reform.

In our 'Inquiry' feature this month, two US experts discuss the important role design can play in containing costs at an operational level, while our European and African experts focus their attention on design as a key component of a preventative approach to care.

It seems we have much to learn from one another – and nowhere has an effective preventative approach to healthcare been better demonstrated than in Northern Ireland, where John Cole's leadership has shown how the design of the physical environment is critical to the effective execution of health strategies founded on health promotion, illness prevention and better management of chronic diseases. (See pp 20-29).

Inserted inside this journal, you will find our Call for Papers for Boston in 2011. We live in an exciting era of economic, technological and environmental change that we should embrace and not fear. Submit your papers to our scientific committee chaired by Jacqueline Vischer and engage in the debate that will determine our future and that of our children.

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

Marketing Director
Jim Benham CIM
T: +44 (0) 1277 634176
E: jim@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 Edelstein 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, Emily Brooks, Veronica Simpson

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 2: Number 4
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 £70; 2 years £115; Single Issue £25
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

BRIEFING

08 PARTNERS LINING UP Leading international firms are lining up for the 7th Design & Health World Congress

09 CONGRESS HEADS TO BOSTON The AIA-AAH will partner with the International Academy for Design & Health for the 2011 World Congress

11 MAKING THE ECONOMIC CASE A Call for Papers has been published for the 2011 World Congress, focusing on the economic case for health promotion by design

OPINION

05 LEADER Marc Sansom reflects on the role of design in health system reform

17 THE BROADER VIEW Designers need to become more proactive in promoting the impact of design on health

18 SUSTAINABLE STRATEGIES Four experts reflect on the role of design in containing costs and supporting preventative approaches to care

20 THE SHIFT LEFT Marc Sansom speaks to Northern Ireland's John Cole about design's critical role as services shift from acute to community settings

PROJECTS

14 CENTRES OF CARE Three community care and treatment centres have transformed the delivery of health and social services in South Belfast

24 CARE IN THE COMMUNITY Veronica Simpson discovers a range of community-based healthcare buildings that are highlighting the power of architecture to inspire more enlightened services

36 SCHOOLS OF DREAMS Salutogenic design was firmly in the spotlight at the third international Architects for Health Student Design Awards

MARKET REPORTS

34 SOUTHERN SYMMETRY Latin America looks north for new partnerships, while retaining a distinct regional flavour, reports Emily Brooks

SCIENTIFIC REVIEW

39 TRANSPARENCY COMES FIRST John Zeisel discusses the importance of research transparency and allowing decision-makes to conclude for themselves a study's reliability

41 HOSPITALS TO LIFE Tye Farrow and Sharon VanderKaay discuss a step-by-step model for developing site-specific, meaningful and measurable design quality standards

49 INCREASING OUTDOOR USAGE Susan Rodiek and Chanam Lee look at how well-designed external space can benefit the health of older adults in residential care

57 A CASE FOR PATIENT SAFETY Kate Fairhall and Laura Bache explore the relationship between single-bed and multi-bed rooms and patient safety

ARTS & CULTURE

62 EBD FOR MULTIPLE BUILDING TYPES Jacqueline Vischer takes a critical look at a book that examines the use of evidence-based design in recent architectural projects in healthcare, the learning environment and the workplace

Briefing

Corporate partners lining up for Boston

Leading international firms have begun renewing their corporate membership agreements with the International Academy for Design & Health, following the announcement that the 7th Design & Health World Congress will be held in the city of Boston from 6-10 July, 2011.

As the excitement builds and the news spreads that the congress will be organized in partnership with the American Institute of Architects, Academy of Architecture for Health, many new firms are also agreeing or expressing an interest in corporate membership or other sponsorship or exhibition opportunities.

As the leading global forum for the exchange of knowledge and research in the field of design and health, the World Congress presents sponsors, exhibitors and corporate members with opportunities to grow their international business through knowledge and market development, networking, advocacy and exposure to the latest research.

Boston to host 7th Design & Health World Congress

With corporate membership offering benefits across a range of research, education, media, advocacy and events throughout 2010-2011, including a new series of international symposia scheduled for Sydney (April 2010), Toronto (June 2010), the Middle East (October 2010) and Africa (February 2011), membership packages can be designed specifically with a firm's unique business objectives in mind.

Marc Sansom, corporate development and communications director, said: "Discussions are underway and many agreements have already reached with both existing and new corporate partners, sponsors and exhibitors. We are open to opportunities to work with new and old friends from around the globe across all of our activities and, in particular, towards the success of the Boston congress."

For more information on becoming a corporate member, visit http://www.designandhealth.com/Partners/Corporate-Partners.aspx

Norway: Three-day hospital design

Over 70 architects, planners, engineers, facility managers, building owners and industry experts from 14 countries have completed the planning and design of an acute hospital in just 72 hours. Healthcare consultant MJ Medical collaborated at the event in live virtual BIMStorm (Building Information Modelling) forums, using interoperable clinical design tools to show how knowledge can be shared to create world-class hospital designs.

US: HDR launches EBD book

A new book that explores the use of evidence-based design concepts in the planning, programming and design of healthcare facilities has been released by HDR Architecture's Healthcare Consulting Group. *Evidence-based Design for Healthcare Facilities* is edited by Cyndi McCullough.

UK: Design dignity challenge

In partnership with the Department of Health, The Design Council has launched a design challenge called 'Design for Patient Dignity', inviting designers to join with manufacturers, service providers and specialist contractors to help eliminate mixed sex accommodation and increase patient dignity in hospitals. Visit www.designcouncil.org/uk/dignity

UK: Tribal helps NHS go global

Tribal Newchurch, with partners the Tropical Health and Education Trust (THET) and Voluntary Service Overseas (VSO), has been commissioned by the Department of Health to develop an NHS framework for international development.

USA: Healing environment in ICU

Perkins Eastman has completed a new 19,600 sq ft intensive care unit on the 15th floor of Tisch Hospital at the NYU Langone Medical Center. The patient- and family-centered unit offers state-of-the-art technology, more privacy, and the space to accommodate open visiting hours.

Africa: Land of opportunity

Africa's growing middle class and the rising availability of generic drugs and low-cost insurance are attracting private hospital groups to Africa, a market valued at $20bn by the World Bank, reports the *Gulf Times*.

USA: Surgery capability enhanced

Shell and core construction is now complete for the $22m Mercy Medical Plaza, the newest facility at Carolinas Medical Center-Mercy in Charlotte. Designed by RTKL, the new facility will expand the hospital's surgery capabilities.

UK: Scottish appointment for HLM

HLM Architects has been appointed technical advisor on the £842m South Glasgow Hospitals project, the biggest NHS building scheme ever undertaken in Scotland.

UK: Top-class emergency care

Gateshead Health NHS Foundation Trust has revealed exciting plans to transform the emergency care unit at the Queen Elizabeth Hospital in Gateshead. The Trust will be working with consultant architects MAAP to develop a new state-of-the-art building.

Syria: New healthcare system

The Syrian Ministry of Health and the European Union are discussing the implementation of a social healthcare system in Syria as part of the Health Services Modernization Program (HSMP) which is financed by the EU.

Global: New web site for Academy

The International Academy for Design & Health has relaunched its web site with a new modern design at www.designandhealth.com

Cover image: Community Hospital of the Monterey Peninsula, California, designed by HOK
Photo credit: Paul Turang

Architecture and health academies to partner for World Congress

Following the success of the 6th Design & Health World Congress in Singapore, preparations for the next World Congress, to be held in the city of Boston from 6-10 July, 2011, have received a timely boost after an agreement was reached with the American Institute of Architects, Academy of Architecture for Health to partner and jointly organise the event.

The agreement, which firmly establishes the congress as the leading global forum promoting the interdisciplinary exchange of knowledge and research in the field, was signed last month by Dr Ray Pentecost, president of The American Institute of Architects, Academy of Architecture for Health (AIA-AAH), and Prof Alan Dilani, director-general and founder of the International Academy for Design & Health.

News that the International Academy for Design & Health will partner with the American Institute of Architects, Academy of Architecture for Heath in the organization of the 7th Design and Health World Congress & Exhibition in Boston in 2011, is exciting researchers and practitioners across the US and around the world

The US is reported to spend twice as much as other industrialised nations on healthcare, yet its system arguably performs poorly by comparison, leaving more than 45.7 million people without health coverage, while 29 other countries achieve a higher life expectancy and 38 other countries have lower infant mortality.

Prof Alan Dilani said: "As healthcare costs in the western world continue to rise, the impact of the global economic downturn has forced governments and public institutions to face up to a new economic reality that is demanding investment in sustainable social architecture and the design of healthy environments that improve human well-being and quality of life.

"The opportunity to organise the congress in Boston together with the AIA-AAH will provide a platform in the USA, which remains a benchmark for the world, to engage at this important time of change for health systems, which across the world are faced with the challenge of ever-rising costs and demand."

(From left) Dr Ray Pentecost and Terri Stewart of the American Institute of Architects, Academy of Architecture for Health after signing the agreement with Prof Alan Dilani of the International Academy for Design & Health

The International Academy for Design and Health believes that human health is significantly related to the designed environment. Its mission is to spread awareness of this important message through its education, research, events, media and advocacy work and to improve and underpin future professional practice in health promotion by design.

Prof Dilani added: "The design and architecture of health services, technologies and buildings play a critical role in reshaping health systems which require a far greater focus on preventative medicine and care than current systems.

"Using the environment as a strategic tool is one of the most cost-effective and enduring approaches to improving public health, but it is one that requires salutogenic perspectives that consider wellness factors to inspire innovative design solutions." Published this month and inserted in this issue of *World Health Design*, the Call for Papers for the 7th Design & Health World Congress in Boston seeks submissions that address a range of issues related to health promotion by design – and its economic impact.

For more information on the congress, see p 11 or visit: www.designandhealth.com/Events/Boston-2011.aspx

Without **evidence**, all you have are theories

Healthcare organizations acknowledge WHR Architects as a leader in evidence-based design.

WHR Architects is a full service architecture, planning and interior design firm focused on projects in healthcare, education, science and technology. Our staff have authored several articles and books about evidence-based design, including *Evidence-Based Design for Multiple Building Types* by Kirk Hamilton and David Watkins. We think of evidence-based design as an integral part of the knowledge-seeking design process. WHR strives to provide a process that substantiates design recommendations on the most dependable data available. We create architecture with **people** in mind.

Learn more about WHR Architects
www.whrarchitects.com | **1.713.665.5665**

WHR ARCHITECTS
Architecture with People in Mind

Congress makes economic case for design

The economic impact of health promotion by design will form the major theme at the 7th Design & Health World Congress for Design & Health in Boston in 2011

The scientific committee for the 7th Design & Health World Congress 2011 (WCDH2011) has announced in this month's Call for Papers, that the congress programme will focus on the economic case to be made for a greater investment in health promotion by design.

As the world comes to terms with the consequences of a global recession, including lower levels of capital investment, ever-tightening public and private purses, and the need for more preventative public health strategies as a means of containing rising healthcare costs, the financial and economic case for health promotion by design becomes ever more attractive.

Chaired by Jacqueline Vischer of the University of Montreal, the scientific committee will lead the development of the programme for the congress, which is organised by the International Academy for Design & Health in partnership with The American Institute of Architects, Academy of Architecture for Health, and supported by major academic institutions and healthcare industries worldwide.

The Call for Papers invites researchers and practitioners from around the world to submit scientific abstracts of both research and case study examples of best practice on a range of themes, including:

Jacqueline Vischer, chair of scientific committee

- The economic impact of health promotion by design
- The role of the built environment in promoting healthy living
- Evidence-based design: Defining evidence and its relationship to research
- Healthcare cost containment: The role of design
- Technology convergence: The intersection between medical technology, nanotechnology and healthcare architecture
- Places and spaces for healing

Papers that address more than one topic related to the congress will be given preferential attention. All papers will be subjected to a rigorous peer-reviewed process

The scientific committee said: "It is increasingly important as the global economy evolves and changes for healthcare planners to understand the economic drivers of healthcare and healthcare design decisions. It is well established that increased spending on healthcare does not equate necessarily with better healthcare or enhanced well-being.

"A salutogenic approach to environmental design is one of the most cost-effective and enduring methods of reducing illness and improving health. Central to understanding this approach 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.

"Our mission is to spread awareness of this important message and its value as a foundation for improving population health and well-being."

Submitting your abstract

All proposals must include an abstract of no more than 400 words in English. The abstract should clearly state the objectives, methods used, results and conclusions. Papers will be presented to a broad audience of diverse interests, disciplines and backgrounds. Consequently, presentations should seek to focus on the practical importance of environmental design and address the congress themes.

Abstracts must be submitted by email or fax to the WCDH 2011 Secretariat by 16 April 2010. Email: academy@designandhealth.com or fax: +46 8 745 0002. All proposals are subject to blind review.

Proposals must include a title, author(s), organisational affiliation and three keywords. Abstracts chosen for presentation will be published in the WCDH 2011 final programme and book of abstracts, and full papers in *World Health Design*.

All abstracts will be comprehensively reviewed by the WCDH 2011 scientific committee and a select number will be chosen for oral presentation or as posters. The authors should register and pay the registration fee in order to present the paper at the congress. Further information on the conference venue, hotel accommodation and registration fee will be provided in the preliminary programme in August 2010.

For more information and to download the WCDH 2011 Call for Papers, visit www.designandhealth.com

Design and Health

7TH WORLD CONGRESS

Boston, 6-10th July 2011

FIRST ANNOUNCEMENT

CALL FOR PAPERS

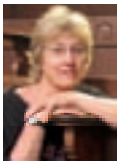
Topic areas for presentations:

- The economic impact of health promotion by design
- The role of the built environment in promoting healthy living
- Evidence-based design: Defining evidence and its relationship to research
- Healthcare cost containment: The role of design
- Technology convergence: The intersection between medical technology, nanotechnology and healthcare architecture
- Places and spaces for healing

For sponsorship and exhibition opportunities, or to apply for corporate membership
Contact Marc Sansom: T: +44 (0) 1277 634176 E: marc@designandhealth.com

& EXHIBITION, BOSTON

An international forum for continuous dialogue between researchers and practitioners

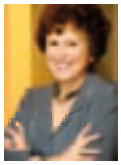

Jacqueline Vischer, PhD

Philip Mead, AIA

Per Gunnar Svensson, PhD

Gunnar Öhlén MD, PhD

Mike Nightingale, RIBA


Jain Malkin, AIA

James Barlow, PhD

Tye Farrow, AIA

John Zeisel, PhD

Alan Dilani, PhD

Ray Pentecost, PhD

Marc Sansom, MBA

Martha Rothman, FAIA

Mardelle Sherpley, PhD

Romano Del Nord

Michael Moxam, AIA

Paul Barach MD, MPH

Derek Parker, FAIA

Charles Siconolfi, AIA

Diana Anderson, MD, MArch, LEED AP

Design & Health
International Academy for Design and Health

THE AMERICAN INSTITUTE OF ARCHITECTS

Media partner

WORLD HEALTH DESIGN

Power of three

South and East Belfast Health and Social Services Trust had a vision: to modernise how it delivered health and social care to its resident population of 205,000. The vision included the development of three community care and treatment centres (CTCCs), each offering a one-stop approach to service delivery. Designed by London firm Penoyre & Prasad in partnership with Belfast-based Todd Architects, each centre has been award-winning, but it is the power of all three as part of the successful delivery of an integrated health strategy that sets the centres apart as placemakers.

The first of the new CCTCs to be completed, the Holywood Arches Centre was a formerly busy but lacklustre health centre, which was rejuvenated with the construction of a new building in front of the old centre – the two buildings are now linked together by a generous atrium. The new centre provides a range of services including social care, primary and community healthcare and acute care out of hospital, as well as seven separate GP practices. The design aims to facilitate future changes in practice, demand, technology and changing work patterns. To encourage staff to come together at lunchtime and share knowledge (300 are outreach workers delivering care in people's home), a staff club was designed on the roof with panoramic views out across Belfast.

Located on a compact, awkwardly-shaped corner site alongside a mainline railway, the Bradbury Centre in South Belfast is made up of two main elements: a curved, glazed organic form and a long brick and

Clockwise from left: The staff club at the top of the Holywood Arches Centre provides staff with views over Belfast; the Bradbury Centre's four-storey atrium acts as a link between the building's two main elements; services in the Knockbreda Centre are arranged around a curvaceous atrium; artwork, such as this printed glass artwork at Knockbreda, was integrated into the budgets for all three centres

rendered block – linked with a glazed-roof four-storey atrium. Welcoming, accessible and easy to navigate, the building is designed to be a pleasure to visit. Interesting colours, warm materials, natural light and a specially commissioned series of artworks create a calm, uplifting and distinctly non-institutional environment.

The Knockbreda Centre, highly commended in this year's Design & Health International Academy Awards, was the last of the three community care and treatment centres to be completed. The 4600sqm five-storey centre achieves civic presence with a generously glassy elevation directed towards the shopping and civic centre opposite – and providing views to the hilly landscape beyond. Internally, services are arranged around a curvaceous atrium. The upper entrance is signalled by the printed glass artwork on the curtain walling. Several sculptures are placed around the site within the landscaping and, internally, there are a number of wall hangings and pictures as well as large scale textiles, helping to create a non-institutionalised healthcare environment.

See ***Care in the Community*** on pp 24-29 to find out more about this and other community care projects.

ANSHEN + ALLEN

Good design can transform lives

architecture planning interiors
healthcare research education

London | San Francisco | Boston | Seattle | Columbus
88 Gray's Inn Road, London WC1X 8AA info@anshen.co.uk www.anshen.co.uk

The broader view

Designers need to take a more proactive role in helping the health world understand the real impact of design on health, urges *Jacques Mizan*

'Prevention' must be the most popular word flying around the world's corridors of power right now. Faced with the volatile mixture of ageing communities, cutbacks in public funding, reduced access to capital and an ever-increasing demand for the latest and best healthcare provision, there is a frantic need to find something to stem the tide – and prevention is it. To some prevention means improving access, longer clinic opening times, more information for patients, choice, 'better' training for doctors, incentives to get doctors to do prevention. Prevention is also about changing behaviour. Significant resources are being ploughed into understanding behaviour change and then designing tools to shape it. One can only imagine the sums of money that have been ploughed into marketing campaigns aimed at stopping smoking, for example. In the UK, the NHS Choices website has been developed at a cost of some £22m to date. None of this seems to be making any significant difference.

What confuses me as a clinician is why all of this goes on in blissful ignorance of the impact of design on health. There is now a growing body of evidence demonstrating how the design of environments can shape behaviour, perhaps more so than any of the aforementioned interventions. A well-designed urban landscape, shaped with and by the community, which provides solutions for exercise, social connections and support, access to nature and fresh food, enabling opportunities for employment and education, these are the true shapers of health and wellbeing. These are the social and environmental determinants of health. And design is core to all of them.

However, shaping environments through design is much more complex than the straightforward solutions presented in the first paragraph. Many within health see such an approach as too costly and simply impossible to do. So the default tends to resort back to the quick fixes of improved access, choice, new buildings, more technology etc. This is short-termism in its worst form and unlikely to do anything that remotely fits the definition of 'prevention'. These interventions are wasteful of taxpayers' money, wasteful of my time as a clinician, and wasteful of the time of designers. How can such waste be justified in such frugal times?

Design needs to swim against the tide and push for – insist on – what might best be described as total-place design

The design world needs to come to the fore now. There is a desperate need to educate the health world about the potential for design to shape health, and how 'savvy' such an investment can and will be. Looking inward, design and architecture fraternities need to widen their focus – to zoom out from the focus on developing spaces and places in isolation.

Of course, it is easier to just go along with what has been requested in the design brief. But if design really wants to play a part in health, then it needs to discourage quick fixes. Design needs to swim against the tide and push for – insist on – what might best be described as total-place design. Crucially, design can, and should be, the driving force to get the remaining stakeholders to do the same.

Dr Jacques Mizan is a senior associate with the Young Foundation's Health Launchpad, a practising GP and an honorary research fellow in the Department of General Practice and Primary Care at Kings College London

Sustainable strategies

The global economic recession has highlighted the challenge of the ever-rising costs associated with healthcare delivery around the world. Our four experts discuss the role of design in containing costs and supporting preventative approaches to care

An integral element in the debate about healthcare reform in the United States needs to focus on eliminating the inefficiencies in the way care is delivered. We believe that a significant factor in helping make healthcare more affordable – and thus more accessible to all citizens – is to contain costs, especially those related to inefficiencies in how a building facilitates the work of its users, as well as how it functions operationally.

Increasingly, research demonstrates that design can exert a powerful influence on both clinical outcomes and building performance. In fact, some gurus predict that 'performance' may be the next big trend in healthcare. In the US, Medicare no longer pays hospitals if they make certain kinds of medical errors, and is considering 'value-based purchasing' that reimburses healthcare providers based on clinical outcomes.

This new emphasis on clinical performance will inevitably impact on facility design and construction. If hospitals and doctors need to prove performance, they will be expecting their facilities to do the same. It will be imperative to demonstrate that design can reduce medical errors, infections and falls while relieving patient and caregiver stress. It is also imperative to show that design can significantly reduce operating costs by decreasing energy and water usage, lowering maintenance costs and lessening waste generation. As we plan, programme and design advanced healthcare facilities for our clients, we have a responsibility to consider all the ways in which those facilities can help patients heal better, allow nurses and physicians to provide better care and help facilities work better and more efficiently. In the face of a rapidly changing healthcare landscape, to do anything less is unacceptable.

Design can significantly reduce operating costs

Doug Wignall, AIA, LEED AP, international director – healthcare, HDR Architecture, US

The idea that good design can be uplifting, inspiring and affect one's morale is well established. In healthcare this means that good design can contribute to faster recovery rates and in turn bring significant cost benefits to the health system.

Most people attending health facilities would probably rather not be there and are apprehensive about what they may have to go through. By designing welcoming and accessible buildings which are easy for people to find their way around, such negative feelings can be significantly reduced. Our designs have as much glazing at entrances as possible so the visitor can see in and once inside are easy for them to find their way around. Treatment and inpatient areas are designed to be as non-clinical as possible using colour, texture and materials to create a rich and interesting, rather than alienating, environment.

So how do such measures reduce cost to the health system? Obviously, if the healing can start before the patient reaches the door and can be enhanced by the internal environment, time spent in the healthcare facilities will be reduced, demand for bed or outpatient space will be less and facilities can be smaller. Patient self-help and empowerment will also reduce staff costs. A popular and accessible health facility will provide opportunities for health education and preventative care for whole sections of the community who might otherwise not become involved until expensive care or treatment is needed. Good design can also provide significant benefits in flexibility and to allow for changing technical needs and care methods at minimal ongoing cost. Now more than ever we need to make buildings last longer and provide a more sustainable estate for the long term.

Good design can contribute to faster recovery rates

Greg Penoyre, partner, Penoyre & Prasad, UK

Prior to the downturn in the economy, healthcare systems were tending toward the construction of larger, showpiece hospitals. These new facilities helped them effectively compete for patients and staff based on image and amenities – but often lacked focus on the potential for efficiency improvements.

Given today's economic climate, building is not the only factor. More healthcare providers are focusing on operational improvements to provide value for their investment. The goal is balance. Each is looking to tune operational effectiveness and right-size square footage without sacrificing the customer experience.

Designing smart hospitals...will be the new standard of efficient care

As such, the owner must set future space and provider efficiency goals. They must also consider opportunities to improve operational effectiveness. Examples of operational effectiveness include developing right-sized space, increasing volume without increasing space, creating non-duplicated services across multiple sites, implementing standardisation and flexibility, and eliminating service fragmentation.

Healthcare providers are incorporating operational strategies which include using lean processes to reduce/eliminate waste, implementing just-in-time delivery models for all support services, increasing caregiver patient time by reducing travel distances, integrating smart technology into the hospital, and using bedside registration. The objective in each case is to increase throughput and efficiency.

Patient- and family-centred care will also continue to drive the healthcare industry. In addition, market competitiveness, increased patient acuity, population ageing, technology and information systems, regulations and building codes, and flexible design will be vital considerations.

Designing smart hospitals that challenge current thinking – and which are anchored in evidence-informed research – will be the new standard of efficient care in the next decade and beyond.

Frank D Kittredge Jr, vice-president/operational planner, Clinical Solutions & Research Group HKS, US

Preventative medicine has long been recognised as a highly effective means of reducing healthcare costs. Good 'primary healthcare' can be a fundamental element of preventative healthcare. However, in the South African context this is often not the case, given that historical political policies have led to resource deficiencies and dramatic disparity between rich and poor, as well as between rural and urban development. The results of this are more evident in rural areas where the primary healthcare clinic is generally the most accessible point of access to medical care.

Here the clinic is required to provide both preventative and curative treatment of infected patients, leading to potential cross-infection. Picture a waiting room where sitting next to a healthy visitor is a patient infected with a contagious disease awaiting treatment.

These buildings should facilitate health workers' optimal opportunities to educate the public

The most problematic issues facing the South African Health system are the prevalence of tuberculosis, HIV and malnutrition. The financial burden on the health budget, in dealing with the consequences of these conditions, is enormous. The incidence of these conditions can be substantially mitigated through an extensive integrated health education plan supported by well-designed and sufficiently staffed primary care centres. These buildings should facilitate health workers' optimal opportunities to educate the public regarding healthy living practices, then offering the health workers opportunities to interact with the broader community – not only those coming for medical treatment. We believe this could assist in breaking down the social stigmas associated with diseases like tuberculosis and HIV. These community health centres or clinics require the sensitive segregation of preventative and curative treatment areas as well as the inclusion of multipurpose community spaces. The design should allow for early screening, on arrival, between healthy visitors and patients with contagious diseases such as active TB.

Alex Van Den Berg, director, Nightingale Associates, South Africa

The shift left

The financial crisis could quicken the movement of services from acute to community settings, and design has a critical role to play, ***John Cole*** tells Marc Sansom

Three projects from Northern Ireland were awarded commendations in the Design & Health International Awards this year. John Cole, chief estates officer of Northern Ireland's Department of Health, Social Services and Public Safety and chair of the European Healthcare Property Network gives his views on procurement, design quality and the contribution research can make to improving healthcare environments.

Marc Sansom: How does design quality improve patient outcomes?
John Cole: I think all of us intuitively feel that our environment has a major impact on our outlook, our approach to work, our interactions with others, our energy levels and our moods. There is an increasing body of work that provides research-based evidence to support our intuition in this regard and which demonstrates the potential for our built environment to have both positive and negative impacts on those who are ill and on the effectiveness of the healing process in different environments.

In health facilities where many users are there because they already have a health problem, it would seem only right that those of us charged with creating the facilities have a responsibility to ensure that, to paraphrase Florence Nightingale, they should do no harm to service users. Poor design quality can be detrimental to healing yet frequently, there is evidence of insufficient focus or recognition by health service clients and design teams on eliminating the negative aspects of poor design, e.g. inadequate space standards, limited natural light, poor ventilation, oppressive interiors, design that facilitates spread of infection or patient accidents. Not only should we eliminate poor design but it is our responsibility to ensure that we optimise the benefits of good design by creating true healing environments to support significantly better patient outcomes and major economies over the lifetime of a facility.

MS: How important is the application of research and evidence to the improvement of healthcare buildings?
JC: Many of the difficulties associated with the lack of consistent high quality design in health facilities are due to: 1) the lack of awareness of some clients and designers of the direct connection between the quality of design input and patient outcomes and 2) the inability to make the case for what are often relatively small amounts of additional capital investment required to deliver high levels of design excellence.

In the debate between architects and directors of finance it is often difficult to demonstrate bottom-line benefits which would justify any additional capital expenditure required because of the lack of relevant evidence. Unfortunately the architectural profession is not renowned for its structured research or for sharing knowledge, the latter partly because of the competitive nature of their work. It is therefore critical that organisations like the Academy actively promote and support research and dissemination of knowledge in these key areas. We need to be able to deliver evidence-based design. To do so we need to be able to ensure that our knowledge base is as current as possible so we can constantly review and update our design approaches to reflect emerging findings.

The team from Altnagelvin Area Hospital, designed by HLM Architects with Health Minister Michael McGimpsey, receiving their Design & Health Awards commendation

MS: Which procurement models have been successful in recent years?
JC: The answer to this question could fill several books but I will seek to focus on what to me are a few key principles which are central to my own approach and which can be incorporated into any of the current procurement models to deliver design excellence. Good design quality is facilitated by:

- a clear understanding by the client of what is required expressed in a comprehensive brief;
- a culture promoting the value of design which is actively and continuously maintained within the project environment and is shared

with all participants;
- a clear articulation of the quality objectives for the project against which all proposals are measured and a firm resistance to accepting anything less;
- a budget for the project which is commensurate with the content and quality of the scheme required;
- selection of design and construction teams on, primarily, quality criteria;
- an ongoing direct relationship and iterative interaction between the creative design team and the real client for the building;
- independent external expert design reviews at key stages to ensure that the required quality is being delivered;
- understanding the difference between the 'what' and the 'how' and not letting the 'how' compromise the 'what';
- viewing the incorporation of art and landscaping as essential elements in the design of health buildings;
- a focus on learning and continuous improvement; and
- a little passion.

John Cole (left) and Northern Ireland Health Minister, Michael McGimpsey presenting Design & Health International Award commendations to the Knockbreda Centre, The Bluestone Unit, Craigavon Area Hospital and Altnagelvin Area Hospital

MS: What advice would you give to governments and health clients assessing procurement models for healthcare buildings?
JC: Start off with a strategic vision of the type of health service you wish to provide and avoid the pressure to give way to short-termism. Health facilities can only be effective if they are responding to a coherent service vision. Articulate that service vision into a design vision.

Invest in becoming an informed client able to interface from a position of strength and knowledge with private sector design, construction and service organisations. Procurement is only effective if you are an intelligent customer.

Select only the highest quality designers and contractors and build longer term partnerships with these organisations with incentives for success but dependent for their ongoing existence on continuing high levels of performance.

As a client, never delegate the responsibility to others to determine what quality of facilities you will receive. Maintain effective ownership of decisions on the design quality of projects through close involvement of key client representatives.

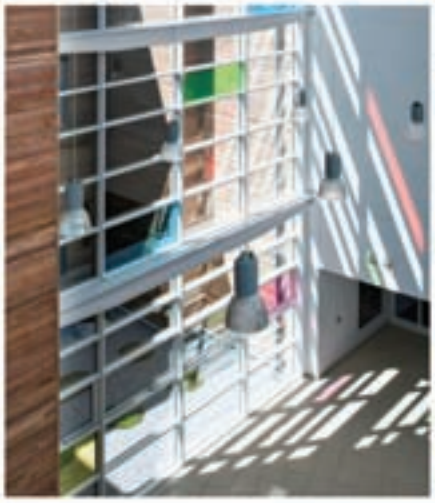
MS: What key factors set the three award winning projects apart as international benchmarks in design quality?
JC: In organisational terms the issues that were key to success in these projects were having the right culture, the right processes, the right resources and the right people and then, most importantly, putting at the centre of the design philosophy the optimisation of the quality of experience of the service user. In relation to more specific design matters, key elements in these buildings, and equally found in others developed by Health Estates, are:
- relating the building to its context;
- investing in public space in the buildings as well as functional space;
- optimising the use of natural daylight and views from the building;
- eliminating unnecessary corridors;
- facilitating natural wayfinding;
- sensitive lighting design;
- attention to detailed design and material, fittings and furniture choice;
- creating human scale and non-intimidating design;
- ensuring that clinical requirements are properly integrated within the overall design approach and do not visually overwhelm; and
- the incorporation of art and landscaping.

Procurement is only effective if you are an intelligent customer

MS: What design factors can improve the patient and staff experience?
JC: Successful buildings should convey a sense of the level of thought that has gone into the design to enhance the experience of staff and patients in using the building. Good buildings engender pride and a sense of ownership by staff, users and the local community.

Too many health buildings feel like large intimidating machines that are processing all who enter. Healing environments must be softer and less relentless. The creation

The New Victoria Hospital



HLM ARCHITECTS

The New Victoria Hospital, Glasgow

The new Victoria Hospital treats around 400,000 patients annually by offering integrated diagnostic and treatment services including outpatient clinics, day surgery, rehabilitation, and specialised emergency services, thereby introducing an ambulatory model of one stop care in South Glasgow based on the following key principles:-

- Increased accessibility to ambulatory care for the local community
- Prevention of emergency work adversely affecting the efficient delivery of elective care
- Improved quality of patient focused care
- Streamlining of the patient journey to provide a one stop service
- Achieving compatibility between healthcare delivery and technology in a fit for purpose building

HLM Architects
2nd Floor
Alea Court
121 West Regent Street
Glasgow
G2 2SD

Christopher Liddle
Chairman
T: 0114 263 9600

of a series of small occasional places which are comfortable and have views out to facilitate conversations or to allow people to withdraw for a time are highly valued. Art and landscaping are particularly important in bringing human scale to buildings.

Architecture is the art of managing conflicting requirements

MS: How do we balance the need for carbon reduction against the patient experience?
JC: Sustainable development is a fundamental requirement of all buildings. Health buildings, particularly those providing more complex services, will have unavoidable high energy needs related to these services but in all other aspects of their design they should be exemplars for low-energy sustainable design solutions. In every project there are compromises. Architecture is the art of managing conflicting requirements to create a solution that appears to satisfy them all.

Sustainable design solutions are more likely to provide an improved patient experience than those which ignore sustainable design principles. Design teams must use their creativity to rise to the challenge of meeting the new standards that will contribute to reducing the impact of climate change. In this regard it is even more essential that best practice solutions are shared.

MS: As healthcare costs rise, what role can design play in promoting the role of preventative public health strategies?
JC: In Northern Ireland the focus of our health strategy is on health promotion, illness prevention, greater personal responsibility for health, earlier diagnoses and interventions and better management of chronic diseases outside the acute sector. The recognition that health problems are often the result of unhealthy lifestyles, poor diet, inadequate exercise and stress resulting from financial, legal, housing, relationship and employment problems requires a more proactive and cross-sectoral approach from a range of government agencies.

As a result, there has been a significant shift in the type and nature of health facilities that are currently being built in Northern Ireland. There is much more investment in community and primary care facilities and, where possible, we are seeking to link these health facilities with other facilities like leisure centres, swimming pools, libraries and community advisory services, which together provide for a more holistic response to the health and well-being of the local community. This is leading to a new typology of building which presents new challenges and opportunities to demonstrate the benefit of high quality design. A good recent example in Northern Ireland is the Grove Health and Well-being Centre in Belfast that combines a wide range of services that are synergistic in this way.

It is difficult to predict the whole-life cost benefits to be achieved by 'the shift left', as this movement of services from the acute setting to community setting is known. Kaiser Permanente in the US has adopted a similar approach to the management of the health of their members and achieved financial results and economies which support this direction of travel. The principal benefits in terms of dramatically improved quality of life for major sections of the population, if achieved, cannot however be measured in simply monetary terms.

MS: What does the future of healthcare infrastructure development look like over the next ten years?
JC: I would predict a number of consequences of the global recession, cuts in public spending and less access to capital, including:

- significantly lower levels of capital investment as governments seek to reduce national debts incurred as a result of the financial crisis;
- more considered regional strategic development plans with more demanding tests; to justify individual capital investment decisions
- rationalisation of acute hospital services into fewer but larger 'centres of excellence';
- incremental modular developments providing a series of high-value focused but flexible 'small-bang' solutions rather than the 'big-bang' developments of new hospital complexes. This incremental approach will allow organisations to take better account of the rapidly evolving models of healthcare, 'the shift left' and the potential of information technology to transform how and where services are delivered;
- innovative system and facility design skills being focused on and seen as a potential facilitator of revenue efficiencies in the cost of delivering healthcare services; and
- the continued development of locality-based primary and community polyclinic facilities, providing a growing range of diagnostic and treatment services which were previously only available in hospital settings, combined with a focus on lifestyle change and health promotion through cross-sectoral multi-agency co-located facilities.

John Cole

1973/5	BSc (Arch) / DAAS Queens University, Belfast
1976	Registered Architect
1993-2007	Member of RIBA Council
2008	Chairman of European Health Property Network
2002-2009	Chief Executive, Health Estates Agency Northern Ireland
2009	Chief Estates Officer, Department of Health, Social Services and Public Safety

Marc Sansom is the editorial director of World Health Design, and corporate development director of The International Academy for Design & Health

Gateways to Health

A number of outstanding community care buildings are drawing attention to the power of architecture to communicate more inclusive and enlightened services and inspire the surrounding populations. ***Veronica Simpson*** reports

Community healthcare should, in an ideal world, be an opportunity for unrivalled creativity. One would think that the necessity for bespoke and differentiated responses, both in the services provided and the design of the buildings that house them, would galvanise and promote creativity in architecture, as well as service concepts, but that is sadly rarely the case. It is only when there are visionary individuals involved, or teams of individuals who have a strong concept of what their community needs and what modern architecture can do to fulfil those needs, that truly remarkable buildings and facilities result.

A handful of outstanding community projects have inspired ambitious projects across the globe in terms of the range of services they provide and the impact these have had on their communities. One is the Bromley by Bow Centre in east London, a GP centre which has grown to house its own art workshops, supports local entrepreneurs and small businesses with space and mentoring, and offers a vast network of classes and community groups at one or more of its idiosyncratically designed buildings (all of this stemming from the vision of resident GP Dr Sam Everington). In the US, the groundbreaking Codman Square Health Center, in Dorchester, Massachusetts, promotes a culture of health and well-being within its urban and impoverished community through youth programmes, after-school computer technology classes for kids, weight loss and fitness programs for overweight teens, adult education and financial health services (driven and supported by its CEO Bill Walczak).

It was a visit to Codman Square that inspired John Cole, chief estates officer at the Northern Ireland Department of Health, Social Services and Public Safety, to reframe all his region's disparate health service offices into a streamlined, multi-disciplinary, holistic framework. But Cole, a former architect, knew that these schemes would be even more effective if they harnessed the power of modern architecture.

Thanks to Belfast's enlightened healthcare and architecture policies, a family of community healthcare buildings is being created that will serve its citizens well into the new millennium. These buildings have become a regional, national – and even international, following a slew of awards – benchmark for high-quality public design, thanks to Cole's visionary policies.

Faced, in 1998 with a £10m bill for repairs from what was then the South and East Belfast Trust (SEBT), Cole and his team

Community Hospital of the Monterey Peninsula (CHOMP) site plan

took a good look at the 42 individual facilities scattered around the city and decided, after visiting a couple of inspiring community care centres in Minneapolis and Massachusetts, to do a complete reorganisation. The buildings have been replaced with three community care and treatment centres (CCTCs), funded entirely by the sale of the 42 existing buildings.

These new buildings represent a radical change in community healthcare provision. Says Cole: "We wanted to provide everything people needed in one building – a one-stop shop, or gateway to health." The centres combine a holistic array of social and healthcare services, including children's services, podiatry, chiropody, physiotherapy, dentistry and Citizens Advice Bureaux, with or without GP services.

In order to flush out the most creative architectural and social solutions, Cole launched a design competition, with competing architects briefed to make right what he felt was wrong with so many health service spaces – among them, the proliferation of "dull, dead spaces", poor clarity, confusing signage and wayfinding, a lack of natural lighting or ventilation and too many "double-loaded corridors with low ceilings and artificial lights". Projects were awarded under his visionary procurement process, 'performance-related partnering' (PRP), which groups projects in clusters; good practice on the part of the construction and design teams on the first completed project – relating to design and build standards, not just budgets – results in their being awarded the remaining work.

Penoyre + Prasad won the first competition, in conjunction with Belfast-based Todd Architects (see *Placemaker*, p14-15). Its first three buildings are now up and running – The Arches, The Bradbury and the 2009 Design and Health International Academy Award-winner Knockbreda – and have been joined by a fourth, the recently opened Carlisle Centre, part of North and West Belfast NHS Trust, which P+P/Todd won at a later date.

Well-designed social circulation spaces enhance wayfinding in London's Waldron Health Centre

Infused with respect and care

There are common principles of design manifest throughout these buildings, though each has its own character, responding to the sites' geographical and demographic constraints. Dominant in each is a central three- or four-storey atrium which welcomes visitors, feeds light into the heart of the building and helps to clarify circulation and wayfinding. Low-slung, open reception desks are immediately visible from the entrance, with attractive and comfortable seating areas and greenery nearby.

The buildings feature generous staff quarters, with rooftop cafes/canteens, lounge areas and expansive views onto the city. Inspired use of highlight colours and artwork also creates a strong and pleasing identity to the buildings – 1% of the total project budget is given over to specific and commissioned artwork.

On visiting these CCTCs, some of them four years into their full occupancy, what is striking is how well they've been maintained. Cole is unsurprised by the continued care: "I think if you give people something that shows that kind of care and respect, they treat it accordingly."

This degree of care and respect extends to staff consideration and consultation throughout the process. Staff were encouraged to "view space as a resource, not as territory" in order to help facilitate the very different methods of working that the new buildings require, including hot-desking and cross-disciplinary collaboration. The results speak for themselves, Cole concludes: "The staff clubs and terraces are well used. Staff are now working very effectively in

Staff were encouraged to "view space as a resource, not a territory"

Community Hospital of the Monterey Peninsula (CHOMP), California
Client: Community Hospital Foundation
Architect: HOK (Los Angeles office)
Cost: US$170 million
Area: 290,000sq ft / 26,942sqm (200,000 sq ft new, 90,000 sq ft renovation)
Schedule: South Pavilion completed October 2006; Forest Pavilion Feb 2007, Renovation due May 2010

To preserve the character and integrity of this much-loved community hospital, the plan, massing and scale of HOK's new CHOMP buildings are almost identical to the original mid 19th-century masterpiece by Edward Durrell Stone. Ornamented concrete exteriors plus large windows offering views of the surrounding mature pine forests and the Pacific Ocean beyond preserve the tranquil look and feel of the original. The project required a new three-storey 120-bed patient wing, plus a new diagnostic and treatment wing, which centralises critical care facilities and related services, and provides new ICU, emergency departments, cath labs and imaging. The renovated area includes a new cafeteria, a cardiopulmonary department, a rehab gym and meditation room. HOK excavated one to two levels down on both ends of the hospital so that the new buildings' roof levels would align with the originals. A three-storey sunken car park for 500 cars has been created under the expanded entrance.

multi-disciplinary teams. It has hugely improved accessibility and understanding of how the services work."

There are now five of these CCTCs completed in Belfast, including The Grove, a combined library, health and leisure centre (designed by Avanti Architects, with Kennedy Fitzgerald). Forty-two are planned over the next 10 years across the five Northern Ireland healthcare trusts, for each of whom an architect team has been appointed. In addition to those already mentioned, the teams include: Edinburgh-based Richard Murphy Architects and Belfast's RPP (Robinson Patterson); Keppie Architects and Gareth Hoskins Architects; and Todd Architects with Hall Black Douglas.

Due to the structure of their healthcare systems, the US and the UK seem to lead the way in community care innovation, says Phil Astley at London's Medical Architecture Research Unit, though he complains that too often these projects are clinically rather than socially driven and seldom does the architecture measure up to the ambitions. However, few would deny that the presence of a growing number of architecturally outstanding community projects either side of the Atlantic are raising the bar in terms of public perception of what these places should look like, as well as what they can achieve for their community.

In the US, HOK has recently completed three very diverse community projects. The newly completed Harlem Hospital Center is, in the truest sense, a community hospital, serving its population of often disenfranchised and impoverished New Yorkers in a way that is intended to motivate and inspire its community (see case study). HOK's Patsy Trine says: "In this community there is a lack of

Kentish Town Health Centre

Design champion and GP Roy MacGregor selected Allford Hall Monaghan Morris (AHMM) as architects of his new community vision through a RIBA-led design competition in 2002 (procured through Local Improvement Finance Trust (LIFT) funding). Surrounded by fine 19th-century residential buildings, it faced local opposition as well as many bureaucratic, funding and logistical battles before the building was completed late 2008. A design inspired by the 'Jenga' woodblock game sees the impact of this huge building reduced by three stacked and cantilevered storeys, broken up by small terraces and balconies. Space and light flows along a three-storey central atrium 'street', off which all treatment rooms flow. Frequent viewing points into and from the building improve legibility and wayfinding. Boldly coloured and playful graphics along the interior and exterior walls, high-quality furnishings and fine art complete a sophisticated and welcoming scheme.

Photo courtesy of Allford Hall Monaghan Morris Photographer: Tim Soar

Client: Camden and Islington Community Solutions for Camden Primary Care Trust, NHS
Architect: Allford Hall Monaghan Morris
Cost: £10.1 million
Area: interior 3,432sqm, external landscape area and car parking 1,332sqm
Procurement: LIFT (Local Improvement Finance Trust)
Completion: December 2008
Main contractor: Morgan Ashurst (formerly Bluestone)
Structural engineer: Elliott Wood Partnerships
Service engineer: Peter Deer Associates
Landscape architect: Jinny Blom Landscape
Healthcare consultant: Sonnemann Toon Architects

trust in institutions. But many of the diseases that are prevalent in the community can be prevented or easily treated without hospital stays or invasive procedures. We wanted to get the community to see it as a place where they want to go in order to stay well."

HOK's masterstroke was to photograph, and then display via huge blown-up projections across the façade of the building, a series of murals created for the hospital in the 1940s through the Works Progress Administration's Federal Art Project (during its eight-year existence, the WPA created over 500 murals solely for New York's public hospitals). The response of the community to its new healthcare building has been overwhelmingly positive.

On the other side of the country, an expansion at the Community Hospital of the Monterey Peninsula (CHOMP) saw HOK adding to an original building by Edward Durell Stone and seamlessly blending the new patient wing and diagnostic centre with the original. Says Trine: "This is one of the most beautiful hospitals in one of the most beautiful locations we've ever done. This was a client that told us they didn't care about cost and they didn't care about certain operational requirements that we usually need to focus on in healthcare. Their focus was all about embracing patients in a healing environment from the moment they walk into there."

The third of HOK's recent community projects takes a leap into the future. For Methodist Stone Oak community hospital in San Antonio, Texas, the client asked HOK to design the facility of the future. HOK responded by creating a canted, 'same-handed' patient bedroom which minimises the distance between bed and bath to reduce the risk of falls; HOK also designed a 'wraparound' patient grab rail that further secures in-room safety.

Enlightened clients and the need to stand out from the competition are increasingly common in the US healthcare system. Less typical in many parts of Europe, there are still areas of outstanding innovation. One such project, the Ravelo clinic in Lanzarote, winner of this year's Design and Health International Academy Awards Judges' Special Prize, ticks almost every box with its bold and yet welcoming design, its treatment of natural light and harnessing of stunning views to maximise the inhabitant's enjoyment of spaces within and beyond the building.

In the UK, this sector has seen some of the most creative architectural solutions of any healthcare stream, with stunning recent examples including Buschow Henley's Waldron Health Centre in Lewisham (winner of Best Primary Care design at the Building Better Healthcare (BBH) Awards 2008) and Edward Cullinen Architects' Stonebridge Hilliside Hub. The Waldron Health Centre achieves maximum legibility and impact through a cleverly arranged series of social circulation spaces that help to define the journey from waiting room to clinic. Stonebridge, meanwhile, marks the culmination of a 14-year long regeneration project for an economically and socially challenged part of North West London. A three-storey mixed-use building, its two 'wings' accommodate a health centre and a retail unit, both topped with mixed-tenure

Peterborough Regional Health Centre *Winner of a Design & Health International Academy Award, 2009

Stantec Architecture
In Vancouver, call Bruce Raber at (604) 696-8000 • In Toronto, call John Steven at (416) 596-6666

Stantec

One Team. Infinite Solutions.

residential units and fused together by a central community facility aimed at education and integration. GP and design evangelist Dr Jacques Mizan (see *Standpoint*, p15), however, feels that too many still end up as "boxes with lots of rooms in them".

"The challenge about being creative with community healthcare buildings," he says, "is that first you need a creative client, and the clients are usually GPs and healthcare teams who really don't have a clue about healthcare design...Secondly, the market of architects and contractors is dominated by a few names. They have got a formula that kind of works. Faced with a client who doesn't know what they are after, they will deliver the safe option. Occasionally you get someone who bucks the trend." Mizan is a great admirer of Penoyre + Prasad's work, for example.

He is also a huge fan of what Dr Roy MacGregor has achieved with Kentish Town Health Centre (see case study). MacGregor's radical notions included banishing all paperwork and making the whole surgery digital (one of only two healthcare buildings in the UK to do so yet, he says), creating a central 'hot-desking' workspace for all staff and making all 'surgery' spaces and offices non-proprietorial. Doors are numbered, painted with black magnetic paint and each member of staff has his or her name on a magnetic strip, which attaches to the door when they're in residence. Staff belongings are tidied away at the end of the day and stashed in a central shelving system. One of the key platforms of MacGregor's new centre is the provision of employment and welfare advice. "For every £10,000 we spend on providing welfare advice, we increase the income of the population by £100,000. Last year we spent £50,000 and captured £498,000 uplift in income for attendees," he says.

Mizan concludes: "To get a building like this you need a real champion who has got the vision, the energy and space within his brief to get where he wants. He has looked at how people work, then looked at how people should work, and tried to create a building that fits the new model. This building may well help the cause. It's been nominated for enough awards now for people to sit up and take notice of what happens when you challenge the notion of territorial space."

Veronica Simpson is an architectural writer

Harlem Hospital Center

Client: New York City Health and Hospitals Corporation
Architects: HOK
Project cost: US$249 million
Area: 150,000sq ft/13,935sqm
Completion: September 2009

Harlem Hospital Center is technically a city hospital, but it is in the truest sense a community hospital, specialising in areas that truly affect this community, including diabetes and heart disease, and offering a major paediatrics facility. HOK masterplanned and designed a new 150,000 sq ft patient wing which uses art, light and colour in order to engage the community. The expansion of the existing facility involved the replacement of most of the beds and diagnostic imaging equipment. The plan integrates inpatient emergency room and outpatient services under one roof in the new Patient Pavilion. Its most outstanding design feature is the wraparound mural projected onto the exterior, echoing the iconic mural designs that have been a major feature of the hospital's public areas since the 1940s.

Southern **symmetry**

Keen to tap into the latest research and innovation, Latin America looks north for new partnerships while retaining a distinct regional flavour, writes ***Emily Brooks***

Two prestigious gatherings in South America this November will promote the region's healthcare to a world audience – the International Hospital Federation's 36th World Congress in Rio de Janeiro (the first in its history to be held in a Latin American country) and the International Union of Architects (IUA) Public Health Seminar in Buenos Aires. As with any such event, the host nations are eager to show off those areas of healthcare in which they excel. But what's the overall picture for a continent that straddles the developed and the still-developing, and experiences high levels of inequality, despite the promise of swift economic growth?

It's easy to see the thinking behind the decision to make Brazil the focus for the IHF's congress. As South America's most populous country, with its highest GDP by some margin, it is one of the four 'BRIC' nations (along with Russia, India and China) that in 2001 Goldman Sachs famously identified as having exceptional growth potential. It is also a country where hospitals play a central part in healthcare policy, absorbing 70 per cent of Government health spending[1]. There are 19 JCI-accredited facilities and programmes here, which are jointly accredited with the Consortium for Brazilian Accreditation. These include the prestigious Hospital Israelita Albert Einstein (HIAE) in São Paulo, which has just opened a 16-storey, 750,000 sq ft new outpatient building that is part of a wider masterplan conceived by Kahn, a practice that has had a Brazilian outpost since 1998. Outpatient buildings are relatively rare in Brazil, where medical offices are usually incorporated within a centralised hospital building. Its high-rise design is a typical response to the realities of building in dense urban environments; its sustainability measures (such as its rooftop park) and anticipated LEED certification, are less than typical for the region.

Hospital Universitario San Vicente de Paúl's welcoming reception lobby

For all this, however, HIAE remains the exception rather than the norm. "A few hospitals are world-class centres of excellence; they serve the minority, the well-off," asserts a recent World Bank report[1]. "'Substandard' best describes most hospitals, the ones serving Brazilians who cannot pay out of pocket or afford private insurance. These hospitals, many dependent on public financing, deliver inefficient, poor-quality care, judging from the available data."

The World Bank's assessment serves as a stark reminder that Latin America is still a developing region, suffering from many of the same health problems that affect similar regions. The Pan American Health Organization's (PAHO) latest review of its territory[2] notes that: "During the past decade, and in good measure due to the growing permeability of transnational borders, diseases once thought to have been brought under control – such as tuberculosis, malaria, dengue, plague, yellow fever – have been reappearing, while relatively new communicable diseases – such as HIV/AIDS, SARS, and more recently, West Nile fever and the new variant of avian influenza

American British Cowdray (ABC) Neurology Center, Mexico City
Project completion date: 2011
Client: American British Cowdray (ABC) Medical Center
Architects: HKS
Project cost: US$31m including parking garage
Size: 185,000 sq ft (17,187sqm)
Number of beds: 100
Contractor: not yet appointed
Structural engineer: Correa Hermanos
MEP Engineer: INCLAR

American British Cowdray (ABC) Neurology Center, Mexico City

The new neurology centre on the Santa Fe campus responds to the curving form of the HKS-designed women's and children's centre, albeit on a smaller scale, and uses similar building materials including composite metal panels and locally quarried marble, to harmonise all of the buildings on campus. Planting on a series of balconies and terraces gives access to nature and protects south-facing windows from the harsh sun. Inside, the particular needs of neurological patients are kept in mind: "When a patient or family goes here, they are going through some harsh moments, and family want to be with the patient as long as they can," says HKS's Enrique Greenwell, lead architect for the project. "A patient that has a neurological problem can sometimes barely walk, so they have a hard time moving from one space to the next. So the idea is firstly to bring as much natural light into the space and secondly make very wide welcoming spaces, with as few walls as possible, to make it easier to transfer from one area to another."

HKS has designed the rehabilitation rooms in response to research that suggests that, although family members like to be able to watch their loved-ones doing their rehabilitation exercises, patients themselves aren't so effective if they know they are being watched: "We've designed a clever glass wall that lets light in but not views out, which fulfils both needs," Greenwell adds.

Hospital Universitario del Río in Cuenca, Ecuador, built to allow for future growth

Pedestrian entrance of São Paulo's Hospital Israelita Albert Einstein

(H5N1) – are emerging as major health threats."[2]

PAHO also identifies high inequality as the chief barrier to the availability of good healthcare for all – nearly 35 per cent of the region's population live in poverty, and 22 per cent do not have access to health services[3]. At the same time, those countries that have experienced rapid economic growth, such as Brazil and Chile, are facing health issues reflective of a more developed society, including chronic and degenerative diseases and accidents and injuries.

The growing incidence of cancer, for example, has recently led to launch by two North American bodies (the National Cancer Institute (NIC) and the National Institutes of Health (NIH)) of the new Office of Latin American Cancer Program Development. The programme's initial focus is on Mexico, Brazil, Chile, Argentina and Uruguay; it aims to gain a better understanding of the cancer burden in these countries as well their capacity for research and treatment.

In line with other developing regions, increased expenditure and a commitment to healthcare reform is widespread. Decentralisation and the introduction of health insurance are the main features of this reform. In Chile, for example, mandatory health insurance means that more than 80 per cent of the population has public insurance, while the remainder are with private insurers[4]. In a recent poll, more than 91 per cent of Uruguayans said they were financially covered for hospitalisation, whether by public programmes, private health insurance or the social security system[4]. As the provision of social security spreads, however, it is expected that governments will be unlikely to have enough resources to meet demand, and that more private hospitals will be built as a result.

In many countries, the healthcare market is very sophisticated and private care is world-class. Doctors are often trained in North America or Europe and return with a progressive and global outlook on clinical matters as well as the way hospitals are built and run. "In Mexico there are no architectural firms geared solely towards healthcare design, so our clients rely a lot on our expertise as planners to lead them through the effort," says HKS's Enrique Greenwell, lead designer on a number of recent projects for the American British Cowdray (ABC) Hospital in Mexico City.

HKS was asked to complete two new projects for its Santa Fe campus, a women's and children's centre, which opened in January 2008, and a neurology centre, construction of which is about to begin (see case study). "I've always said that these are site-driven designs," says Greenwell. "The problem we faced with the women's centre as well as the neurosciences centre is that they're landlocked in a very developed area, with parking areas in front of the hospital – and they are pretty much perched on top of a hill, so you have to have drives that lead up to them." These large areas of hard landscaping were

at odds with HKS's philosophy of allowing widespread access to the natural environment. An additional issue was building something in keeping with the existing hospital, which consisted of two very different-looking structures – one covered in hammered metal panels, the other in glass. The women's centre's curving form links the two: glass on one side (low-e, and with solar shading, both to minimise solar gain) and metal on the other (this time in a smooth finish rather than hammered, so it needs cleaning less frequently). Having moved much of the parking underground, HKS created a 'green belt' at the exterior using low-maintenance native plants and made sure than green areas, rather than hot concrete, were visible from patients' rooms.

From a business perspective, having a local base appears to be key to securing and maintaining clients. HKS has a new office in Miami as well as an established outpost in Mexico City that Greenwell says is "probably one of our smaller offices but one that has worked steadily for the past seven years. We have a lot of work in that area of the world and we believe it is a growing market. It's working for us." HKS was recently awarded the design of Puerto Rico's Guaynabo City Hospital, a pioneering public-private partnership venture that will result in the country's first all-private-room hospital.

Kahn sees its HIAE project as the marriage of two strands of expertise – with knowledge of local customs and building regulations coming from its São Paulo office while the latest research, innovation and specialist design knowledge feed in from its North American offices in Detroit and Birmingham.

Meanwhile, Perkins+Will worked in conjunction with a local architect, Condisegno, for its latest project in Colombia, the Hospital Universitario San Vicente de Paúl in Rionegro (see case study). "We have found that most local architects have limited knowledge or expertise in the healthcare market," says Marlene Liriano, principal and interior design director at the firm's Miami office, from where it oversees its Latin American interests. Having successfully collaborated on this project, Perkins+Will is exploring further opportunities with Condisegno in Colombia.

Hospital Universitario San Vicente de Paúl, Rionegro, Colombia

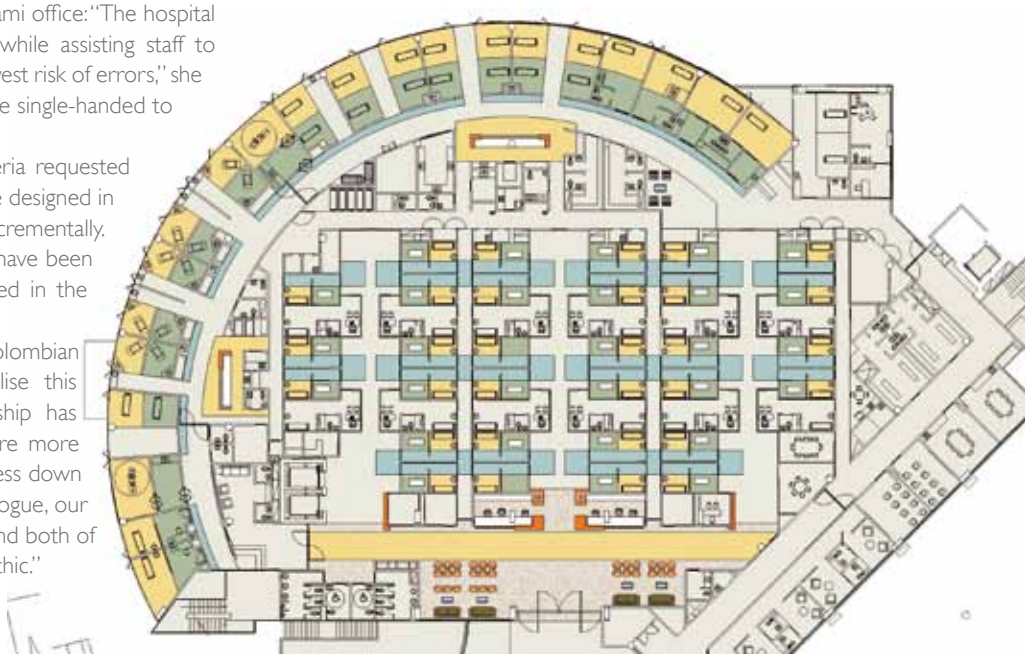
A well-planned hospital that harnessed state-of-the-art technology was Perkins+Will's brief from its client, Hospital Universitario San Vicente de Paúl. Already a 95-year-old Medellin establishment, the university's new facility in Rio Negro is strongly influenced by US trends in healthcare design, such as in its use of intuitive wayfinding and the influence of retail design in allowing each of the clinic buildings to have its own storefront. Evidence-based design was also used to develop the building, explains Marlene Liriano, principal and interior design director at Perkins+Will's Miami office: "The hospital directors wanted a highly efficient facility while assisting staff to provide the highest level of care with the lowest risk of errors," she says. "With that in mind, all patient rooms are single-handed to avoid potential mistakes."

Flexibility and adaptability were key criteria requested by the hospital, and major components were designed in modules so that the campus could grow incrementally. Speciality finishes and wayfinding elements have been designed so that they can be easily changed in the future when needed.

Perkins+Will is working with a Colombian architecture practice, Condisegno, to realise this project, and the success of this partnership has led the two practices to collectively explore more business in the region. Liriano puts the success down to "an open line of communication and dialogue, our collaboration and respect as professionals, and both of our firms having the same goals and work ethic."

Hospital Universitario San Vicente de Paúl, Rionegro, Colombia

Project completion date: 2011
Client: Hospital Universitario San Vicente de Paúl, Medellin, Colombia
Architects: Perkins+Will (programming and interior design), Condisegno, SA (local associate architect)
Size: 540,000 sq ft (50,168sqm)
Number of beds: 260
Construction cost: undisclosed



Unparalleled experience in the design of long term care homes.

Montgomery Sisam Architects have designed over 50 long term care homes, enriching the lives of over 8000 residents through unique and responsive architectural solutions.

MontgomerySisam

T 416.364.8079 F 416.364.7723 montgomerysisam.com

Alice Liang, design principal at Montgomery Sisam in Toronto, offers a different picture of Latin American countries' willingness to work with overseas architecture firms – at least in Argentina, where she has spent time promoting Montgomery Sisam's work as well as visiting hospitals for her own research. "I have sensed that, in Argentina, there is not a trend yet to engage specialists from abroad for joint venture," Liang says. The prolonged economic challenges mean that "whatever work there is remains with the locals".

Ecuador offers a recent example of this practice. Hospital Universitario del Río (HUR), a new private facility in Cuenca, was designed by Ecuadorian architect Xavier Corral. He travelled extensively in Colombia and the US to research the building of this international-standard hospital. "One of the main differences when compared to other local and national institutions is that it was built from zero in a terrain large enough to accommodate future growth," says the hospital's CEO, Dr Diego Castresana. "This hasn't happened elsewhere because hospitals mainly expand their facilities by purchasing the next-door building – along with all the problems it encompasses." HUR's administration and management are outsourced to a US firm, the American Hospital Management Company (AHMC) – another way in which North America is influencing healthcare south of the border. The partnership removes some of the isolation that can occur with single private hospitals, says Castrasana: "Because of the relationship AHMC has with hospitals across Latin America and other countries, we are constantly gathering information regarding performance that benefits all the hospitals in the network." Crucially, it also lends an air of financial stability to the project: "Because of AHMC, private investors see HUR as a safer environment."

Emily Brooks is an architectural writer

Outpatient Building, Hospital Israelita Albert Einstein, São Paulo, Brazil
Project completion date: 2009
Client: Hospital Israelita Albert Einstein
Architect: Kahn do Brasil / Albert Kahn Associates
Size: 750,000 sq ft (69,677sqm)
Construction cost: US$120m

References

1. La Forgia GM, Couttolenc BF. Hospital Performance in Brazil: The Search for Excellence, *En Breve* 120, March 2008; 1:20.
2. Pan-American Health Organization. *Health in the Americas*. Washington DC: PAHO; 2007.
3. World Bank. *Health, nutrition and population brief: Progress In health In the Latin America and Caribbean region*. Available online at www.worldbank.org
4. Savedoff WD. *A moving target: Universal access to healthcare services in Latin America and the Caribbean*, Inter-American Development Bank, paper no 667, January 2009.

Schools of dreams

Salutogenic design was firmly in the spotlight at the third international Architects for Health Student Design Awards

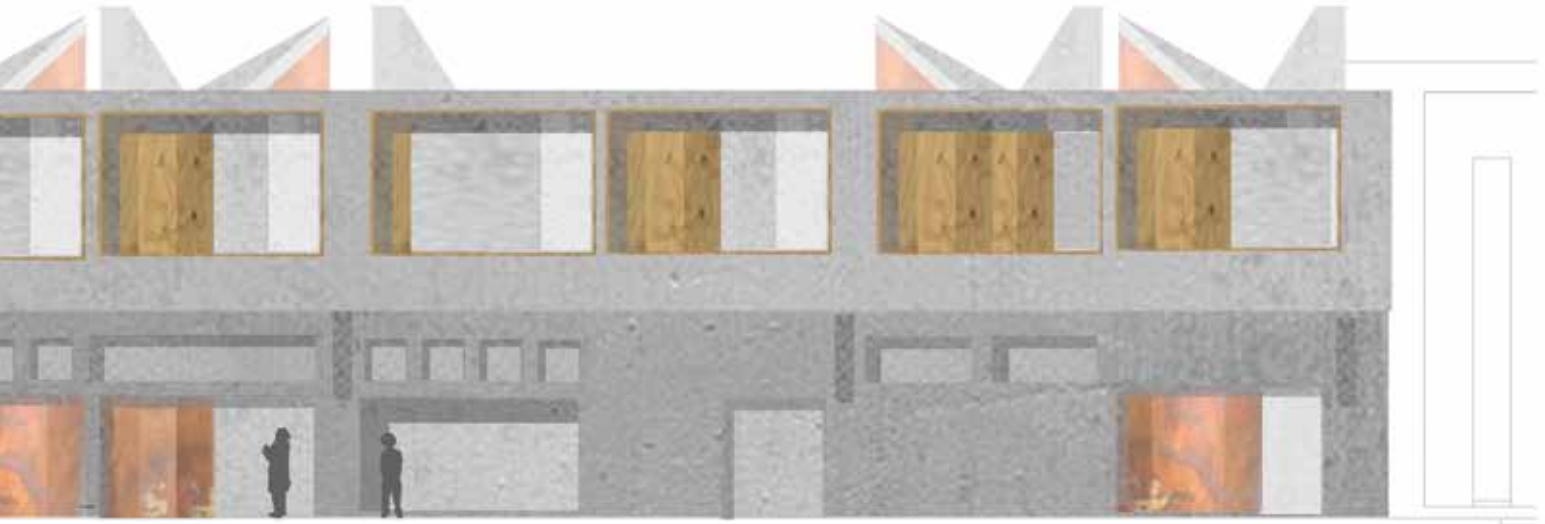
A childhood memory of a fireplace in a doctor's surgery has translated into a winning design for Ireland's Iseult O'Clery. Exploring the relationship between light, relationship and health, O'Clery designed a primary health and community centre whose concrete chimneys pick up the grain of the existing adjacent terrace houses and raise the health centre "like an attic" above the community centre, which opens onto a canal side park. Nestled in each GP's room is a small waiting room, with light reflected down from a folded copper roof. Examination space in each consultation room is concealed within a timber box, "sitting like a piece of furniture within the room" and lit by a south-facing chimney which allows patients to "glimpse the sky".

O'Clery's design topped this year's Architects for Health (AfH) Student Health Design Awards, presented in London on 27 September. AfH executive board member Jamie Bishop, from Fleet Architects, commented: "Student work is a fertile territory with the licence and luxury to take a critical position on healthcare design, which could and should influence practice in the future. In the design of her consulting and examination room Iseult (O'Clery)'s project ultimately challenged flaws in one of the most common of clinical rooms, flaws which are repeated unchallenged time and time again."

Over 80 entries were received for the awards and eight entries shortlisted before the judges retired to an anteroom to debate and elect a winner. The judging panel was chaired by current AfH chair John Cooper. The other judges included Dr Sam Everington, a GP in London's Bromley by Bow Centre which was used by the UK government as a model for healthy living centres; Dr Patrick Hutt, a newly qualified GP who has written extensively about general practice and is currently researching the evidence for different health centre configurations; Thomas Gardner, project architect and key Sustainability Group member at Allford Hall Monaghan Morris; Francesca Pont, an architect at Cottrell & Vermeulen Architecture; Paul Serkis, commercial director – infrastructure for Brookfield, sponsor of the awards; and last year's AfH Student Health Design Award winner Elaine Neish. The entries were judged against a carefully considered list of criteria, developed since the awards began three years ago, including creativity, aesthetics, whether the applicant had considered patients and staff in the design, and the graphic quality and skill shown in the submission, taking into account at what stage the student was in their career.

Judging panel members Paul Serkis (from sponsor Brookfield), Sam Everington and AfH chair John Cooper

Joint runners-up in the competition Jing Zhao, a second-year M Arch student from Texas A&M University, and Agnes Wesolowski, a graduate of the University of Applied Sciences and Arts in Dortmund, Germany, were also applauded for their innovative designs. Zhao designed



Above: The chimneys in Iseult O'Clery's winning design rise up "like an attic" and let light into the consultation rooms below, allowing patients to "glimpse the sky"

an outpatient clinic and wellness centre which takes advantage of a creek-side setting in Texas, while Wesolowski's design created a clinic on the outskirts of Kigoma, Tanzania incorporating an open 'agora' space.

The other six shortlisted designs were: Geoffrey Liddle, a student at Northumbria University, UK who designed a memory centre for dementia care patients; Jonathan Schofield (University of Westminster, UK) for 'Thames Salmon Rehab', designed to float on the river Thames; Soren Thiesen from the Royal Danish Academy of Fine Arts – School of Architecture with his response to the high rate of sexual assault in South Africa with his design for a trauma centre for rape victims in Cape Town; Alexander Thomas, a London Metropolitan University student with his proposal for a Venetian hospital; and Ewan Cooper and Ashleigh Donaghey, also from London Metropolitan University, for mental health unit 'Brooke House', set in a deprived area of London.

Judging panel member Thomas Gardner commented: "This was a valuable event, showing how healthcare design can raise its head from the interpretation of regulations and take a broader view, looking at how architecture can improve the wellbeing of both the individual and the city. In future, it would be fascinating to see student push the range of scales further, investigating issues from microbiology to the global health economy, without losing sight of this very real, very personal, human-scale environment in which actual lived experience takes place."

• Special thanks are given to Brookfield for sponsoring the awards programme and to Jamie Bishop and Fleet Architects for their organisation and support.

Right: Runner-up Agnes Wesolowski placed insecticidal mosquito nets around wards and waiting areas to help prevent malaria in her Tanzanian clinic

Below right: Spanning a creek, runner-up Jing Zhao's design for a clinic and wellness centre aimed to promote access to nature, encourage social interaction and create good wayfinding

Medical Architecture

MAAP, is a multi-disciplinary company committed to well-considered planning and design of healthcare buildings.

Our approach is centred on people and the belief that research and excellence in design can create better medical and therapeutic environments for patients, staff and the public to experience and enjoy.

Established in 1991, the founding Directors are former members of the Medical Architecture Research Unit (MARU) in London. Today, we design buildings, undertake research, consultancy and provide advice to professional bodies in the sector. Our work spans two decades and includes projects in the UK and more recently in Canada, Europe and Australasia.

Roseberry Park,
St Luke's Hospital Site,
Middlesbrough, UK.
Due to be completed
2010.

maap

Design &Health
International Academy for Design and Health

Design & Health Scientific Review
Transparency comes first

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

This issue's research articles raise three important questions for every design research study: The relevance and quality of the research methods employed; whether or not causality can be attributed to the environmental design characteristic in the environment-behavior equation; and how to formulate design guidelines that effectively reflect the research.

Rodiek and Lee's exemplary study of garden design and outdoor space use among older adults living in assisted living residences faces the methodology question head on. The sample of assisted living residences included were carefully selected employing both a stratified and random sample, and thus have a high probability of being representative of the universe to which the authors later generalise. Although their major data gathering method for user behaviour and attitudes is a questionnaire, Rodiek and Lee address this shortcoming in their "further studies" section by suggesting that behaviour-mapping, focused interviews and an intervention study would refine their hypotheses and findings. The environmental data were collected using a carefully tested "Environmental Audit Tool." And, because data analysis forms a significant part of "methodology" they demonstrate care and thoroughness in their conclusions. The point of design and health research is not to "get it right," but to present the research and analysis transparently so that readers can decide how much reliance to place on the study.

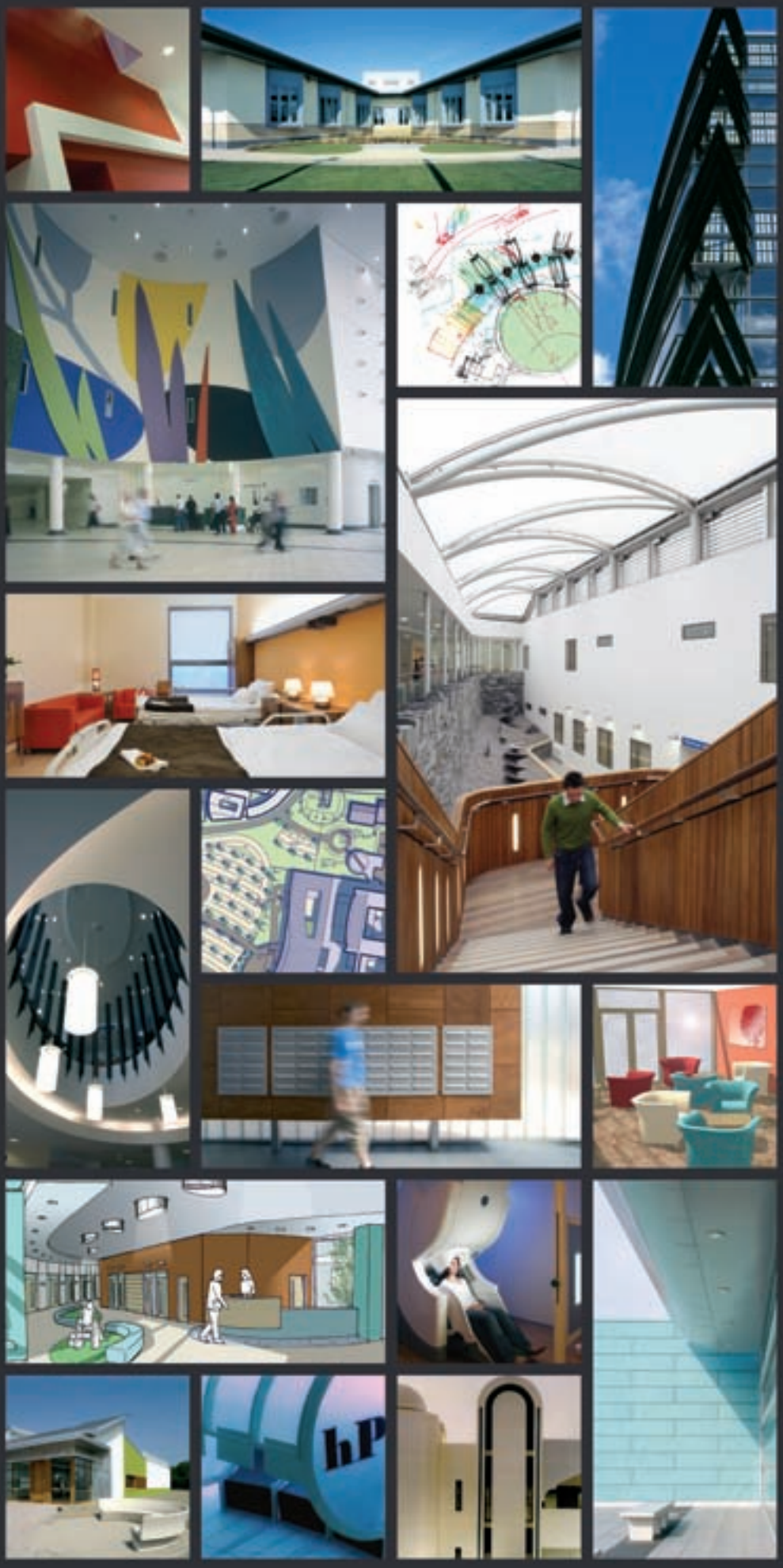
The National Patient Safety Agency (NPSA) and Arup do an equally excellent job in approaching an even more complex environment-behaviour issue – single or multi-bed hospital rooms. I say this is more complex because these authors take on previous much heralded research that states single-bed hospital rooms are better than multi-person rooms because they improve "patient safety." Methodological rigour – resting on a thorough plan of analysis – makes this paper a model of its kind as well. The major point the authors make serves as a warning to all design and health researchers: beware of drawing simple causal conclusions without taking into account the natural complexity of environments, their management, their use, and the diversity of those who use them. The authors conclude that patients' hospital experience and wishes must be respected in making hospital design decisions – and that patients do not uniformly prefer single-bed rooms. They also conclude that "environment" must be understood to include both operations and physical characteristics, thus that management, leadership, staff training, and behavioural change such as hand-washing must be taken into account in design decision-making. And finally they conclude that methods must be employed that reflect the behaviours and attitudes of all stakeholders – in this case doctors, nurses, and facility staff all of whom raise meaningful reservations about the question of single- versus multi-bed hospital rooms.

Farrow and VanderKaay's article is also interesting, but mis-titled, referring in its title to "design standards" while it really focuses on design process. Specifically the article illustrates that decision-making stakeholders need to address intangible qualities of a design – those qualities about which there can be no standards like hope, community pride, and individual identity. This article, like the other two, makes an equally significant and universal point – no matter what data are presented to design decision makers, design is a creative act in which both users and designers aiming at high-quality design must take into account both tangible evidence-based research findings as well as designs wonderful and magical intangible qualities.

41-47
Design Quality Standards: Intangibles that bring hospitals to life
Tye Farrow, MArch UD, OAA, MAIBC, NSAA, NAA, FRAIC; Sharon VanderKaay, BSc. ASID

49-55
External space: Increasing outdoor usage in residential facilities for older adults
Susan Rodiek, PhD, NCARB;
Chanam Lee, PhD, MLA

57-61
Patient Safety: Single-bed versus multi-bed hospital rooms
Kate Fairhall, BSc (Hons), MSc; Laura Bache, BSc (Hons), MSc, MPhil; Pat Young; Peter Dodd



NIGHTINGALE
associates

Shaping the future
of healthcare

www.nightingaleassociates.com

TRIBAL A member of the Tribal Group plc

Bluewater Health in Sarnia, designed to provide 'light, life and comfort' (photo courtesy Farrow Partnership)

Design Quality Standards:
Intangibles that bring hospitals to life

This research project assesses the effectiveness of a step-by-step model for developing site-specific, meaningful and measurable design quality standards, while creating supporters who were prepared to implement them

Tye Farrow, BArch, MArch UD, OAA, MAIBC, NSAA, NAA, FRAIC; Sharon VanderKaay, BSc Design, ASID

For over 25 years, the terms 'patient-focused care' and 'healing environment' have been in common use by hospital administrators and healthcare design professionals. Despite well-intentioned efforts to provide psychosocially supportive settings, we continue to see spaces that demonstrate little empathy for the vulnerable state of patients, family and staff[1].

Canadian architecture critic Lisa Rochon has described the majority of hospital environments as "factories built to contain the ill". She continues: "Sadly, for the most part, inspired hospital design is wishful thinking."[2]

While there are rigorous technical construction codes that dictate the requirements for fire and life safety, no code protects the public from exposure to austere healthcare infrastructure. To avoid the risk of building hospitals that function merely to process sick people, decision-makers must confront the inherent challenges of defining, monitoring and implementing intangibles.

For example, the intangible design qualities of a hospital influence its position on the Asset-Liability Pyramid (Figure 1). In contrast to technical standards, design standards cannot be validated by means of traditional scientific methodologies. However, if such barriers to working with intangibles are viewed as insurmountable, it will be difficult to make a convincing case in support of economically vibrant healthcare assets.

Generic and vague statements such as 'patient-centred' or 're-thinking the 21st-century hospital' may represent the sincere aspirations of decision-makers; however, these phrases are inadequate when creating meaningful, location-specific design quality standards.

Desire v reality

The research presented in this paper set out to examine the nature of gaps that frequently occur between espoused desires to create a 'healing environment' and the built reality of these spaces. This research began broadly

WORLD HEALTH DESIGN

ARCHITECTURE | CULTURE | TECHNOLOGY

Alan Dilani
Design & Health

Ray Pentecost
Clark Nexsen

Debajyoti Pati
HKS

Ian Forbes
DesignInc

Mike Nightingale
Nightingale Associates

Alice Liang
Montgomery Sisam

John Cooper
John Cooper Architecture

George Mann
Texas A & M University

Dr John Zeisel
Hearthstone Alzheimer Care

Diana Anderson
WHR Architects

Pat Young
National Patient Safety Agency

Charles D Cadenhead
WHR Architects

Global perspective, local identity
Making thought leadership count

Subscribe today to World Health Design

Subscribe today and you will receive:

- Incisive comment and analysis
- Thought leadership interviews
- Latest scientific research
- Architectural project reviews
- International market reports
- Global technology updates
- Arts and culture reviews

And save £30 off the cover price

Design & Health
International Academy for Design and Health

To subscribe,
call: **+44 (0)1277 634176**
or email: whd@designandhealth.com

Subscription rates: Cover price: £25; Annual Individual: £70; Annual Team (5 copies): £230; Two Years Individual: £115; Two Years Team (5 copies): £395

Figure 1: The Hospital Asset-Liability Pyramid illustrates how intangibles can contribute to wealth creation

by reflecting on over 10 years of conscious experimentation in the field with client stakeholder groups. Six questions were raised at this early stage:

1. Why is there frequently a gap between espoused aspirations and physical reality?

2. Can one assume that improved design quality standards will inevitably result in truly therapeutic hospital environments?

3. Are decision-makers capable of discerning the difference between facilities that are merely new in contrast to facilities that address complex psychosocial issues?

4. What motivates administrators and politicians to take a strong advocacy role in achieving optimal human-centric design?

5. What motivates apathetic or hostile decision-makers to become strong advocates for improved design standards?

6. Can we assume that the causal connections between intangibles – for example, design that conveys a meaningful identity and makes an emotional connection – and tangible outcomes, such as attracting staff and major donors, are apparent to decision-makers?

Several preliminary hypotheses for further study were identified as possible responses to questions 1-6 above. All of the themes that emerged from this early stage of inquiry were related to an inconsistency between espoused values and built reality. Explanations for this discrepancy that appeared worthy of further investigation included:

- a lack of rigour in defining what constitutes a therapeutic healthcare environment;
- believing that intangibles are too abstract to meaningfully define and monitor;
- failure to assist decision-makers in connecting intangibles to tangible outcomes;
- expecting stakeholders to appreciate and support imposed standards; and
- underestimating the hidden potential of even the most vocal naysayers to become enthusiastic advocates for quality design standards.

In order to address all of the above issues, Farrow Partnership Architects has developed a highly participatory, step-by-step consulting model. This model, described below, draws on Farrow's collective knowledge of adult learning principles and intangible value creation.

The intangible nature of human-centric design quality criteria is a factor that can deter decision-makers from committing resources toward improving these standards. However, in order to progress beyond current hospital design norms, new approaches are needed for creating effective standards, as well as for attracting influential advocates.

The model was evaluated by Angus Reid Strategies in its research report, *Evaluating the Farrow Model of the Design Standards Creation Process*, dated 27 May 2009. For this study, Angus Reid collected qualitative survey data from six community hospital client representatives using a combination of closed and open-ended questions[3].

Peel Regional Cancer Centre radiation maze (photo courtesy Farrow Partnership)

Background

The specific design quality standards procedures and tools evaluated by this qualitative research project were developed over a 10-year period through a process of discovery, inquiry and reflection. In addition to field observation and experimentation, the procedure and tools were informed by literature research regarding 1) the nature of intangibles[4] and 2) adult learning principles[5].

Listed below are qualities and characteristics that have been identified by experts[4, 5] as inherent to intangibles, and on which the

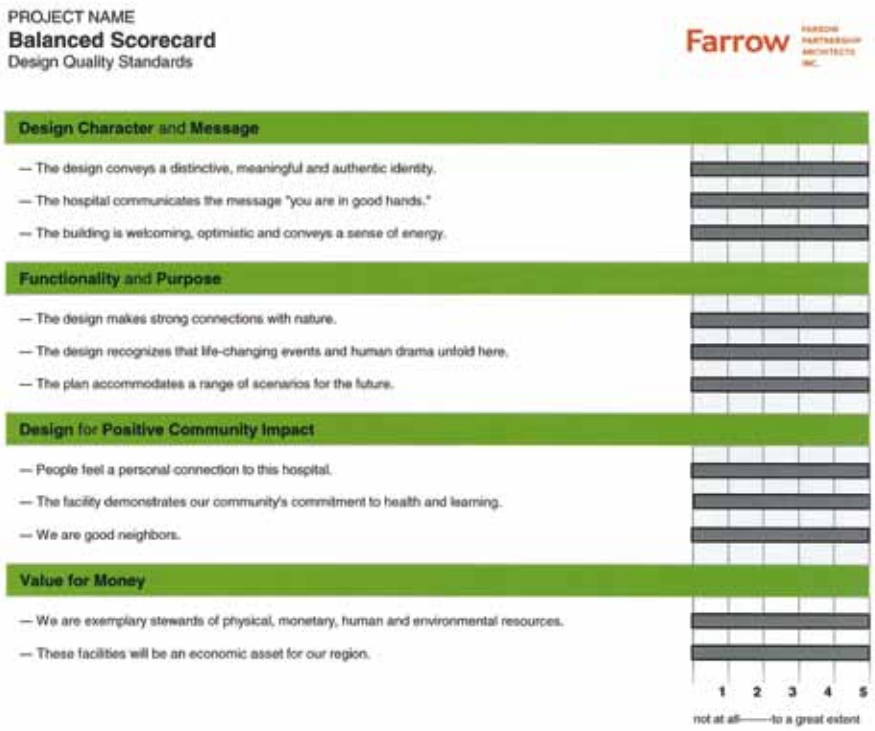


Figure 2: The Balanced Scorecard helps measure the gap between meaningful criteria and what is being proposed

design quality standards process and tools in this study are based.

1. Intangibles are a pre-condition for tangible benefits.

2. The connection between intangibles and tangibles is not always obvious.

3. Intangibles are typically valued at zero by accountants who avoid assigning rough numbers.

4. Intangibles are susceptible to being dismissed by decision-makers who believe only what can be counted counts.

5. A first-hand hospital stay can suddenly change the mind of decision makers who believe that only what can be counted counts.

The design quality standards model, as defined in this study, draws on adult learning theory. In the 10-year development of this methodology it was hypothesised that stakeholders require a learning process to effectively implement effective standards, rather than a selling (commonly referred to as a 'buy-in') process. Listed below are the adult learning principles[6] applied to the quality standards creation and implementation process that is the subject of this study.

1. Adults learn best when they perceive a gap between what they know and what they need to know (i.e. imposed, highly ambitious standards may be rejected out of hand) or gaps between what is and what can be – for example, "Let's examine a range of so-called 'healing environments' to learn what is possible and the extent of any gaps."

2. Adults learn best when they engage in a dialogue and inquiry process rather than through a lecture or one-way presentation – i.e. a process based on shared inquiry and discovery rather than the traditional buy-in model.

3. Adults learn best when the subject makes an emotional connection – pre-determined quality standards, however rigorous, may be regarded by stakeholders with indifference unless these standards gain personal significance.

4. Adults learn best when they are provided the context to make their own cause-and-effect connections. Some links between intangibles and value creation are not always obvious; these links can be identified through dialogue between stakeholders and designers.

5. Adults learn best when they have opportunities for personal revelations, also known as the 'a-ha moment' or a personal epiphany.

Method

For this research project, Angus Reid Strategies conducted semi-structured interviews consisting of approximately 30 standard questions with six key client representatives who had participated in a variation of the standards creation model described below.

Participants were asked to assess the effectiveness of this process in designing a human-centric healthcare environment using a four-level Likert scale. Respondents were encouraged to make comments above and beyond the survey questions while being assured that all of their responses would remain anonymous. The survey aimed to test the process against four objectives:

- to help check assumptions regarding what people expect;
- to help identify potential roadblocks and how they might be circumvented;
- to translate your vision and values statements in to actual physical space; and
- to give a sense that this is something "we are all in together".

The standards process and tools creation model that was the subject of this qualitative assessment consisted of the following steps.

Prepare stakeholders

Prepare stakeholders to participate in a facilitated dialogue session (which came to be known approximately four years ago as 'Common Ground') that has defined boundaries and outcomes, rather than a traditional meeting governed by an agenda, or a presentation and questions format.

In contrast to being issued a rigid agenda prior to the session, invitees received a 'Purpose, Principles and Expectations' document that briefly described the dialogue process, listed sample questions they could think about ahead of time and defined anticipated outcomes for the session.

Engage in dialogue sessions

Engage stakeholders in learning process-based facilitated dialogue sessions. These sessions were eventually branded as 'Common Ground', 'Critical Eye', and 'Scenarios for the Future' in order to set them apart as a reliable, repeatable set of workshops with defined tangible and intangible outcomes. The gap assessment tool that emerged from these sessions was known as the 'Facilities Balanced Scorecard'.

Reflect on roles

Ask stakeholders to reflect on their role as representing countless other citizens in the community for, potentially, generations into the future.

This step helps participants think beyond their official title to their role as a communicator who assists others in learning about project priorities and challenges on an everyday basis. As well, this step highlights participants' legacy and their shared responsibility for a successful project, rather than soliciting buy-in to pre-packaged quality standards.

Analyse local aspirational phrases

Jointly analyse locally-used aspirational phrases such as 'patient-focused care", including selected terms from the organisation's vision and values statements, for example, 'healthy communities'.

During the dialogue sessions, examine what these terms mean to the specific stakeholders in the workshop. For example, must 'patient-focused care' overshadow 'staff-focused care'? Can a health- and human-focused environment fulfill the needs of all?

This step recognises that stakeholders typically have limited experience in evaluating intangibles such as 'instilling confidence' and 'conveying a strong identity'. The dialogue process gives participants an opportunity to become more constructively critical of vague design objectives (See Figure 3).

While some design quality standards can be applied universally, such as "Our hospital conveys the message 'you are in good hands'", there are individual historically and culturally meaningful priorities that contribute to creating positive emotional connections.

A generic 'anywhere' hospital may be sufficient for functioning at the bottom of the Hospital Asset-Liability Pyramid shown in Figure 1; however, a sense of individual identity is a key component of the value creation model.

Examine tangibles and intangibles

Jointly examine the connection between tangibles and intangibles. Through the dialogue process, make the hidden (or less obvious) links between design and design outcomes more recognisable.

This step helps apathetic decision-makers or naysayers see that design standards (based on intangibles) are a necessary pre-condition for tangible benefits such as attracting donors or reducing length of stay for patients.

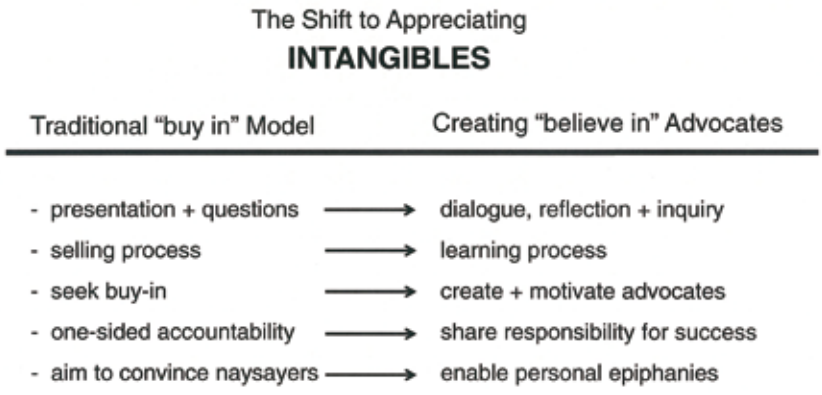


Figure 3: A new model for working with intangibles
When seeking support based on tangible criteria, such as hard numbers, the traditional model may still be effective; however 10+ years of experiments in the field indicate that human-centric design quality standards require a different approach

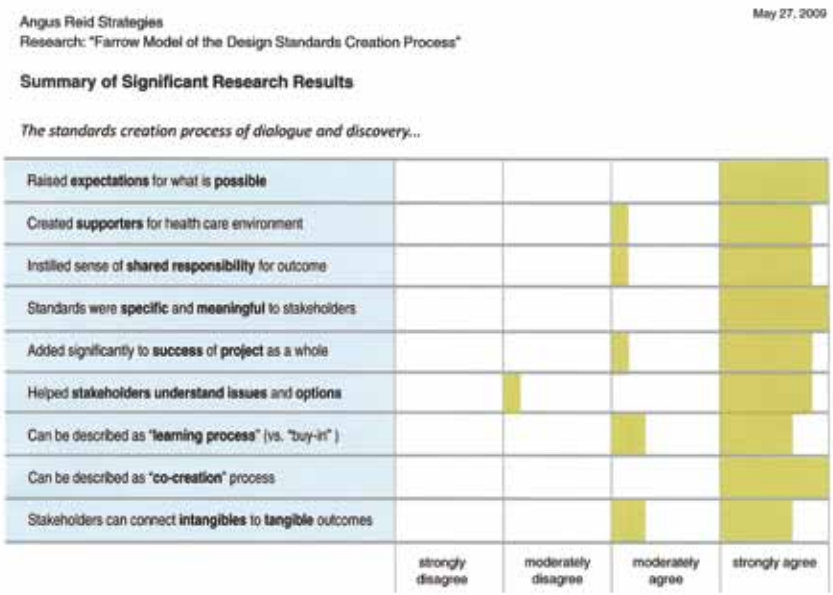
Ask in-depth questions

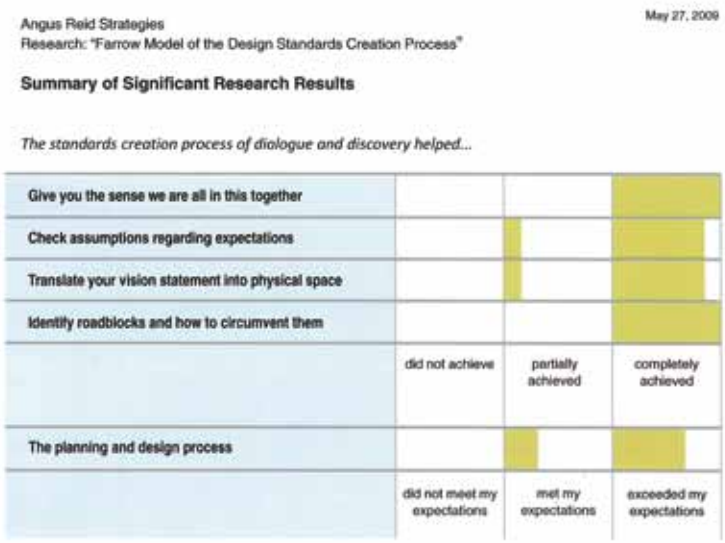
Ask in-depth philosophical questions that highlight the value of intangibles and design quality standards, as well as the cost of accepting vague standards.

An intangible to be considered when developing design standards is the explicit recognition that a hospital is a highly emotional place. It has proven beneficial to review with decision-makers how they should respond to, as the Danish architect Erik Asmussen[7] says, "what happens here". Life-changing events and extremes of human drama call for non-technical qualities beyond competent infrastructure or corporate office quality standards. For example, depending on the specific client group, these questions have been posed:

- What kinds of connections do we perceive human beings seek with nature?
- Do hospitals share distinguishing qualities with other meaningful spaces, such as religious or academic buildings?
- How can these connections be made most effectively in a healthcare setting?

Upper atrium of Colchester Regional Hospital in Truro, Nova Scotia (photo courtesy Farrow Partnership)





Figures 4 & 5: The summaries of the significant results of the research indicate that most participants felt they had benefited from the step-by-step learning process and had developed a sense of shared responsibility

• What is the value of protecting these connections with standards?

• What is the cost of not making these connections?

• How and why should these qualities be expressed as design quality standards?

In particular, the client's mission, vision and values statements are closely analysed to determine how these words can be translated into physical space, and why it is vital to minimise any gaps between espoused priorities and built reality. The consequences of ignoring this gap in terms of credibility with staff, patients and donors are assessed during the facilitated dialogue sessions.

Create criteria for gap analysis

Jointly create criteria for a gap analysis diagnostic tool. The Balanced Scorecard aims to elevate design standards above the traditional intangible status of *optional* and *arbitrary* to the status of *necessary* and *verifiable*. Rather than accept vague aspirations such as 'design excellence' and 'healing environment', the scorecard provokes decision-makers to measure the gap between meaningful criteria for their specific project and what is being proposed at each stage as the design progresses.

Apply scorecard tool

Use the scorecard tool to jointly monitor any 'say-do' gaps that may be identified by anyone at any point as the design progresses. The purpose of this step is to share responsibility among all project participants for ensuring that the built reality will be as inspiring as the words. The scorecard encourages candid conversations about how planning participants are doing, rather than potentially accepting lower standards or ignoring collective self-delusion.

Results

Overall, each of the respondents who participated in the Angus Reid research, "reflected favourably on their experience with Farrow Partnerships Architects' step-by-step method for developing design quality standards"[3].

All respondents characterised the design standards creation experience as "a learning process, rather than a buy-in process". The research also found that: "What seemed particularly important to respondents was the ability of the process to accommodate a broader number of stakeholders in the planning and decision-making processes, as well as the ability of the process to organically generate consensus among a large group of stakeholders, even when a wide disparity of opinion existed to start."

The following are a range of comments that were representative of those received. On 'values', one participant commented that it was: "a collaborative approach involving our organisation learning as much about ourselves as we did about the principles of design."

Some of the intangible outcomes were identified as:

"...creating a great quality of life for staff"

"...creating a buzz in the community"

"....people are happy to come here...it's an uplifting place; it's not just a hospital"

"...provide hope and inspiration"

"...a source of pride for our community"

"...a better frame of mind while administering care."

With regard to the process, participants commented:

"The architect has a lot of ideas, but so does the owner. The design process involved a lot of back and forth, a sharing of ideas."

"...this isn't just getting a hospital built; this is a chance to step back and look at the ways in which we deliver healthcare."

"...that iterative process was really important."

And on value for money:

"I did not believe in the beginning that we could accomplish what we wanted to for patients staying within a budget that could be tolerated by the public purse. But guess what? We did it. And for cheaper than many other generic big-box hospital projects."

Conclusions

Although there is evidence of global interest in raising healthcare design standards, advocacy alone is unlikely to result in significant change. This paper has presented the results of a standards development process, based on adult learning principles, that builds on a fundamental understanding of the nature of intangibles.

As the research by Angus Reid Strategies indicates, when participants become engaged in a step-by-step learning process, they develop a sense of shared responsibility for creating site-specific, meaningful standards. This learning process, based on dialogue and discovery, can be more effective than efforts to gain buy-in for preconceived standards.

Decision-makers who are neutral, apathetic, or actively opposed to raising design quality can become sensitised to the impact of human-centric design through the process of articulating standards. When these intangible qualities are captured in precise terms, such standards can be rigorously monitored using a balanced scorecard.

When ratings are reviewed with client groups at major milestones during the project, there is remarkable consensus regarding the appropriate number to be assigned to these intangibles on a scale of 1-5. Although there is no way to prove such numbers objectively, the exercise indicates that intangibles can be monitored effectively.

Based on research in the field, the process of creating and applying effective design quality standards requires a willingness to challenge what constitutes a true healing environment. Meaningful terms of reference, developed and refined through facilitated dialogue with each unique client group, are the foundation for meaningful standards. Each project has unique design priorities and sensitivities that make their standards, and therefore their hospital, come alive.

Thunder Bay Regional Health Sciences Centre aims to 'embrace humanism' (photo courtesy Farrow Partnership)

Authors

Tye Farrow, BArch, MArch UD, OAA, MAIBC, NSAA, NAA, FRAIC, senior partner, Farrow Partnership Architects, Toronto, Canada

Sharon VanderKaay, BSc Design, ASID, director, knowledge development, Farrow Partnership Architects, Toronto, Canada

References

1. Experts call for action on design quality. *World Health Design*, October 2008, p9.

2. Rochon L. Why is hospital design so unhealthy? *The Globe and Mail*, 15 December 2007.

3. Angus Reid Strategies. *In-depth interviewing qualitative research project: Evaluating the Farrow model of the design standards creation process*. 27 May 2009.

4. Lev B. *Intangibles: Management, measurement and reporting*. Washington DC: Brookings Institution Press; 2001.

5. Blair MM, Wallman SMH. *Unseen wealth: Report of the Brookings Task Force on intangibles*. Washington DC: Brookings Institute Press; 2001.

6. Knowles MS, Holton EF III, Swanson RA. *The Adult Learner: The definitive classic in adult education and human resource development*. Maryland Heights MO: Elsevier; 2005.

7. Coates GJ. *Erik Asmussen, Architect*. Stockholm: Byggförlagte; 1997.

design for a quality of life

Perkins Eastman

115 FIFTH AVENUE
NEW YORK, NY 10003
212.353.7200
info@perkinseastman.com
WWW.PERKINSEASTMAN.COM

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

Images: The Evelyn H. Lauder Breast Center of Memorial Sloan-Kettering Cancer Center (MSKCC) and MSKCC Imaging Center

External Space:
Increasing outdoor usage in residential facilities for older adults

Well-designed outdoors environments can have a beneficial effect on the health of older adults in residential facilities by encouraging them to more spend time outdoors

Susan Rodiek, PhD, NCARB & Chanam Lee, PhD, MLA

The purpose of this study was to learn how the designed environment can encourage or discourage elderly residents from spending time outdoors in long-term care settings. The research was conducted at 68 randomly-selected assisted-living facilities in three diverse climate regions of the US (Houston, Chicago and Seattle). Residents and staff (N=1560) filled in written surveys on outdoor usage and preferences, with corresponding staff questions to confirm the validity of resident responses. The outdoor areas at each facility were evaluated with a 63-item environmental audit tool, testing seven core design principles derived from previous research and practical experience.

After controlling for factors such as gender and mobility, the study found several environmental features that significantly influenced how much time residents spent outdoors. Features associated with increased outdoor usage were: high accessibility, clear indoor-outdoor connections, safe paving, good maintenance, round-trip walkways and a choice of comfortable sitting areas with appealing views. There was strong correlation between outdoor usage, walking, physical activity, environmental satisfaction and self-reported health of the residents surveyed.

The implications of this study are that well-designed outdoor environments can have a major impact on health-related behaviour in long-term care settings, potentially leading to substantial therapeutic benefits. By better understanding specific features that promote outdoor usage, environmental designers may significantly impact the health and well-being of a growing population of frail elderly residents.

Figure 1: Walkways can encourage physical activity

In a rapidly ageing global society with diminishing resources, it is increasingly important to find cost-effective ways to promote and maintain health in older adults. Having access to nature and the outdoors is widely considered to be therapeutic for elderly residents in long-term care settings. Recently, research is beginning to confirm that older adults who spend time outdoors may derive health benefits such as better sleeping patterns, less pain, decreased urinary incontinence and verbal agitation, better recovery from disability, and even increased longevity[1-4].

In spite of knowledge of potential health benefits, and although most residential care facilities provide usable outdoor space, it is commonly reported to be underused by elderly residents[5-7]. Relatively few studies have assessed how environmental design can encourage outdoor usage; however, a number of studies have examined how environmental features may encourage physical activity[8,9]. Others have developed design guidelines to improve the usability of outdoor space, based on research, practice and theoretical underpinnings[10-14]. Components such as outdoor walkways, activity spaces and indoor-outdoor connections (Figures 1-4) are considered to be important for older adults. However, because of the scarcity of outcome-based studies, the specific environmental features that encourage outdoor usage are not fully known.

Methodology

The main objective of this research was to learn how the physical environment influences outdoor usage in long-term care settings, so future facilities can be designed to better

Figure 2: Outdoor areas can provide places for activities

support residents' needs and preferences. The main methodology reported in this paper compared residents' levels of outdoor usage with assessed environmental qualities, after controlling for various personal and environmental factors.

This study focused on an intermediate level of residential care, typically called 'assisted living' in the US. This consists of relatively homelike congregate residential settings that provide a range of assistive services[13]. At the assisted-living level, the majority of residents are still able to access the outdoors independently, but typically spend most of their time in the facility environment. Although people with advanced dementia are also reported to derive benefits from having outdoor access[14-16], they were not included in the scope of this study.

The study was conducted in three of the 10 primary emerging megapolitan regions of the US[17], selected on the basis of having the greatest climatic diversity[18]. In each region, the sample selection area consisted of a two-hour driving diameter from the core of each region's primary city: Houston, Texas; Chicago, Illinois; and Seattle, Washington. Residential facilities were randomly selected from the list of all licensed assisted-living facilities with 50+ residents. This resulted in 68 facilities total, ranging from dense urban contexts to outlying urbanised suburbs and towns.

Written surveys were developed to assess outdoor usage, activities and preferences. Specific questions in the staff survey were used to verify and confirm the levels of outdoor usage reported by residents. The surveys were pre-tested and revised several times, with the final versions having 40+ closed-ended questions, plus additional write-in responses. In pre-testing, residents had difficulty calculating the overall amount of time they spent outdoors per week or month, so instead they were asked how often they usually went out and how long they usually stayed each time; their responses were multiplied to obtain the minutes per week they spent outdoors.

Residents and staff were recruited by written invitations distributed by facility administrators. Residents (N=1128) completed surveys independently, in small group sessions with assistance from researchers as needed. Staff (N=432) completed surveys independently and, in some cases, returned them by mail. The mean age of residents was 83.9 years (range 33 to 104), with 79% women and 21% men. The mean age of staff was 44 (range 27 to 62), with 89% women and 11% men. Residents were predominantly Caucasian, while staff race and ethnicity were fairly diverse; percentages roughly approximated the estimates for each sample population.

Environmental audit process

The outdoor areas at each facility were evaluated with a 63-item environmental audit tool, using a 10-point scale to rate each environmental feature or quality. A team of two trained researchers completed the environmental audits, using the same personnel at all facilities. Because most facilities had at least a few outdoor areas, researchers used observation, physical traces and staff reports to learn which outdoor areas were most used by residents. They evaluated a maximum of three outdoor areas at each facility, using printed audit forms. The two evaluators worked independently, and later their ratings for each item were averaged.

The audit tool developed for this

study tested seven core design principles derived from a comparison of widely cited publications in the recent literature. Because of the scarcity of empirical research, the most comprehensive information on this topic was found in 'best-practice' design guidelines developed by experienced architects, landscape architects, gerontologists and care providers; these sources generally had high levels of agreement on the main environmental qualities considered to influence outdoor access for older adults, and were also generally in agreement with existing empirical studies on the topic.

To develop the hypotheses, the most commonly cited environmental issues were placed in a matrix and grouped into distinct categories, resulting in the following seven core principles to be tested in this study:

1. Indoor-outdoor connections: how well does the outdoor area connect with the common indoor areas and circulation routes?

2. Contact with the world beyond the facility: are residents able to view off-site features such as landscaped areas, roads or human activities?

3. Safety and security: is the outdoor area safe and secure, with good visual contact with the indoors and designed to minimise the risk of falling?

4. Comfort and accessibility: does the outdoor area comfortably support the physical needs and reduced functional abilities of older residents?

5. Freedom, choice and variety: does the outdoor area provide opportunities for stimulation, autonomy and personal choice?

6. Enjoyment of nature: does the outdoor area offer an abundance of appealing nature elements, presented in ways older adults could enjoy them?

7. Place for activity: does the outdoor area afford safe, comfortable, inviting opportunities for walking or other activities?

In order to test these principles in actual settings, specific environmental features were developed as items that could feasibly be rated. For example, a more accurate rating can be established for a door threshold than rating the overall 'accessibility' in an outdoor area. The evaluators were asked to rate each feature according to how well it would support usage by elderly residents. Thus, instead of rating a door threshold as a physical object, it was rated according to how easily a resident could get across the threshold. Each of the seven core design principles was assessed with 8-10 individual features that appeared to be its main components, resulting in 63 total items. Each feature was rated from 1-10, with 1 being an 'extremely poor example', 5 being 'average' and 10 being 'the best that could be expected'.

In pre-testing, the audit tool was found to have high inter-rater reliability (the level of agreement between different raters), with Cronbach's alpha and intra-class correlation coefficients ranging from .92 to .95 for the overall scale (.70 is often considered adequate reliability). In addition to ratings, certain environmental features were measured directly, such as the presence or absence of an automatic door opener or the pounds of force needed to open a manually-operated door.

Analysis

Resident surveys without a full set of responses were dropped from the analysis. To account for the clustering in the data (e.g. residents from the same facility share the same environmental features), the Huber-White robust covariance estimator for clustered data was used in STATA. In addition, as several of the environmental variables had similar or overlapping characteristics, all items from each principle were analysed using factor analysis. This grouped the correlated variables into distinct categories using a common latent factor variable. These latent factor variables were tested but did not lead to significant results, so individual audit items were analysed separately and only those items significant at the level of 0.10 were retained. Individual variables were examined for distribution and several variables were categorised or transformed to ensure proper distributions necessary for running statistical modelling.

To begin, the model included all possible variables of interest in a linear regression model and used a backwards stepwise approach. At each step, the variable with the highest p-value (the lowest statistical significance) was removed from the model (if two were close, the one of least interest was removed), until the significance levels of all the remaining regression coefficients were at most 0.10.

Figure 3: Easy indoor-outdoor connections help to encourage elderly residents to access outdoor space

Aside from questions relating to the main outcomes, a number of personal variables were surveyed and tested for their significance in the model, including: gender, age, health, vision, history of falls, mobility, level of daily assistance needed, pet ownership, urban vs rural background, former occupation and attitudes and preferences about the outdoors. Variables found to be significant were controlled for in the analysis.

Because nearly all facilities were found to have at least 2-3 usable outdoor spaces (mean=2.24 outdoor spaces rated per facility), it was reasoned that the most-used spaces would exert the greatest influence on outdoor usage, while the less-used spaces would have relatively less impact. Therefore, in arriving at the overall ratings for each environmental variable at each facility, the ratings were weighted according to how much the different outdoor spaces were reported as being used by residents. Rather than combining separate items to achieve an average rating for each of the seven general principles, the rating for each of the 63 environmental variables was entered separately in the model.

Preliminary analysis found that most facilities had a few residents who spent far more time walking than other residents did.

Figure 4: Outdoor seating and gardens create a comfortable, welcoming environment for less-mobile residents

Verbal reports suggested that those with very high levels of walking might be motivated by pre-existing habits, interest in staying healthy, etc and less influenced by environmental conditions than the typical resident. Therefore, two models were constructed: a full model with all residents and a second model excluding the very 'high-level walkers' who walked more than 500 minutes per week.

Comparing outcomes, it was found that, although there were differences with and without the high-level walkers, the environmental relationships were fairly comparable overall. The model that excluded the high-level walkers showed stronger association with the environmental variables of interest, appeared to be somewhat more consistent and stable, and is reported in this paper, except where noted otherwise.

Results

In the model that excluded the high-level walkers, residents reported 241 minutes per week (mean) and 75 minutes per week (median) of time spent outdoors (about 20-60 minutes per day). The distribution was skewed, but roughly corresponded with staff estimates that residents spent 185 minutes per week outdoors (about 45 minutes per day) and helped confirm the resident self-reports.

Several non-environmental factors were found to be significant and were controlled for in the analysis. Age was inversely related to outdoor usage, so that older residents generally spent less time outdoors. People using assistive devices such as walkers or wheelchairs also spent less time outdoors. Gender did not make a significant difference in outdoor usage, but people with pets spent considerably more time outdoors.

People spending more time outdoors reported that they cared very much about being outdoors, they felt more free outdoors than indoors and they preferred to walk outdoors rather than indoors, when possible. Surprisingly, people who spent more time outdoors were also more worried about falling outdoors; this might be due to being outside long enough to observe existing hazards and barriers.

Overall, this study found that several of the hypothesised environmental features, including some from each of the core design principles, were significantly associated with substantial increases in outdoor usage. In Figures 5-7, the bars on the graphs simulate (extrapolate) the increased minutes of outdoor usage per week, if that specific feature received a three-point higher than average rating on the audit scale (i.e. rated as eight out of 10 possible points), while all other significant environmental features were held at an 'average' rating of five points. The 'base' outdoor usage if all features were rated at five points was found to be 118 minutes per week, shown at the bottom of each graph.

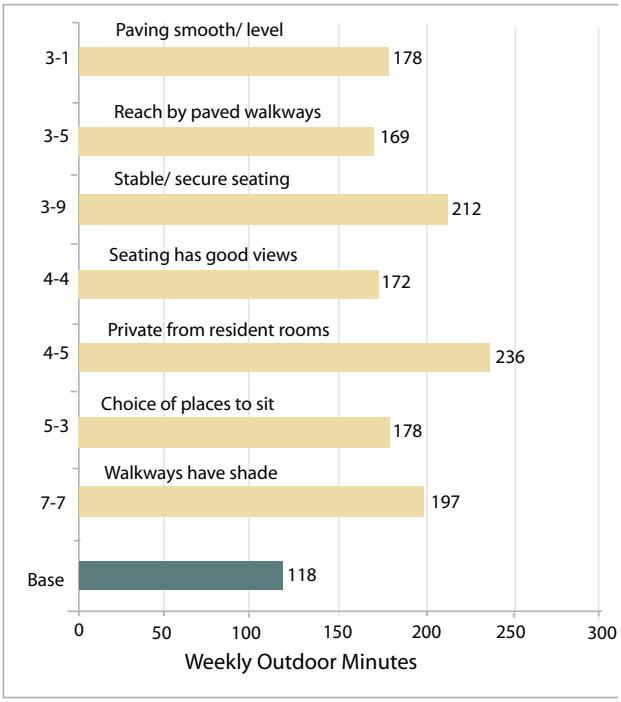
The graphs are organised by the magnitude of impact on outdoor usage, as shown by the differences in scale along the x-axis. The features shown in Figure 5 were found to increase outdoor usage up to two times; those in Figure 6 increased outdoor usage up to 3.5 times; and the features in Figure 7 had an even stronger impact on outdoor usage. In addition to the features reported here, several others increased outdoor usage to a lesser extent.

Discussion

These results show that several environmental features are strongly linked to levels of outdoor usage at assisted-living facilities. While a significance level of 0.10 was used to develop the statistical model, when the analysis was complete, the features presented here were all significant at the 0.01 level. In addition to being highly significant, the magnitude of these effects is quite large. For example, Figure 5 shows that the feature with lowest impact (3-5: 'the outdoors can be reached entirely by paved walkways') still increases the amount of time spent outdoors substantially – by an additional 51 minutes per week. Anyone working with older adults in residential care settings knows the difficulty of influencing habits such as outdoor usage or physical activity, and this would be a substantial increase.

The environmental feature with the highest impact (item 6-8 in Figure 7: 'the outdoor area has good views of birds and wildlife') is associated with a nearly 10-fold increase in outdoor usage – from 118 minutes per week to 1,032 minutes per week. This is the equivalent of going from about 27 minutes per day to nearly two and a half hours per day, which is a radical change. As a statistical projection with all other variables held constant, this does not necessarily reflect what would happen in actual experience, with multiple variables operating in each case. Nonetheless, these results suggest that the physical environment can have a significant and powerful effect on outdoor usage in long-term care settings.

Overall, the findings strongly supported the main environmental concepts found in the published literature on this topic, which is based more on practical experience than



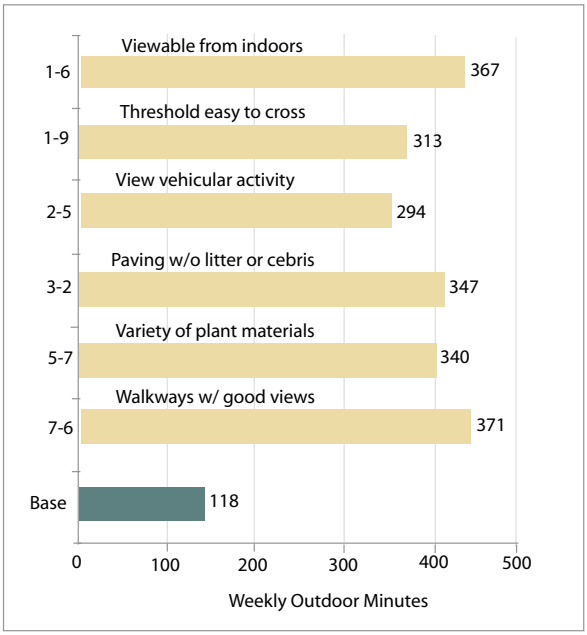


Figure 5: Environmental features with the lowest impact
Figure 6: Environmental features that increased outdoor usage by up to 3.5 times

on quantifiable research. By incorporating these prevailing concepts as hypotheses, this study provides confirmation that specific environmental features do influence the behaviour of elderly residents. Generally, the main types of features that have long been considered important by practitioners, such as safe paving, good seating and strong indoor-outdoor connections, were also found to be important in this study. Several specific features thought to be important were not found to be significant here, possibly due to correlations among similar features.

There were several features that showed counter-intuitive or insignificant results in this study, primarily due to correlations among similar environmental features. Environmental features are often found to be associated with each other[19], leading to multicollinearity problems during the statistical analysis and, therefore, possibly cancelling each other out in the model. This paper focused on the positive correlates of outdoor usage only, but future papers and follow-up studies are needed to disentangle the complex relationships among the environmental variables.

In addition, self-selection may have introduced bias, if the people agreeing to participate were the most active and outgoing residents. However, it is also possible that the participants self-selected from the most available and 'housebound' residents, while more active residents were off site or busy with other activities. To overcome possible bias, future studies could develop a strategy for randomly selecting participants. Past studies by this research team were unable to recruit sufficient numbers by this process and encountered resistance to this approach on the part of facility administrators.

There are several ways in which future studies could examine and build upon this study to triangulate and confirm or question the findings presented here. These include:

a) Behaviour-mapping: add an observational component at selected sample facilities, such as those with the lowest and/or highest environmental ratings;

b) Interview: add a structured interview component to obtain more in-depth understanding of how specific components of these environmental features influence residents' behaviour;

c) Interaction: further analyse how different environmental features interact with each other (for example, are some features effective only in the presence of others?); and

d) Intervention: conduct an intervention study to test some of the environmental features in actual settings.

Conclusion

Implications for theory and literature. This study helps fill a gap in the existing evidence base on how the physical environment impacts on outdoor usage in residential care settings. Although there is rapidly growing interest in the importance of this topic, there is still comparatively little quantifiable research. Having a greater number of robust studies will make it easier to compare results and develop further theories to explain environmental influence on the behaviour of older adults, not only in regard to outdoor usage but also, by extension, in regard to other environment-behaviour issues.

Implications for practice. Architects and landscape architects can benefit from having information on environmental features that support resident usage of outdoor areas. These findings can also be useful in convincing decision-makers to budget outdoor improvements at existing communities, or to include this as a serious consideration in planning new communities. The environmental audit tool used in this study will be adjusted based on the findings and released for use in evaluating existing communities or planning new ones. The basic design principles have been incorporated in a DVD-based educational programme, certified by the American Institute of Architects for

ELDERLY CARE BY DESIGN
LONDON 2010

Date: February, 2010

Residence de l'Abbaye, Paris

Designing environments for independent living

Examining how investment in the design of environments for older people, from hospitals to residential facilities, including nursing homes and facilities for the end of life, can support independent living, health and wellbeing right up until the last few days of life

The Amity Aged Care facility at Sutherland Hospital, Sydney

Symposium Objectives

- 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 pyschosocially-supportive environments for older people (including interiors, art, furnishings and access to nature and outside space)
- Reporting on international case studies of environments for older people that are delivering real and measurable benefits to the communities they serve
- Identifying new technologies to support older people in leading independent lives

Who should attend?

This is a multi-disciplinary event in which participants are invited from the public, private and voluntary sectors

- Architects
- Interior designers
- Project directors
- Nursing and care home managers
- Directors of Social Services
- Companies providing products and services for the elderly
- NHS Managers
- Senior care and community nurses
- General Practitioners
- Estates and Facilities Managers

An international symposium from

Design & Health
International Academy for Design and Health

To submit a paper or case study, book your place, sponsor or exhibit…

visit www.designandhealth.com
call 44 (0) 1277 634176
email info@designandhealth.com

continuing education credit[20]. Although this study was conducted in assisted-living settings, many of the concepts may apply to other levels of care, such as nursing facilities, senior apartments and CCRCs (continuing care retirement communities).

Cost-effectiveness. By providing information on the relative role of different environmental features, this study will make it easier for administrators to make informed decisions when allocating scarce budget resources. For example, some changes may be quite feasible and inexpensive, compared with the magnitude of their effect on resident behaviour.

Overall, environmental improvements have the advantage of being relatively permanent and cost-effective after initial investments are made. Unlike programmed activities that require the ongoing expenditure of funds and availability of staff members to provide continuing services, the environment can provide health-promoting opportunities day after day, year after year, at the cost of basic upkeep and maintenance. In spite of diminishing resources and a growing population of older adults, it may be possible to significantly improve the health and quality of life in residential care settings, by improving access to nature and the outdoors through environmental design.

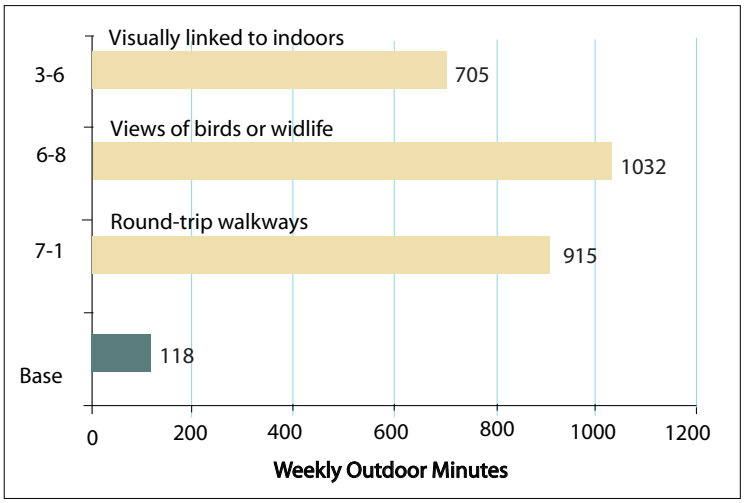


Figure 7: Environmental features with the greatest impact on outdoor usage

Acknowledgments

This study was supported by SBIR grant No. R44AG24786 from the National Institute on Aging (NIA), a division of the National Institutes of Health (NIH). Statistical analysis was provided by Matthew Cefalu and May Boggess at the Department of Statistics, Texas A&M University. The research design received valuable input from Roger Ulrich, Department of Architecture, Texas A&M University. Many thanks to the assisted-living facilities, residents and staff members who participated in this study, and to Ronald L Skaggs, FAIA, for his generous support and encouragement.

Authors

Susan Rodiek, PhD, NCARB is a Ronald L Skaggs endowed professor of health facilities design at the Department of Architecture, Texas A&M University

Chanam Lee, PhD, MLA is associate professor in the Department of Landscape Architecture and Urban Planning, Texas A&M University

References

1. Connell BR, Sanford JA, Lewis D. Therapeutic Effects of an Outdoor Activity Program on Nursing Home Residents with Dementia. *Journal of Housing for the Elderly* 2007; 21(3/4):195-209.

2. Fujita K, Fujiwara Y, Chaves P, Motohashi Y, Shinkai S. Frequency of going outdoors as a good predictor for incident disability of physical function as well as disability recovery in community-dwelling older adults in rural Japan. *Journal of Epidemiology* 2006; 16(6):261-270.

3. Jacobs J, Cohen A, Hammerman-Rozenberg R, Azoulay D, Maaravi Y, Stessman J. Going outdoors daily predicts long-term functional and health benefits among ambulatory older people. *Journal of Aging and Health* 2008; 20(3):259-272.

4. Takano T, Nakamura K, Watanabe M. Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. *Journal of Epidemiology and Community Health* 2002; 56(12):913-918.

5. Cutler LJ, Kane RA. As great as all outdoors: A study of outdoor spaces as a neglected resource for nursing home residents. In S Rodiek & B Schwarz (eds), *The role of the outdoors in residential environments for aging* (pp29-48). New York: The Haworth Press; 2005.

6. Cranz G, Young C. The role of design in inhibiting or promoting use of common open space: The case of Redwood Gardens, Berkeley, CA. *Journal of Housing for the Elderly* 2005; 19(3/4):71-93.

7. Rodiek S. A missing link: Can enhanced outdoor space improve seniors housing? *Seniors Housing and Care Journal* 2006; 14:3-19.

8. Joseph A, Zimring C, Harris-Kojetin L, Kiefer K. Presence and visibility of outdoor and indoor physical activity features and participation in physical activity among older adults in retirement communities. In S Rodiek & B Schwarz (eds), *The role of the outdoors in residential environments for aging* (pp141-165). New York: The Haworth Press; 2005.

9. Michael YL, Green MK, Farquhar SA. Neighborhood design and active aging. *Health and Place* 2006; 12:734-740.

10. Berentsen VD, Grefsrod E, Eek A. *Gardens for people with dementia: Design and use*. Tonsberg, Norway: Ageing and Health, Norwegian Centre for Research, Education, and Service Development; 2009. Available at www.nordemens.no/?pageID=138

11. Cooper Marcus C. Alzheimer's garden audit tool. In S Rodiek & B Schwarz (eds), *Outdoor environments for people with dementia* (pp179-191). New York: The Haworth Press; 2007.

12. Grant CF, Wineman JD. The garden-use model – An environmental tool for increasing the use of outdoor space by residents with dementia in long-term care facilities. In S Rodiek & B Schwarz (eds), *Outdoor environments for people with dementia* (pp89-115). New York: The Haworth Press; 2007.

13. Regnier V. *Design for assisted living: Guidelines for housing the physically and mentally frail*. New York: John Wiley and Sons; 2002.

14. Zeisel J. *I'm Still Here: A breakthrough approach to understanding someone living with Alzheimer's*. New York: Penguin; 2009.

15. Cohen-Mansfield J, Werner P. Visits to an outdoor garden: Impact on behavior and mood of nursing home residents who pace. In B J Vellas, G Fitten & G Frisconi (eds), *Research and practice in Alzheimer's disease intervention in gerontology* (pp419-436). Paris: Serdi Publishing; 1998.

16. Mooney P, Nicell PL. The importance of exterior environment for Alzheimer residents: Effective care and risk management. *Healthcare Management Forum* 1992; 5:23-29.

17. Lang R, Dhavale D. *Beyond megalopolis: Exploring America's new "megapolitan" geography*. Metropolitan Institute Census Report 05:01; 2005. Accessed 5 February 2007 from www.mi.vt.edu

18. Fovell R, Fovell M. Climate Zones of the Conterminous United States Defined Using Cluster Analysis. *Journal of Climate* 1993; 6:2103-2135.

19. Lee C, Moudon A. The 3Ds+R: Quantifying land use and urban form correlates of walking. *Transportation Research Part D: Transport and Environment* 2006; 11(3):204-215.

20. Rodiek S. *Access to Nature for Older Adults*. Three-part DVD series; 2009. Available from Center for Health Systems & Design, www.accesstonature.org

Novena Hospital
Singapore

ATLANTA BEIJING CALGARY CHICAGO DALLAS DENVER DUBAI HONG KONG HOUSTON
LONDON LOS ANGELES MEXICO CITY MIAMI MUMBAI NEW YORK OTTAWA SAN FRANCISCO
SHANGHAI SINGAPORE ST. LOUIS TAMPA TORONTO VANCOUVER WASHINGTON, DC

We Create. We Inspire. We Connect. We Care.
www.hok.com

Single-Bed Versus Multi-Bed Hospital Rooms: **The case for patient safety**

The UK's National Patient Safety Agency and Arup have collaborated to research the relationship between patient safety and the provision of single-bed and multi-bed rooms

Kate Fairhall, BSc (Hons), MSc; Laura Bache, BSc (Hons), MSc, MPhil; Peter Dodd, MBA, MAPM; Patricia Young

The issue of single-bed versus multi-bed rooms has been much debated over the last few decades. It is a debate that has been of both national and international interest and, increasingly, we are seeing a general trend towards the provision of single-bed rooms[1]. Consistent with this, the NHS has recently advised that, in the UK, 50-100% of all patient rooms should be single occupancy in newly-built hospitals[2]. There are clearly a number of primary motivations for this change, including the need to identify the most cost-effective layout, control healthcare-associated infections (HCAIs) and meet patient expectations and legislative requirements[1]. Despite this clear shift towards single-bed rooms, the debate continues as to whether multi-bed or single-bed hospital rooms offer more advantages for patient safety. This is a key question as it has implications for all healthcare stakeholders. Room type can impact on the cost, operations and design of the hospital environment and, ultimately, safe healthcare delivery.

The debate about the provision of room type and patient health and well-being dates back decades. Arup recently republished a paper called *A Scandalous Impromptu*, originally written in 1976 by Evan JR Burrough[3], which is in essence a business case set in 1976 that mirrors the arguments now being posed again, over 30 years on. It provides strong views against multi-bed wards and advocates that patients who are already unwell and suffering from their existing illness, should not have to put up with noisy, crowded and impersonal environments. One quote from the paper reads: "It is the custom for a sick horse to be segregated to a loosebox, an orphaned lamb to the kitchen, a sick dog at times to the best bedroom, but our patients

Are multi-bed or single-bed patient rooms safer?

are put in large dormitories and obliged to adjust themselves to endure, sometimes for the very first time, an intensely public life with many discomforts, which are in now essential for the investigational treatment."[3]

This quote was from Sir Rupert Vaughn Hudson who, in 1960, was calling for single rooms to combat infection but was also writing from a humanitarian point of view, to provide for everyone what only the rich or the insured could provide for themselves. The question is therefore posed as to why this debate continues today and why general opinion appears to sway in favour of single-bed rooms. Of more specific interest and relevance to this paper: what type of room is actually better for patient safety?

The research focus

In order to address these questions, the National Patient Safety Agency (NPSA) commissioned Arup to work in collaboration with it to conduct a number of research activities to both examine, and add to, the current evidence base relating to the debate over single-bed versus multi-bed rooms.

The aim of this current research was to firstly build upon a previous piece of work that was carried out by Arup[4], which examined the challenges and negative assumptions around single-bed hospital rooms, but focus specifically on the implications of room type on patient safety. This research also intended to explore the existing literature and evidence base around this topic. Patient safety, for the purpose of this research, was defined as: "Incidents of patient slips, trips and falls; occurrences of medication errors made by hospital staff; cross-patient infection rates with evidence for their relationship to room occupancy type; or any other harm that arises during a patient's hospital stay."[5,6]

As well as focusing on patient safety as an outcome measure, this research aimed to consider the wider context, which is pertinent to the relationship of room type and patient safety. This was in order to provide a holistic understanding and included factors such as cost, design and construction, cleaning and maintenance. The research also endeavoured to collect data around the issues relating to patient safety from across a number of stakeholders involved in the clinical and managerial delivery of healthcare, the design, construction and operations of healthcare facilities and patients themselves. Therefore, it included the following stakeholders: architects, designers and construction specialists; cleaning and catering specialists; clinical, managerial and operative staff within the hospital environment; and patients.

Although this list may not be exhaustive, it takes a novel approach by exploring a cross-section of the stakeholders' perspectives and enables comparisons to be drawn across these stakeholder groups.

Over a three-month period, the NPSA and Arup worked collaboratively and conducted research using a multi-method approach over three key stages (see Figure 1). Stage one consisted of a review of the

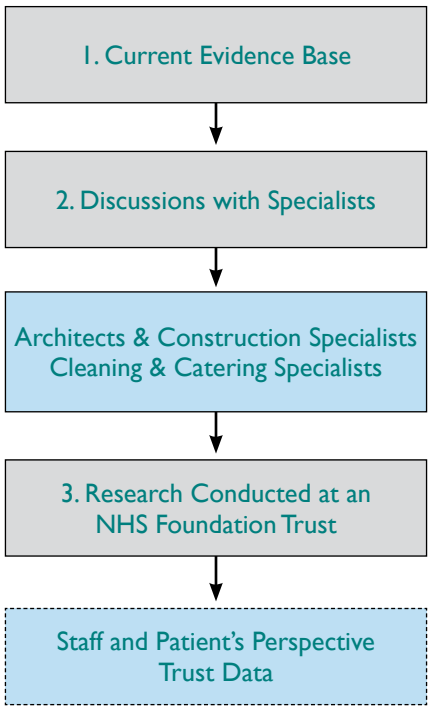


Figure 1: The different stages of the research approach and the stakeholders involved at each stage

literature to examine the current evidence base in relation to single-bed versus multi-bed rooms and patient safety. This included a review of the literature published since the 2007 Arup report to ensure inclusion of the most relevant, up-to-date literature and reduce repetition.

Stage two involved discussions with specialists in the field of hospital design and construction, and cleaning and catering, to ascertain their views on the topic and explore some of the practical issues surrounding room type and patient safety. These discussions were facilitated via a number of telephone interviews and a workshop.

Stage three comprised research conducted at an NHS foundation trust, with a good ratio of single- and multiple-occupancy bed wards, to ascertain staff and patient perceptions and obtain data from an acute healthcare context. This stage of the research included a series of workshops with a cross-section of staff, including managers, clinicians, nursing staff and estates staff, to understand the range of perspectives and differences in opinions.

This subsequently led onto the design and distribution of a staff and patient survey within the trust which explored their perspectives, opinions and personal preferences around room type and patient safety. Background variables were also collated to enable exploration of issues relating to patient age, condition and room type preference. The views of staff and patients were compared and contrasted during analysis. Trust data was also researched to provide baseline information in order to identify whether or not there were any differences from a financial perspective in the multi-bed and single-bed facility. This included data relating to performance (length of stay, waiting times), costs (capital and operating expenditures – Capex and Opex), and patient satisfaction.

The current evidence base

Within the current evidence base, a number of key variables were highlighted, including; slips, trips and falls, HCAIs, medication errors, patient well-being and recovery. Other variables, such as patient dignity and confidentiality, were highlighted by research as having an indirect relationship with safety (both psychological and physical) within the hospital environment[7]. Figure 2, illustrates these variables.

Much of the evidence within the literature and professional press advocates the use of single-bed room designs within hospitals, with numerous benefits outlined for patient safety. These include reduced slips, trips and falls, due to the reduced patient movement associated with their close proximity to en-suite bathroom facilities[8,9]. Furthermore, medication errors have been found to be lower in single-bed rooms as they allow nurses to deal with patients individually without distractions from other patients[1,10].

Cross-infection rates are often quoted as being lower in single-bed room hospitals as patients are isolated, with reduced inter-patient contact. In addition, staff handwashing behaviours change, catalysed by single-bed room designs and the provision of a sink in each patient room[2,7]. A benefit of single-bed rooms for patient well-being is the control afforded to patients over their environment, such as the level of lighting[9,11].

Despite these advantages, much of the current literature suggests that the provision of a single-bed room does not automatically assume a safe patient environment. There are also some downsides, and in-fact single-bed rooms have been criticised as reducing the observation of patients, as they reduce the frequency that medical staff check on patients, as well as remove the occurrence of inter-patient observation, which may impact on slip, trip and falls occurrences[12].

Another criticism of single-bed rooms is that patients may have less opportunity to participate in social interaction, which can negatively impact on their well-being. Importantly, the evidence suggests that design features of a single-bed room can moderate the impact that this room type can have on patient safety. For example, the benefits identified for single-bed rooms on reducing slips, trips and falls can be mitigated if the room size is too small as this can increase the number of trip hazards blocking the space around the patient bed[12].

While conducting the literature review a number of challenges were revealed surrounding the current evidence base. Firstly, most evidence is not empirical. Although, the current evidence base largely cites the numerous advantages of single-bed rooms, research has been criticised as lacking in rigour, with support for single-bed rooms often based upon 'expert opinion' or uncontrolled studies, with minimal evidence based in carefully controlled field experiments[13].

In addition, there is little research based upon UK/European hospitals. Most studies around this issue are from the US, which may reduce application of their findings to the UK healthcare system. And, finally, most evidence is single-bed centric. The research evidence that is available focuses on single-bed issues with minimal multi-bed-centric research[1], therefore posing problems for identifying the specific advantages or disadvantages of multi-bed rooms.

These challenges and shortfalls in the literature highlight the clear need for more UK-based, empirical, controlled studies, which focus on both single-bed and multi-bed room issues to enable firm conclusions to be drawn as to which room type offers more advantages for minimising patient safety incidents.

Discussions with specialists

The majority of the design and construction specialists outlined clear advantages for single-bed rooms in terms of patient safety – reduced slips, trips falls, cross-infection rates, medication errors, enhanced patient well-being and recovery, as well as improvements in staff hygiene behaviours. There were some views, however, that a 100% single-bed room

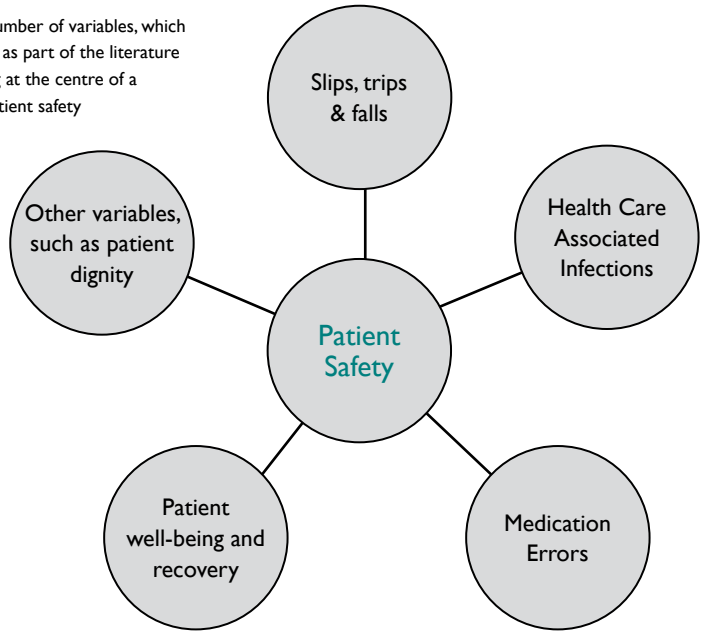


Figure 2: The number of variables, which were identified as part of the literature review, as being at the centre of a definition of patient safety

design may not be the best option – 100% single-bed room hospitals are difficult to design as they have a shallower and longer design. They suggest that patients should be given the choice, as some may prefer multi-bed rooms for the social interaction they allow. Additionally, 100% single-bed room hospitals may offer less economical use of space than mixed-room hospital design, although the NHS Estates[1] and Detsky[7] argue that ward designs with 100% single-patient rooms require the same space as those with 50% single-patient rooms, as long as other space-saving design features are integrated.

Based on these design considerations, many of the design and construction specialists proposed that a mixture of rooms is best. Still, the question is posed as to what is the optimal single-bed versus multi-bed ratio. Other key perceptions included:

- There are always going to be trade-offs with both room types; the decision should be made at a local level.
- Effective management and operations may be a key variable to consider alongside room type in improving patient safety.
- Room design needs to be flexible in order to accommodate current and future needs, however both types of rooms offer some advantages.

The discussions with cleaning and catering specialists covered a wide range of issues concerning the costs and benefits of introducing single-bed rooms into hospitals. It was suggested that any additional costs of cleaning a single room could be recompensed by a higher throughput (lower cross-infection rates and improved recovery time). Single-bed rooms may take longer to clean and may actually increase staff 'travel time'. However, it is likely to be easier to clean a single-bed room as patients are generally not in the way and disinfectants can also be used more effectively (hydrogen peroxide vapour).

It was also suggested that single-bed rooms may exert a positive influence on patients' perceptions, so they are perhaps more actively aware and involved in the cleaning of their room, leading to 'occupancy pride'. It was suggested, however, that irrespective of room type, hospital design should take into account storage needs, as appropriate design could in fact lend itself to reducing slip, trip and fall occurrences and HCAIs, if hazards are stored away properly and cleaning equipment is more readily accessible. It was felt that room size was likely to be the most important factor in designing storage space, rather than the room type itself.

For catering, the direct impact of a having a single- or multi-bed room was not thought to be of very great significance, although single-bed rooms may reduce the likelihood of catering staff confusing patients, which can be particularly problematic if some patients are 'nil by mouth'. Another potential benefit of single-bed rooms is their ability to accommodate space for visitors; this could encourage friends and families to play a more active role in patient care by helping to feed the patient they are visiting.

NHS foundation trust research

During the workshops at the foundation trust, staff suggested a number of benefits and disadvantages for both single-bed and multi-bed rooms, based on a number of the patient safety variables. A common finding was that what was a disadvantage for single-bed rooms was often found to be an advantage for multi-bed rooms, and vice versa. Generally, staff advocated the use of single-bed rooms when considering patient safety, particularly when considering the potential benefits for patient well-being in single-bed rooms. The results of these workshops went on to inform the design and structure of questions used in the survey.

The survey findings (shown in Figure 3) revealed that both staff and patient groups were found to have mixed views relating to the patient safety variable of slips, trips and falls, although the majority of staff and patients proposed that multi-bed rooms are better as they allow more observation from staff and other patients. On the other hand, some advantages of single-bed rooms on this variable were that they contain less clutter, there are fewer obstructions from equipment, the risk posed by other patients is reduced in single-bed rooms, and single rooms may be more amenable to designing in safety features, such as grab-rails. The mixed views found from the literature review conducted by Arup in February 2009[5] mirror those identified in this study[6].

Most staff and patients reported the superiority of single-bed rooms for preventing medication errors, reasons for which included fewer distractions from other patients and less potential for confusion between the patient's medicine in single-bed rooms. More support was also found for single-bed rooms in terms of preventing HCAIs; this was likely to be due to less contact with others, reduced sharing of equipment and facilities, easier-to-control infection outbreaks, easier deep cleaning between patient occupancies and increased confidentiality for open discussion between patients and staff. The current evidence base does not, however, provide such strong views in favour of single-bed rooms on this patient safety variable, as it instead suggests

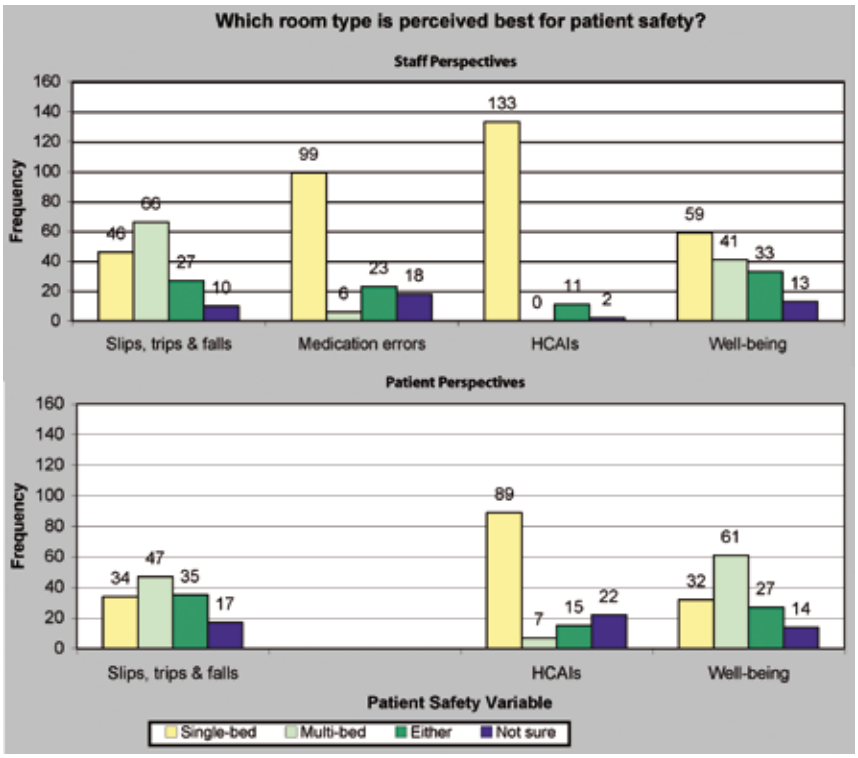


Figure 3: Staff and patient's perspectives on the room type that is better for each of the different patient safety variables

that evidence for HCAIs is mixed. However, there was also a consistent view, consistent with Pangrazio[8], who suggests that single-bed rooms may be better as they prevent direct contact between patients.

Finally, for the last patient safety variable, patient well-being, staff and patients were in disagreement as to which was the preferred room type. Staff felt that single-bed rooms were better as they increase privacy and dignity and prevent conflict from other patients, whereas patients perceived that they received more support from other patients in a multi-bed room compared to single-bed room. The current evidence base was found to provide no clear conclusion for the advantage of single-bed rooms versus multi-bed rooms on patient well-being, although there is some evidence that single-bed rooms can improve patient well-being as they offer a quiet and private environment[12].

The data collated in the surveys was also examined to investigate whether staff and patient perceptions of room type and patient safety differed as a function of age and staffing position. Indeed findings did reveal differences. The views of patients under the age of 60 were mixed around the room type that was better for overall patient safety (approximately 50:50). Conversely, the majority of patients over the age of 60 perceived multi-bed rooms as being better for overall patient safety. Variations were also found for staff position, as the majority of doctors perceived that single-bed rooms were better, whereas the majority of nurses had mixed views, with a slight preference for multi-bed rooms. This highlights the strong need to consider different patients and staff when providing evidence as to room type. Perhaps the answer is that one solution does not fit all, instead highlighting the importance of 'patient choice'.

As part of this research the trust's organisational data was explored to highlight whether any differences existed between single-bed rooms and multi-bed rooms in relation to performance data, including Capex, Opex and length of stay. However, data in the hospital was not collected about room type which meant that comparisons were not possible. This suggests there is a shortfall in the data that is currently collected by acute hospitals and this needs to be considered by those who administer the NHS guidelines. Until consideration is given to data down to the level of room type, such comparisons will be difficult to explore and the issue of the best room type will not be answered.

During this exercise other practical difficulties posed by the current set-up of single-bed and multi-bed rooms in acute hospitals. For example, a patient may be transferred several times during their stay, including between single-bed and multi-bed rooms. Therefore, understanding how room types impact upon HCAI rates is almost impossible as we are unable to isolate occurrences of cross-infection to patients' occupancy of a single-bed room or multi-bed room. This difficulty could be remedied by looking at wards which are made up of either 100% single-bed or multi-bed rooms, which means that patients who reside in that ward for the duration of their stay will have been exposed to only one room type. With this data, comparisons could then be made across the ward, providing characteristics, such as age, and patients' conditions and severity of conditions are similar.

Conclusion

This research builds upon the current UK evidence base. The data has been collected from a UK NHS foundation trust hospital and, so, increases transferability to the UK's National Health Service – compared to much of the data that has been collected in the US. Furthermore, the research approach adopted has allowed the advantages and disadvantages specific to both room types to be highlighted, and so has built upon the current research base, which is currently criticised as being single-bed centric.

Based upon the evidence collected, it is feasible to conclude that single-bed rooms are at least as favourable as multi-bed rooms for patient safety, and usually more so, but it does depend on the patient safety variable. The research also provides a unique insight into the different perspectives within and between different stakeholders, and how perceptions and preferences may vary as a function of patients' age and condition and the ward in which staff usually work.

However, there is still no conclusive answer as to what the exact ratio of single to multi-bed rooms is that a new hospital within the UK should be aiming for in its design. The current research study does, however, advocate the continued use of both room types within the acute hospital setting, with an emphasis on patient choice to allow the patient to select

the best room for a speedy recovery, based upon their needs and personal preference.

The current evidence base supports the significance of patient choice in modern healthcare settings. The question is posed, however, whether it is the patients themselves who should make this choice or the staff. The research highlights the interesting finding that staff and patients seem to have quite different views about what room type is better for patient well-being. It highlights the notion that staff do not necessarily know what the patients think and raises a number of issues for consideration, including whether we need to take into account what is actually safest for patients, what patients want, how well-educated patients are on patient safety issues and, if they knew more, whether their opinion may change. This also raises the issue of what patients really want: comfort, safety or social interaction? Patient safety is only one of many variables that are important to consider in the single-bed versus multi-bed room debate.

For design and construction specialists, other variables, besides patient safety, are of key importance in this debate. They suggest that, despite their numerous advantages, 100% single-bed rooms may not be the optimal solution as they are generally harder to design. Evidence is less clear for other variables associated with the operational issues of room type, such as cost and hospital performance. Indeed, the research highlights the challenges in obtaining the information needed to draw suitable comparisons. Such data is not collected at the level of room type and the combination of room types in acute hospitals do not easily allow comparisons between room types on such issues.

The research also highlights some interesting points for consideration, relating to the complexity of the hospital environment and the moderating effects of some design factors. For example: room size, flexibility of design and positioning of nurses' stations can all impact upon patient safety in single-bed rooms. Phiri[14] highlights the need to consider the impact of the wider hospital network, including corridors, waiting rooms and meeting rooms, in addition to bedrooms. This paper suggests that when conducting research in any environment, there are a large number of interlinking variables to consider. These moderating factors are likely to go beyond the design of the environment and may also include operational factors, such as management, leadership, staff training and behavioural change to encourage 'safe' behaviours such as hand-washing. Therefore, it might not be sufficient to merely ask the question: are single-bed rooms or multi-bed rooms better in optimising patient safety?

Perhaps the answer to the debate, lies in some form of innovative hospital design which does not limit itself to room type, but somehow incorporates elements which are identified as important in promoting patient safety, such as room size, flexibility to support the patient's personal preferences, shared social spaces and efficient ward layout.

Next steps

Key to future work in this area is the development of more rigorous research from which conclusions can be confidently drawn to inform the future design of hospitals. This should include more controlled empirical research to explore other variables to better understand the strength and direction of the relationships between patient safety variables and the hospital environment, and research conducted in other healthcare contexts, such as primary and community care, to assess the applicability of the findings to other contexts. In future research it is suggested that a multi-disciplinary approach should be adopted whereby a cohort of stakeholders are engaged. This will optimise transferability and the potential for the practical application of research findings.

A number of practical suggestions emerging from the study are also offered. Based on the existing evidence base, as well as the shift within the NHS, patient choice is clearly important. Therefore, where possible, patient choice should be accommodated and patients empowered to identify the room they believe will allow the speediest recovery.

The evidence base also suggests that within hospital environments there are moderating variables that can increase, or even mitigate, the positive impact that room type has upon patient safety. When considering room design it is therefore essential to simultaneously consider the wider hospital environment, such as decentralised nurses' stations.

The recording of performance data should also be improved to allow for reliable comparisons across room types and for conclusions to be drawn as to which room type is preferable in terms patient safety, as well as variables such as satisfaction. There is a need for this information – to firstly add to the current evidence base and secondly to allow hospitals to make design decisions with a foundation in research.

Authors

Kate V Fairhall, BSc (Hons), MSc and Laura Bache BSc (Hons), MSc, MPhil, are managements consultant at Arup

Peter Dodd MBA, MAPM is a project manager at Arup

Pat Young is design specialist at the UK's National Patient Safety Agency

References

1. NHS Estates. *Ward layouts with single rooms and space for flexibility*. London: The Stationery Office; 2005. Downloaded on 17/12/2008 from www.dh.gov.uk

2. Dowdeswell B, Erskine J,Heasman M. *Hospital ward configuration determinants influencing single room provision*. A Report for NHS Estates by the European Health Property Network; 2004. Downloaded on 20/11//08 from www.pcpd.scot.nhs.uk/PDFs/EUHPN_Report.pdf

3. Burrough EJR. *A Scandalous Impromptu*. Oxford: EJR Burrough; 1976. [reproduced in 2008 with the kind permission of the author's son AP Burrough]

4. Arup. *Challenging the negative assumptions associated with single patient rooms: a review of the evidence*. 2007.

5. Arup. *Single bed versus multi-bed hospital rooms: The case for patient safety* [literature review]. 2009.

6. Arup. *Single versus multi-bed rooms and patient safety: providing a methodology and undertaking a comparison between a multi-bed and single-bed facility in the UK*. 2009

7. Detsky M, Etchells E. Single-patient rooms for safe patient-centered hospitals. *JAMA* 2008; 300:954-956.

8. Pangrazio JR. Room with a view: looking at the future of patient room design. *Health Facilities Management* 2003; 16(12):30-32.

9. Clancy C. Designing for safety: evidence-based design and hospitals. *American Journal of Medical Quality* 2008; 23(1):66-69.

10. Joseph A. *The role of the physical and social environment in promoting health, safety, and effectiveness in the healthcare workplace*. Concord CA: Center for Health Design; 2006.

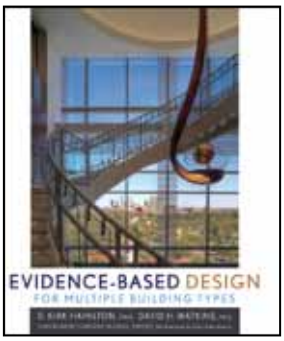
11. Brown KK, Gallant D. Impacting patient outcomes through design: Acuity adaptable care/universal room design. *Critical Care Nursing Quarterly* 2006; 29:326-341.

12. Stichler J. Is Your hospital hospitable?: How physical environment influences patient safety. *Nursing for Women's Health* 2007; 11(5):506-511.

13. Van de Glind IM, De Roode S, Goossensen MA. Do patients benefit from single rooms? A literature study. *Health Policy* 2007. 84(2-3):153-161.

14. Phiri, M. (2003) *One patient one room – Theory and practice: An evaluation of the Leeds Nuffield Hospital*. A study report for NHS Estates. Downloaded on 20/11/08 from www.sykehusplan.org

Arts and Culture



Evidence-based Design for Multiple Building Types

D Kirk Hamilton and David H Watkins
John Wiley and Sons, 2008
Price: £50.00 / €82.50 / US$75.00

Evidence-based Design for Multiple Building Types starts out by making a clear statement of its bias and point of view. Architects are losing market share to a plethora of other specialists in the building industry, particularly to professionals who have a better understanding of users' needs and client requirements. A demonstrated competence in acquiring and using scientific evidence to apply to design decisions is a way to rectify this imbalance and have better luck winning projects from competitors.

Basing their definition of evidence-based design (EBD) on the identification and evolution of evidence-based medicine, the authors refer at least twice to the proposed (now newly in place) certification programme available to train architects in carrying out EBD. The book recommends that interested practitioners read more, and become familiar with and learn to refer to, academic and scientific articles to broaden their knowledge base about what research results are out there.

In order to bolster its case, the book presents a range of recent architectural projects in different specialised areas – healthcare, learning environments, the workplace (citing a series of studies published by Knoll furniture systems), as well as lab design (ably illustrated by projects from one of the authors' own architectural firm), retail and "places for assembly and performance". To their credit, the authors also include chapters on historical preservation and, on another scale, urban design projects. In each case, a short overview of what is known about designing in the field is provided. However, the format does not allow sufficient data or detail for these sections to qualify as 'evidence' in any sense of the word.

The brief project descriptions include photos, as well as summary texts which provide an overview of the requirements that were communicated to the architects. Unfortunately, these do not extend beyond simple summaries of either the project goals or sustainability requirements or energy-conservation objectives – and they invariably end with statements such as "the project has been very successful" or "the clients are very pleased".

Not that there is anything wrong with presenting interesting projects and summarising their achievements. Architectural journals do it all the time. But for the novice looking for instruction on how to follow the authors' advice and make his or her practice more competitive by adopting an EBD approach to design, there is little to go on.

What is the 'evidence' used in each project, how was it acquired and how was it used? How is a design professional to assess whether results from a furniture manufacturer's five case studies qualify as evidence or not? More importantly, what were the outcome measures for success or for achieving each project's stated goals? How were these outcomes defined and what measures were implemented to collect and analyse data? As the authors state in Chapter 3, the key to good research is knowing how to frame the question.

The book fills these gaps in part by providing extensive discussion in Part 3 of how to carry out EBD and of the skills needed to become an effective researcher. The authors use this opportunity to list current failings in architectural education, indicating what adjustments need to be made to provide graduating architects with more relevant skills to today's world.

Unfortunately, to become a good researcher requires more than simply becoming a designer who does research. The book is not clear on how implementing EBD differs from conventional information-gathering that is carried out at the start of every design project. It also neglects to mention the costs associated with loading a conventionally-financed building project with field research studies. And it is not clear how investing considerable time and resources to acquire the skills the authors recommend will provide architects with their long-sought competitive edge.

To achieve its goals, this book needed to address the real EBD challenge for a design professional – that is, intelligent and innovative ways of applying the results of scientific research to design decisions in the real-world context of projects with time, budget and political constraints.

Jacqueline C Vischer is a professor and director of the interior design programme at the University of Montreal

A World of Experience

TSOI / KOBUS & ASSOCIATES
ARCHITECTURE • PLANNING • INTERIOR DESIGN

Since our founding more than 25 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.

One Brattle Square
Cambridge, MA
617.475.4000
www.tka-architects.com

TRIBAL

www.tribalgroup.co.uk
E: info.health@tribalgroup.co.uk

Improving healthcare delivery

New and upgraded health buildings need to support improved and constantly changing models of healthcare delivery. They also need to be efficient, safe, attractive to patients, visitors and staff alike, environmentally sustainable and, last but by no means least, they must be affordable.

That's quite a balancing act.

At Tribal our multi-disciplinary health planners employ their knowledge and state-of-the-art experience of providing and managing health services and facilities, and their specialist knowledge of planning and design to help clients achieve this required balance. Whether in the UK or further afield (we love travel) we help clients in both the public and private sectors to plan ahead, including:

- preparing service strategies often based on innovative models of care
- forecasting demand
- assessing the feasibility of proposed changes
- drafting design briefs
- devising solutions
- calculating costs
- assessing affordability
- writing business cases.

We can help you analyse a problem, challenge a proposition, improve efficiency and plan your way to a better future.