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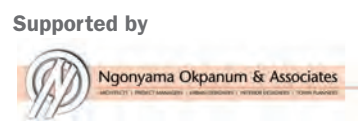
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Bayelsa State Teaching Hospital, Nigeria designed by NOA



Contributors

Gunther de Graeve

Although blessed with a good climate and a laid-back attitude, Australia could be doing much more in the realm of public health



Diana Anderson

Medicine has become the art of managing extreme complexity; this ultra-specialisation has led to the need for a much more collaborative environment



Richard L. Kobus

'Safety first' is something we're taught from early childhood – and the same applies to healthcare, where good design equals fewer mistakes and less stress



Monica Eriksson

Health promotion is a discipline that is still in relative infancy, but the salutogenic model of health is adding to our knowledge base



Behrooz Behbod

Public health schemes that put people ahead of pollution could be the prescription for the prevention and treatment of childhood asthma



Cover Image

Park Nicolett Melrose Eating Disorders Institute, Minnesota, designed by Ellerbe Becket



New ideas and knowledge are golden

The world, and human lives, are in a state of constant evolution, but there are moments in history when it feels more like revolution. As massive social, cultural and political change engulfs the Middle East, while Europe and North America continue to struggle with the impact of the financial crisis and subsequent global economic meltdown, and China and Asia continue to rise as economic forces, the pace of change in the 21st century seems relentless. Some may argue that we have enough knowledge and ideas, but not enough understanding to implement and apply them. But knowledge and ideas are constantly evolving too, and in this time of change and flux, ideas are golden. Scientific and social experimentation, intellectual ambition and curiosity are the legacy of enlightenment, and this year there will be no better place to learn about and create new ideas and knowledge that embrace change, and have the opportunity to make history, than the 7th Design & Health World Congress. Taking place in Boston from 6-10 July, the congress will provide a chance for participants to think, to act and to say what needs saying; to challenge the status quo and enjoy an open and robust debate in which ideas can be interrogated, argued for and fought over. Read more about the Congress on pp8, 19 and 21, then visit www.designandhealth.com to register online to book your place at the most influential event in your field in 2011.

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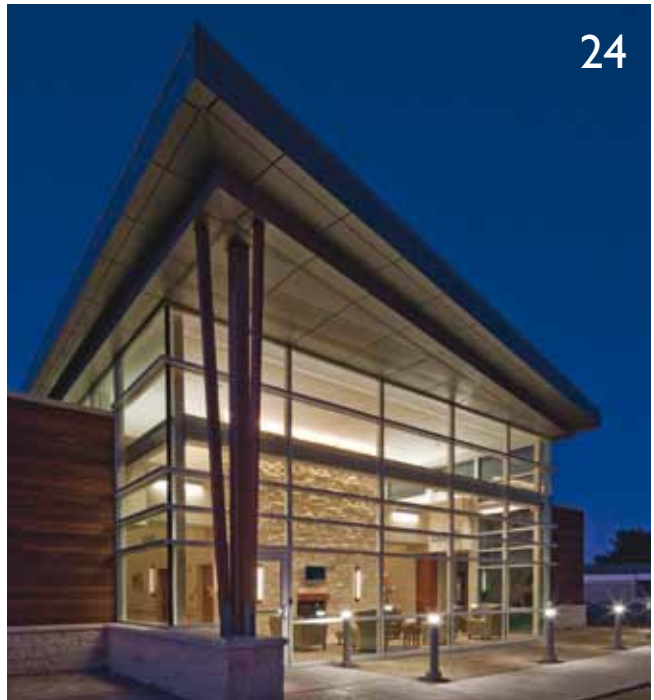
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A world of opportunity

The 7th Design & Health World Congress in Boston in July will reflect today's global economy, providing the ideal platform for exhibitors to develop international markets

Book your exhibition space

The exhibition is arranged in two key areas at Boston Marriott Copley Place: the exhibition hall, which includes the principal catering points; and the congress lobby, which provides access to the main conference room, exhibition hall, poster displays and additional catering points.

Exhibiting companies will include:

- architecture & design services;
- art consultants & suppliers;
- infrastructure consultants;
- interior designers & urban planners;
- technology & communications; and
- suppliers of furniture, furnishings & floor coverings, medical equipment, beds & patient rooms, signage & safety products and healthcare products.



Confirmed sponsors and exhibitors include: Altro Floors, USA; American Institute of Architects, USA; Anshen + Allen, USA; Arup, Global; Brainlab, USA; Britplas, UK; Cannon Design, USA; Enovate, USA; Farrow Partnership Architects, Canada; Forbo, USA; Graphisoft, USA; HDR, Inc, USA; HLM Architects, UK; Innerface Signs, USA; International Academy for Design & Health; Kaizan Food Service, Canada; Lee Burkhart Liu, USA; MAAP Architects, UK; Mincey Marble, USA; Montgomery Sisam, Canada; Ngonyama Okpanum, South Africa; Nightingale Associates, UK and Africa; Olympus, global; Perkins Eastman, USA; Philips, Netherlands; Primera Life, UK; RTKL, USA; Schneider Electric, USA; Shepley Bulfinch, USA; Stantec, Canada; Steris, USA; TKA Architects, USA; Tribal Group, UK; YK Group, Belgium; Webb Designs, USA; WHR Architects USA; Woods Bagot, USA; World Health Design, Global; Zeidler Partnership Architects, Canada

Organised by the International Academy for Design & Health, in partnership with the American Institute of Architects, Academy of Architecture for Health, the 7th Design & Health World Congress & Exhibition will bring with it a leading-edge scientific programme that will underpin future professional practice in health promotion by design, and a platform for international trade that will truly reflect the modern global economy that we live in today.

In the wake of US healthcare reform, there are new opportunities for international firms to bring their expertise and innovation to a raft of new typology of hospital infrastructure that will serve the previously uninsured. Firms based in North America, meanwhile, will have the opportunity to meet with international delegates to explore opportunities to expand into international markets, notably in the Middle East, Africa and Asia.

Marc Sansom, corporate development director, IADH, said: "Those firms that wish to survive in an increasingly globalised world will understand the imperative to invest now in international markets, collaborations, partnerships and knowledge, while those that retreat into the comfort of domestic home markets, hoping to ride out the storm, risk an uncertain future."

"Here at the International Academy for Design & Health, we hope we can assist you at the 7th Design & Health World Congress & Exhibition to build your global trading platform for developing and expanding your international markets."

With only a limited number of booths still available, book your exhibition and sponsorship today for the 7th Design & Health World Congress & Exhibition, from 6-10 July, 2011 in Boston. With exhibitor traffic flow at the heart of our programme and venue, you will be able to reach an unprecedented new international audience with your products, services and design solutions.

Global thinkers connect health and sustainability

World Health Design tackles a tough topic with the launch of its supplement, the first in a series



Design and health professional communities around the world have a unique opportunity to promote improvements in wellbeing and recovery linked to energy efficient connection of health environments with nature, according to a new supplement launched by *World Health Design* in this issue.

Guest edited by Sunand Prasad, past president of the Royal Institute of British Architects, *Essays in Sustainable Healthcare Design* features five interdisciplinary essayists of international repute in a reflection on the current legislative, technical, financial and moral issue and challenges of sustainability, and its connection to health promotion and wellness.

All the essayists take the view that the world's health services must take a lead in addressing the challenges presented by sustainability and the more efficient use of our natural resources. Prasad sets out the case for the special connection between sustainability and health, while Prof Richard Jackson of the University of California Los Angeles takes a broad view of the link between design, wellbeing and the urban environment.

Perkins+Will principal Robin Guenther then argues for the creation of hospitals that actively enhance the healthiness of humans as well as of the natural environment, while Arup's head of global

health Phil Nedin frames sustainability as five oppositions in order to very clearly chart the choices that confront the commissioners of designs and buildings. Brendan Lovelock rounds off the essays by extending the principle of sustainability to the domain of human resources and skills, showing how rapid developments in digital and virtual technologies could be harnessed to improve the quality of the human experience.

Prasad comments: "This supplement amounts to a plea to healthcare clients, experts, managers and designers to show leadership in an area where it is now clear what has to be achieved and many examples exist of how to start achieving it.

"The challenge of building a sustainable future may seem daunting but we can be encouraged by the promise of an extraordinary opportunity to take both the planet and ourselves to higher state of health and wellbeing."

The launch of the supplement will be the first in a series of essay reports on keynote issues and challenges of our times, each of which will be guest edited. In the July issue, *Essays in Healthy City Design* will be guest edited by Prof Tony Capon of the Australian National University, and will be circulated at the 7th Design & Health World Congress.

"At *World Health Design* we are always seeking ways to improve and enhance our reputation and value offering to our readership," says editorial director Marc Sansom. "Our new 'essays' series of reports will engage leading researchers and practitioners around the world in the field of design and health in an interdisciplinary debate. The aim is to drive forward new ideas and design innovation, and support their rapid implementation in practice for the benefit of human health and quality of life."

If you wish to sponsor *Essays in Healthy City Design*, or contribute to future essay reports, contact the editorial director, Marc Sansom at marc@designandhealth.com



Sunand Prasad



Richard J Jackson



Robin Guenther



Phil Nedin



Brendan Lovelock

Challenge Africa

The Ministry of Health in South Africa and the International Academy for Design and Health announces a major competition to design a 'Health Promoting Lifestyle Centre' in South Africa. Winners will be announced in Cape Town in October

Half of all deaths of children under the age of five occur in Africa, where only a few countries are able to spend the \$34-\$40 per person per year that WHO identifies as the minimum necessary to meet a population's basic healthcare needs. Over the next decade, it is estimated by the International Finance Corporation that \$25-\$30 billion of new investment will be needed in healthcare assets, including hospitals and clinics, to meet the growing demands of the healthcare market in sub-Saharan Africa.

The continuous improvement of the quality of life and wellbeing of all African citizens will be founded on the recognition that a healthy population is the foundation for social development and economic growth. It requires new perspectives that consider wellness factors to encourage innovative design for a healthy environment.

Design objectives for enhancing human health must facilitate an active lifestyle, enable the successful management of physical, psychological and emotional stress, and support mental and cognitive processing of information by stimuli in a variety of designed environments. Central to this is the development of a scientific research base that explores the application of a 'salutogenic' approach to health infrastructure – preventative care that moves the focus away from risk factors and the treatment of disease towards a holistic understanding of a healthy society in the African context.

A preventative vision for primary healthcare

A recent meeting between Dr Alan Dilani from the International Academy for Design and Health, Dr Aaron Motsoaledi, health minister of South Africa and Dr Massoud Shaker, senior adviser to the health minister, resulted in the development of a vision for primary healthcare in South Africa – 'Health Promoting Lifestyle Centres' (HPLCs) – which could subsequently be extended across sub-Saharan Africa.

These community HPLCs will focus mainly on primary healthcare, with a strong focus on health promotion, wellness, education, preventative care and early intervention – a salutogenic, rather than a curative, approach.

The HPLC should be friendly and welcoming, empowering the community towards self-care. It should clearly indicate a paradigm shift in healthcare facility design, showing a greater understanding of 'salutogenic' health and how the physical environment can be a valuable tool for preventative medicine and as a means of promoting and supporting health processes. Environmentally supportive and innovative design principles shall be at its forefront. It should therefore feature the following:

- health promotion/educational facilities, to introduce the examination of patients' lifestyles
- an outpatient area and other support facilities e.g. waiting areas, waste disposal and storage
- recreational infrastructure to support an active and healthy lifestyle
- mother and child facilities (pre-natal, delivery and post-natal)
- dental care facilities
- HIV and AIDS counselling facilities, and TB screening facilities
- adolescent-friendly counselling areas for teens on issues of teen pregnancies, substance abuse, alcohol, self care etc
- environmentally friendly and well landscaped external



Top: South Africa's Health Promoting Lifestyle Centres (HPLCs) will focus mainly on primary healthcare. Above: Mexico's award-winning Centro de Rehabilitación de Infantil, a model of supportive design that could be replicated in Africa

- features, including children's play areas, designed with a local cultural approach
- parking areas.

The designer should endeavour to create optimal and sustainable physical environments using indigenous architecture and local materials as much as possible, within stringent financial constraints and overall reduced operational and maintenance costs.

Qualification for applicants

The applicant shall demonstrate relevant in-depth experience and adequate skill in infrastructure design in the healthcare arena. A proven track record of successful, innovative healthcare facility design and planning is required. In addition:

- the consulting firm should indicate the qualifications and experience of at least two key staff to be responsible for the design proposal, including professional registration with relevant professional bodies
- key staff members need at least five years' post-graduate experience
- relevant research done on previous similar projects should be indicated
- the consulting firm should indicate the key staff members'/experts' knowledge of issues the client considers pertinent to the realisation of the HPLC
- any other supporting documentation for any claims for preference/consideration is also welcome.

How to submit an entry

The Statement of Qualification (SOQ) submittal shall consist of the following, in order:

1. a letter of introduction and contact details
2. past performance information
3. qualifications and experience submission and any other relevant supplementary information
4. the approach paper/methodology.

Please submit SOQs by email to info@designandhealth.com, no later than 24 June 2011. Late or facsimiled submittals will not be considered.

We offer an equal opportunity to all able and competent consulting entities. Involvement of African-based consulting companies is encouraged to ensure local identities.

Applicants who do not have operational offices in Africa are encouraged to participate, and will be required to indicate in their approach paper how the implementation phase of this project can be achieved should their proposal emerge as the winner of this competition. Joint-venture partnerships at project implementation stage with consultants with operational offices in Africa are required.

Pre-submission enquiries, and announcement of winners

Submit enquiries, questions, or comments to Prof. Alan Dilani, director general of the International Academy for Design & Health, at dilani@designandhealth.com. All requests for information or clarification must be submitted by 10 June 2011. Responses to questions or comments will be emailed to the individual applicants. No hard copy reply will be issued. A number of consultants shall be approved to participate in this competition and a reasonable fee will be paid for those participants. The winner will be announced by South Africa's health minister at the International Symposium on Design and Health, taking place from 25-26 October 2011 at Cape Town International Convention Centre.



Above, l-r: IADH's Alan Dilani, South African health minister Aaron Motsoaledi and senior adviser Massoud Shaker (right). Top: Cape Town's Guga S'Thebe arts centre has a perfect sense of place

2011 deadlines

Deadline for pre-proposal enquiries	10 June
Deadline for submission of pre-qualification	24 June
Call for design proposals for HPLC by chosen consultants	10 July
Deadline for submission of design	15 September
Final evaluation by client representative	15 October
Announcement of competition winners at the Academy's Cape Town symposium	26 October



Prince Court Medical Centre, Kuala Lumpur (310 beds)

Photography: Glenn Hester Photography

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With ancient heritage, an abundance of fresh air and sunshine, and a laid-back approach to life, many people around the world would trade their current life to live in Australia. You might think that in this land of milk and honey, the environment should inspire behaviour that embraces a healthy lifestyle, and that there would be a conscious demand for unpolluted public health. But once again, the environment seems to be losing the battle with commercial reality: fast food, planning principles based on petrol cars, and the latest electronics that allow us to move everything and anyone around us without having to physically move ourselves.

All of this leads to growing pressure on health funding, which dominates the government's budgets and shows no immediate sign of getting under control. Some might say it is up to the government to tackle this issue and put in place the policies that turn the curve around. I would argue that it is our collective duty to alter our behaviour and create a sustainable lifestyle that is underpinned by public health, fuelled by the natural environment.

We are not restricted by either climate or law to go swimming in warm oceans, nor to access beaches, foreshores and parklands to enjoy picnics and outdoor play. We don't need to wait for the government to ban fast-food advertising to start eating more healthily. We do not need to do any more research to know that it is both our personal behaviour and our current demands towards the built

environment that obstruct us from becoming a nation that achieves best records in public health – which will then bring our health expenditure, our insurance costs and our government budgets back on track.

So do we just require governments to keep advertising that prevention is the key to better health as a constant reminder? No, we require more action. We can run as long as we want in the great outdoors, but until we start focussing on better and healthier planned communities and embrace initiatives of alternative mobility rather than wider highways, we will remain a nation of disease and treatment. Today, policymakers are under enormous pressures to implement faster and easier approval processes to make way for the urgent need to more community developments. Rightfully so! The process is too complicated for what can be as simple as mathematical equation. But the more complex issue is how to plan and create a community that is underpinned by a healthy behaviour – where kids can safely walk or ride to school, where the fastest means to a bottle of milk from the corner shop is not to drive, and where domestic air-conditioning is considered a solution to poor building design rather than a luxury.

So why is public health is considered a matter for the health department, and why are sustainable communities considered tasks for architects, engineers and builders? We as a nation need to recognise that our public health, our healthcare system and our community environment are interconnected, and that this connection can be a major player in the solution to the pressures on our healthcare systems. Until we take action on health grid planning, we will keep missing the opportunity to truly become the land of milk and honey.

Gunther de Graeve is design executive and health markets leader at Parsons Brinckerhoff in Australia

Much to achieve

At first glance a land of milk and honey, Australia could be doing so much more to create healthy communities, says *Gunther de Graeve*

The more complex issue is how to plan and create a community that is underpinned by a healthy behaviour

Catalysts for change

With major healthcare reform underway in all corners of the globe, what role should designers and architects play in rising to its challenges? Three experts take a personal view from their own territory – North America, Australia and the UK



Healthcare reform in the US is still in transition, with the end-goal being to provide the highest quality care at the lowest possible cost. Experts anticipate that increased access to care will inevitably lead to more demand being placed on facilities and the existing building infrastructure. Changing the way that care is delivered will no doubt have an impact on space needs, prompting the design of environments that are cost-effective, functional and flexible.

In North America, Canada's single-payer healthcare system has informed the US healthcare debate, while Canada's design of hospital facilities has maintained many US standards and guidelines, such as private rooms. The patient

experience will likely continue to be the driver for new healthcare design concepts and evidence-based research.

In *The Checklist Manifesto*, Atul Gawande writes about the demise of the historic Master Builder, recognising that the variety and sophistication of advancements in the construction process have overwhelmed the abilities of any individual to master them. Dr Gawande likens this to his field of surgery, and to medicine overall, which has become the art of managing extreme complexity. The ultra-specialisation of medicine has led to the need for a collaborative environment. From a staffing perspective, we will likely see more of what has already begun – a shift towards multidisciplinary team care and the need for our space designs to accommodate this collaboration (such as conference areas integrated within patient care units, space for larger rounding and surgical teams, etc).

As ageing populations and the number of insured individuals rise, these demographic changes have the potential to place a greater demand on medical services, particularly in speciality areas such as intensive care. Will healthcare reform generate a need for bigger, better and more state-of-the-art centres, or will we see healthcare disperse to satellite facilities, freestanding clinics, and home care providing more preventive and accessible medicine, leaving hospitals as mainly critical care centres?

Emerging trends and challenges lie ahead. In the future, it is likely that both the US and Canada will have a mix of public and private healthcare delivery. The policymakers' goal is to find the right balance. The designer's goal is to be a leader in this change, advocating for ways to transform their clients' practices through innovative research and design solutions.

Diana Anderson is a medical planner and 2008-9 Tradewell Fellow at WHR Architects, Houston, Texas

Medicine has become the art of managing extreme complexity



In the world of economics, reform could quite legitimately be associated with the economic problem of scarcity – the seemingly unlimited human needs and wants in a world of limited resources. The economist would suggest that not all of society's goals can be pursued at the same time, and that tradeoffs must be made of one good against others.

Within the health setting we are confronted with a number of changes to the 'want vs need' equation, including increasing demand for health services, an increasing range of healthcare products and services (not just those associated with western medicine and/or the major teaching hospitals) and improved access to health services (in part associated with the decentralisation of technology that is now accessible beyond the metropolitan fringes). Treatment regimes and

models of service continue to evolve and are being fast tracked to application.

So, how can design assist the reform challenge? Here are a few thoughts:

- The delivery of more basic healthcare (including routine assessment and treatment delivery) should be closer to where people live, work and learn. Services might be delivered from a 'shopping centre' mixed-use development or as part of an expanded civic amenity. Either or both could be operated by the public or private sector!
- There needs to be a general rethink around the design of residential accommodation for the aged and/or the chronically ill. The embedding of now-routine technology in the home has emerged over the last decade and should be further advanced to assist against accidental injury and advanced diagnosis of variations in health status.
- Facilities should promote the normalisation of health treatment and encourage the participation of those who need it: less institutional, more 'natural' and inspiring.
- An increase in the application of generic or modular design principles that enable greater flexibility and the adaption and reconfiguration of spaces for a range of clinical and support functions.

None of the above is controversial: it's common sense, it's available today, and it only awaits its opportunity to compete for the scarcity of the health dollar.

John Breguet is director of health consulting at Woods Bagot, Melbourne

Treatment regimes and models of service continue to evolve

There has been much focus recently on how we reform health services – but we need to radically reform the way we design buildings to avoid obsolescence at completion.

There is an over-emphasis on centralisation, procurement and risk avoidance, and no trust placed in the art of architecture or the tools of the designer. Fear of failure overwhelms innovation: time spent in user consultation is inversely proportionate to culpability, and client briefing is another form of mediation and conflict resolution.

Evidence-based design cannot guarantee buildings that we want to inhabit, but it may deliver functionality perfectly. It has become a bargaining chip, not a decision-making tool. Sustainability challenges the preoccupations of the clinical community, whose aspirations rarely include small, local, dis-aggregated, adaptable, energy-sufficient and manageable facilities. But when big is best, we only want to pay for its visible manifestations. Likewise, we cannot cope with the impact of the car: it is initially given priority over virtually everything else, but in the end, parking is often not properly integrated, making access inconvenient for patients and visitors alike.

Flexibility is presented as important, but it is not properly defined and eventually forgotten when affordability becomes the issue. We are told to keep FM separate in clinical areas, but will not invest adequately in the technology or allow for future-proofing.

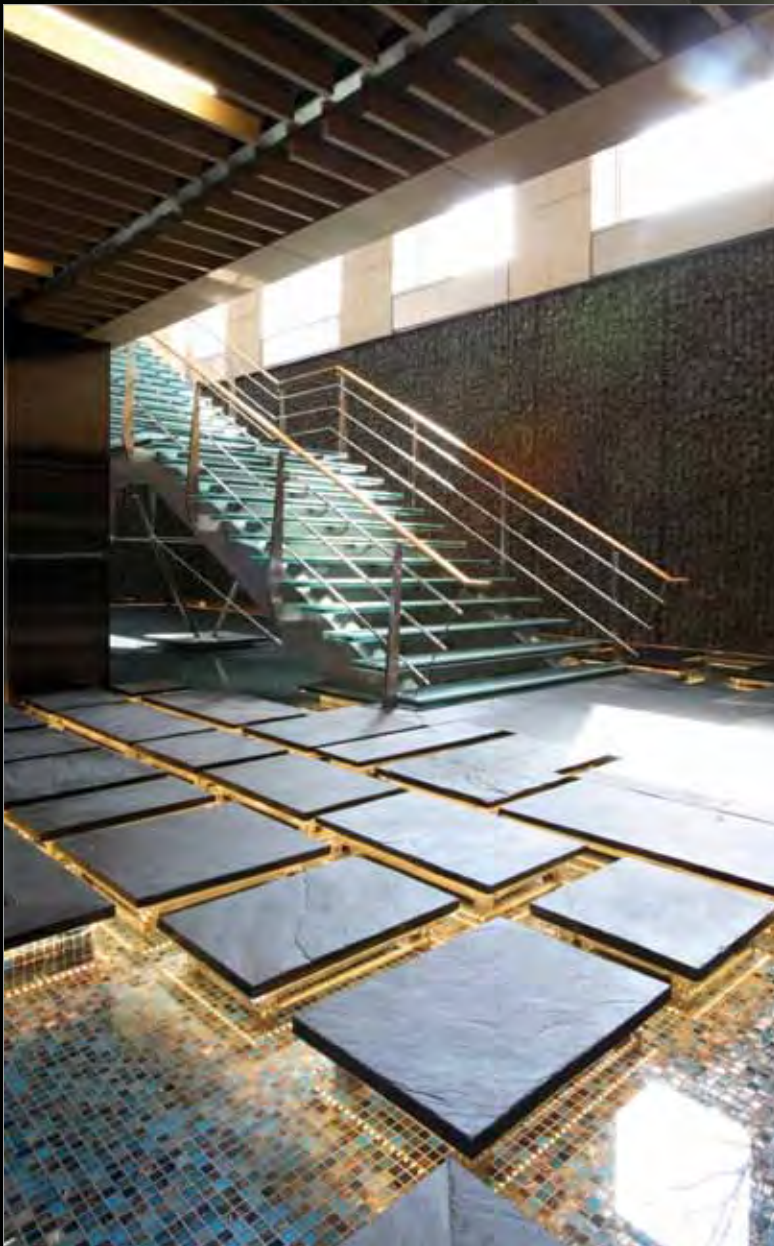
So if we want to move on from the 1950s, we will need to ditch our emotional attachment to territory and professional silos, embrace the fantastic clinical research and technological innovations of the past decades, understand the dynamic changes in our workforce and negotiate the expectations of our users more intelligently.

Forget about making the ideal, functionally efficient hospital. Instead, make classically beautiful buildings in beautiful places: the future will take care of itself.

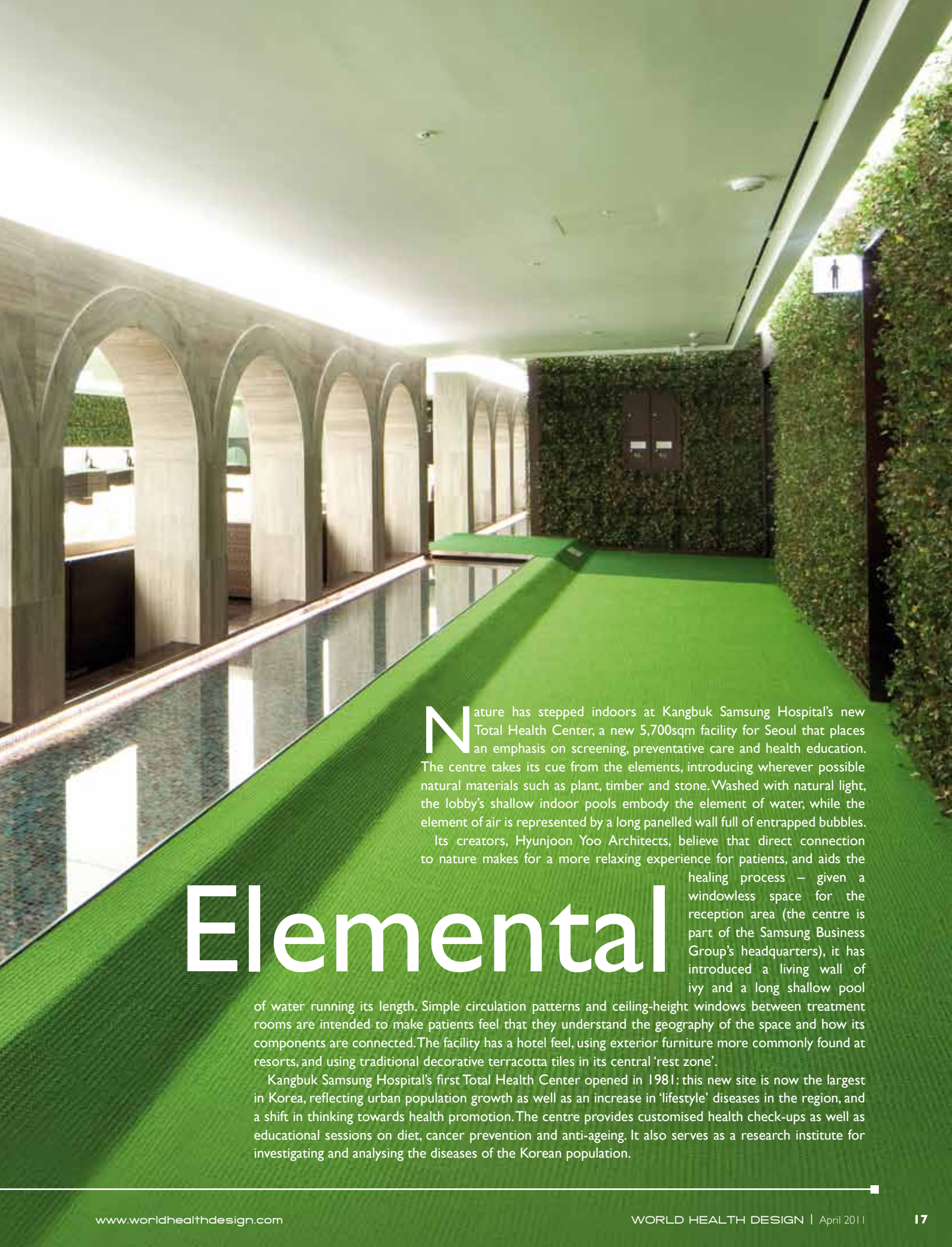
Mungo Smith is a director of MAAP architects, London



Fear of failure overwhelms innovation



Seunghoon Yum



Nature has stepped indoors at Kangbuk Samsung Hospital's new Total Health Center, a new 5,700sqm facility for Seoul that places an emphasis on screening, preventative care and health education. The centre takes its cue from the elements, introducing wherever possible natural materials such as plant, timber and stone. Washed with natural light, the lobby's shallow indoor pools embody the element of water, while the element of air is represented by a long panelled wall full of entrapped bubbles.

Its creators, Hyunjoon Yoo Architects, believe that direct connection to nature makes for a more relaxing experience for patients, and aids the

healing process – given a windowless space for the reception area (the centre is part of the Samsung Business Group's headquarters), it has introduced a living wall of ivy and a long shallow pool

Elemental

of water running its length. Simple circulation patterns and ceiling-height windows between treatment rooms are intended to make patients feel that they understand the geography of the space and how its components are connected. The facility has a hotel feel, using exterior furniture more commonly found at resorts, and using traditional decorative terracotta tiles in its central 'rest zone'.

Kangbuk Samsung Hospital's first Total Health Center opened in 1981: this new site is now the largest in Korea, reflecting urban population growth as well as an increase in 'lifestyle' diseases in the region, and a shift in thinking towards health promotion. The centre provides customised health check-ups as well as educational sessions on diet, cancer prevention and anti-ageing. It also serves as a research institute for investigating and analysing the diseases of the Korean population.

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We are shifting towards a better understanding of how the design of the built environment – in all settings, from healthcare to the places where we live, learn and work – affects our health. This new thinking will drive debate at the 7th Design & Health World Congress in Boston, from 6-10 July

The economic imperative in the 20th and early 21st century may yet come to be re-evaluated as society starts to recognise its huge consequences for human health and wellbeing at the expense of greater investment in social and cultural capital.

Driven by cost concerns on one hand and new knowledge and understanding on the other, a global movement is gathering pace and returning public health issues and challenges to the fore of health policy.

Six of these visionaries in the field of design, health and urbanism will lead proceedings at the 7th Design & Health World Congress & Exhibition organised by the International Academy for Design & Health in partnership with the American Institute of Architects, Academy of Architecture for Health (AIA-AAH).

A new paradigm is gaining ground that focuses on the prevention of disease and the promotion of health, rather than on medical intervention and the curing of disease. Prof Richard Jackson, paediatrician and chair of environmental health sciences at the University of California Los Angeles, declares: "Our health is determined in large part by our environment – what we eat, drink and breathe, and where we work, live and socialise." He considers that this is creating a new landscape that in the future will recognise the architect, designer and developer of physical environments as key collaborators with nurses, physicians and public health professionals in the improvement of individual and population health.

Joining Prof Jackson on stage will be Lord Nigel Crisp, former chief executive of the NHS in the UK, and author of *Turning the World Upside Down: the search for global health in the 21st century*. In his book, Lord Crisp recognises that the paradigm shift for a new definition of health has three distinct strands: a) the need for independence and self-determination at an individual level; b) the state of our interdependence and mutuality at a family, community, professional, national and international level; and c) the belief that an individual and nation's health is a human right that governments should protect and promote. This paradigm shift, explains Lord Crisp, irrevocably alters the way we think about and operate the core features of traditional western scientific medicine: professional competence; scientific discovery; commercial innovation; and massive spending.

It is a view shared by Dr Julio Frenk, dean of the Harvard School of Public Health, who explains how the

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California Los Angeles



Lord Nigel Crisp,
House of Lords, UK



Dr Julio Frenk, Harvard
School of Public Health



Clayton M. Christensen,
MBA, M. Phil, DBA,
Harvard Business School



John Spengler, Harvard
School of Public Health



Mohsen Mostafavi
Harvard School of Design

dominant health paradigm of the 20th century, which was based on the provision of healthcare, has reached its limits, shown by the fact that health outcomes are no longer improving despite larger percentages of GDP being invested in healthcare. Dr Frenk calls for the new paradigm to be based on attention to health prerequisites (income, housing, food, social interaction) and health promotion, identifying the creation of healthy environments as a key factor.

Innovation in global health and health systems

Disruptive innovation is what's required, according to Prof Clayton Christensen, a world renowned professor at Harvard Business School and author of *The Innovator's Prescription: A Disruptive Solution for Healthcare*.

Central to his thinking is the development of user networks for patients with chronic conditions and unhealthy practices that allow them to learn how they can help themselves, and find the motivation and desire to do so. With hospitals focusing on diagnostic services and the provision of standardised care and wellness coordination driven downstream to specialised clinics, care will be taken back into the community to primary care physicians and nurses with new sets of responsibilities.

As health systems reform around the world in recognition that health starts at home and in the settings where we lead our daily lives, not in the hospital, greater attention is being paid to the factors that create health and cause disease.

Harvard School of Public Health's Dr John Spengler will focus attention on how his studies, which reveal that people spend 65% of their time in their residences, 25% in some other indoor environment, 5-7% in transit, and usually less than 5% of their time outdoors, show that the contaminant levels encountered in these indoor environments are important contributors to exposure, discomfort, irritation and negative health effects. Dr Spengler's investigations explore ways to promote improved air quality through sustainable development strategies that reduce the stresses on the earth's environmental ecosystems (both human and non-human) and integrate environmental knowledge into all aspects of society (commerce, government, academic and religious).

At a macro level, the rapid growth of cities around the world – over 50% of people now live in cities – is set to accelerate even further in the decades to come, and while offering many social, economic and cultural benefits, if urban sprawl is left to find its own path, unplanned and unchecked, the risk to human health of poor quality built environments is of major concern.

With a focus on the sustainability of the city linked to its health impacts, Mohsen Mostafavi, dean of the Harvard School of Design and the author of *Ecological Urbanism*,

will discuss how an ecological approach is urgently needed both as a remedial device for the contemporary city and as an organising principle for new cities. He will describe how design provides the synthetic key to connect ecology with an urbanism that is not in contradiction with its environment.

These six visionaries from the field of design and health will ensure that the debate at this year's 7th Design & Health World Congress will be at the leading edge of health policy and new design thinking, supported by an innovative scientific programme that will underpin future professional practice in health promotion by design.

The full scientific programme will challenge the community to discuss the factors that contribute to the successful creation of a healthy society. Technical showcases, posters and an exhibition of the latest innovations in the field will provide a unique opportunity for participants.

Sessions will include presentations by physicians as well as psychologists, designers, architects, planners, artists, nursing professionals and economists. Topics will include the latest research findings in the field including: health promoting facilities, sustainable design, research-based design, mental health, post-occupancy evaluation, senior care and public-private partnership financing models (known variously as PPP or PFI).

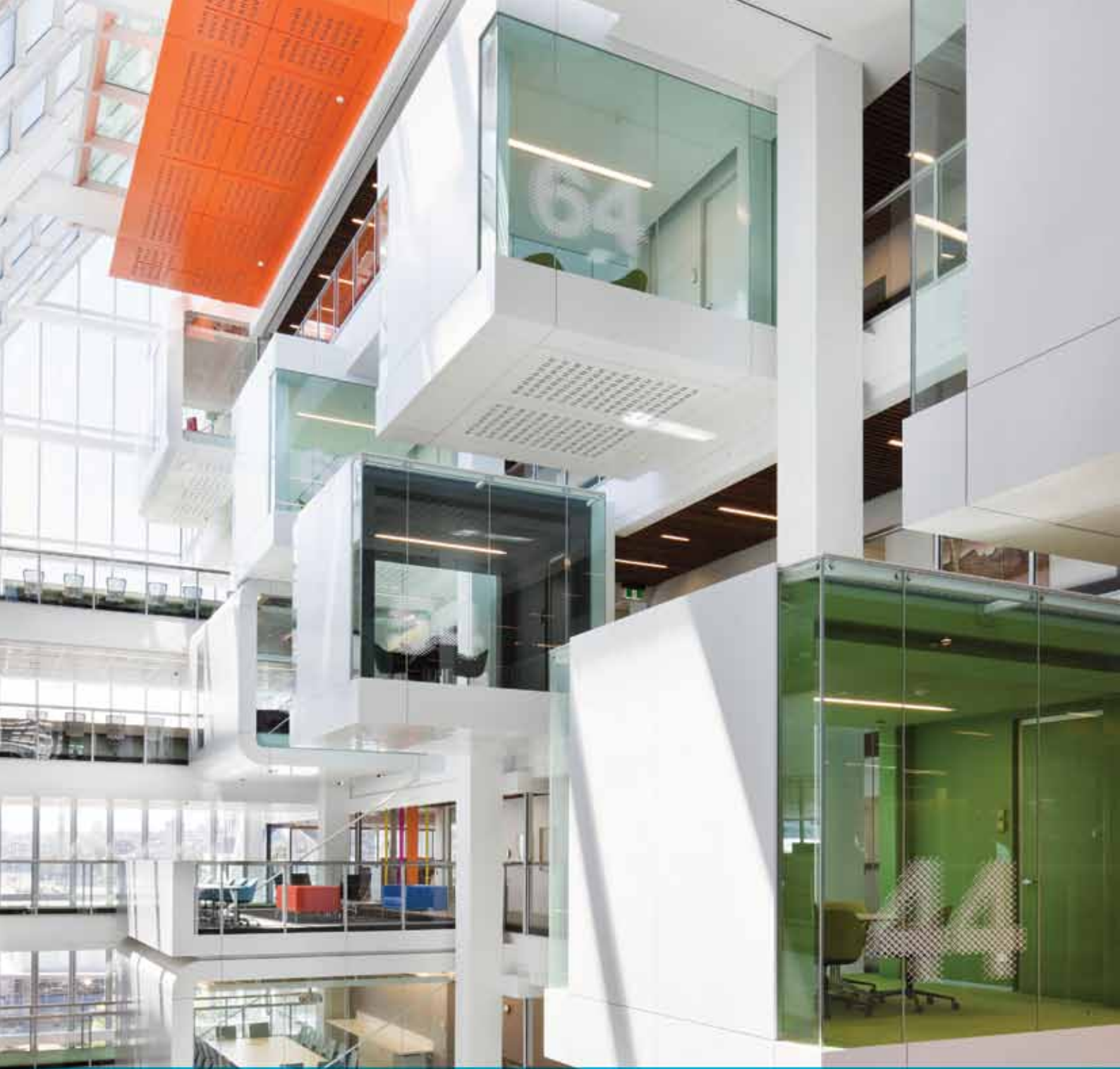
In addition, the trends and influences on design and health around the world – including Australia, the Middle East, China, India, South East Asia, Africa, Europe and North America – will be considered.

Marc Sansom is corporate development and communications director at the International Academy for Design & Health



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Children are taught “safety first”, “don’t play with matches”, “look before crossing” and “learn from mistakes”. From childhood, parents and teachers build safety into lessons of daily care and practice. Likewise, safety must be an overriding design priority built into every healthcare facility project from the start.

While great strides have been made over the past ten years, much more can be done to increase hospital safety and efficiency. The safety of patients, families and staff must be central to a hospital’s vision and mission. Providing the highest-quality healthcare and workplace environment is synonymous with providing the safest possible environment. The new University of Minnesota Amplatz Children’s Hospital is setting new standards for the design of higher-quality, safer healthcare facilities. It features safety-orientated design elements and innovations including 96 same-handed, single-occupancy inpatient rooms, decentralised team nursing stations, dedicated medication areas and nurse servers, integrated family space, and on-stage/off-stage circulation. Amplatz’s owner, Fairview Health Services, embraced a safety culture and collaborative approach, driving design safety innovations into the building from day one.



The recently completed University of Minnesota Amplatz Children’s Hospital, designed with safety as a driving principle

Effective design can minimise mistakes and reduce stress and fatigue, helping to ensure that no one gets in harm’s way. **Russ Williams** and **Richard L Kobus** explain how to design in a way that puts safety first

Free from harm

Hospitals need to invest in safety-orientated design up front, committing to safety as a driving principle, inherent in the expectations and measurable outcomes for success. By taking a collaborative approach to planning, design and construction, they can incorporate the expertise and knowledge of skilled specialists. Partnering involves assembling the right team of architects, planners, consultants and contractors; gaining the direct experience and buy-in of the hospital’s physicians, nurses, and clinical and internal staff; seeking the input of patients, families, and users; and testing options and mock-ups. A thorough understanding of current best practices, research and critical thinking integrates design safety into the building from the outset.

Hospitals can look to other industries for effective principles for improving safety and efficiency in the healthcare environment. Lean production practices, for example, help

identify and eliminate waste, ie, anything that does not add direct value to the consumer. Applied to the planning of healthcare facilities, as it has been at Amplatz, lean production strategies can lead to shorter walking distances, decentralised nursing stations and medication rooms, standardised layouts and processes, improved flow of services and supplies, and optimised adjacencies and spatial relationships. Reducing factors that cause stress and fatigue, and reducing time spent on non-essential tasks (such as walking, or searching for supplies) directly results in increased value and time spent with the patient, improved efficiency and error avoidance.

Strategies of patient- and family-centred care and evidence-based design contribute to safe and efficient healthcare environments. Ample natural light, a variety of respite spaces for families and staff, easily accessible hand-washing stations and ergonomic workplace design elements help increase safety by contributing to a reassuring environment, improving infection control and reducing fatigue and stress. Studies show that family involvement as an integral part of patient care helps comfort patients, normalise activities and offer watchful care. Routines in nursing care, identical arrangements in rooms and proximity of supplies, materials and medications to the patient room have also been shown to lessen the likelihood of mistakes. These concepts are translated into the physical environment through design elements such as visual access, standardisation, proper work-counter heights, and the separation of patient and public activities from the ongoing flow of supplies, maintenance, and housekeeping activities.

Russ Williams (right, above) is vice president of professional services at the University of Minnesota Amplatz Children’s Hospital, and **Richard L Kobus** (right, below), FAIA, FACHA, is a senior principal at Tsoi/Kobus & Associates



The future is uncertain for healthcare development in the US. A sluggish economy and the as-yet-unknown shape of the healthcare system – still under debate following the introduction of Obama's healthcare reform bill – have slowed down the development of new healthcare projects to a crawl.

"We have had a perfect storm," comments Brad Barker from RTKL. "The economy has tanked, capital markets have locked up and together with new healthcare legislation, it's brought the boom to a screeching halt." The economic downturn is also making healthcare providers become more business-process oriented and risk conservative, with a stronger emphasis placed on return on investment.

In addition, the focus is turning to prevention, targeting chronic disease and lifestyle issues in order to find ways to prevent people having to go to hospital. "In future, we will have facilities that will support behavioural change," says Greg Chang, Ellerbe Becket's managing director for healthcare. Its new University of Oklahoma Cancer Institute will provide an integrated, multidisciplinary health service that focuses not only on cancer treatment but also on long-term wellness and prevention, providing massage and yoga therapy and advising patients on lifestyle issues.

State of flux

While the dust settles on the new healthcare reform bill, uncertainty is the only certainty in the US – while north of the border, Canada pushes ahead with heavy investment. *Kathleen Armstrong* reports

On a broader scale, the health reform bill proposes the establishment of accountable care organisations (ACOs), networks of doctors and hospitals that will together share responsibility for the provision of care to patients. The first ACOs are scheduled to launch in January 2012, with an aim to provide the best care at the lowest cost: similar organisations already exist in states such as California. Kaiser Permanente, for example, is a managed care organisation whose patients are members of the organisation, encouraging physicians and doctors to work together to "keep patients healthy", looking at lifestyle and other issues in order to reduce the need for hospitalisation. The organisation has a presence in a number of states on the east and west coast, including the recently opened Santa Rosa Hospital in San Francisco (see case study).

It is estimated that around 40m people who are currently uninsured could enter the health system when the health reform bill becomes law. Bill



HDR's McCook Hospital, Nebraska, embodies a trend for community facilities



One of the large, same-handed patient rooms at McCook



Juravinski Hospital, Hamilton, Ontario

The Juravinski Hospital campus, part of the 980-bed Hamilton Health Sciences Network, consists of 13 buildings and two parking structures. The new facilities by Zeidler Partnership Architects and Garwood-Jones & Hanham Architects, include an emergency department, diagnostic imaging, operating rooms, critical care areas, inpatient units and a day hospital. A shift towards ambulatory care has resulted in a reduction in beds from 277 to 254. Juravinski Hospital supports the oncology programme at the adjacent Hamilton Regional Cancer Centre via physical links and sharing of resources.

Contract form: Infrastructure Ontario Build Finance

Project completion date: Stage IA, July 2010; Stage IB, July, 2012

Cost: C\$180m

Area: 39,500sqm

Client: Hamilton Health Sciences Network

Architects: Zeidler Partnership Architects and Garwood-Jones & Hanham Architects

Project manager: Stuart Mussells, Zeidler Partnership Architects

Main contractor: Ellis Don

Structural engineer: Halcrow Yolles

Landscape architect: G O'Connor Consultants





Mary Catherine Bunting Center at Mercy, Baltimore, Maryland

The new 21-storey, 65,000sqm Mary Catherine Bunting Center was designed to replace ageing facilities at the Mercy Medical Center in downtown Baltimore. A roof garden functions as an addition to the landscape, setting aside a third of the building footprint for open space. The garden offers views to nature for nearly all visitors, with access from the 8th floor to the main lower garden and from the ICU waiting area on the 9th floor to a private upper level retreat. By establishing a 'ground plane' on the 8th floor level, the garden minimises the perceived height of the building and introduces a more human scale to a large urban structure.

Contract form: Construction manager at risk

Project completion date: December 2010

Cost: US\$261m

Area: 65,000sqm

Client: Mercy Medical Center, Baltimore, Maryland

Architect: Ellerbe Becket

Project manager: Adrian Hagerty, AIA, LEED AP

Main contractor: Whiting-Turner Contracting Company

Structural engineer: Ellerbe Becket, an AECOM company

Landscape architect: Mahan Rykiel Associates

Around 40m people who are currently uninsured could enter the US health system

Rostenberg from Anshen+Allen sees two different ways that this could impact on the health service. "One scenario is that more people will be purchasing healthcare services. The other is that more people will be getting care earlier, so we will be able to get by on the space we already have."

Doug Wignall from HDR predicts that "there will be a need to build outpatient facilities for this new patient population. These will be smaller, more regionally focused 'convenient' hospitals." HDR was involved in US\$23.5m expansion and redevelopment of the HDR-designed Community Hospital in McCook, Nebraska which opened in January 2010. It features a new patient wing with large, same-handed patient rooms with zones of care for the patient, caregiver and family and decentralised nursing stations designed to allow more direct patient contact with nursing staff. The hospital is typical of the type of facility that is designed to be at the heart of the of the small regional communities it serves.

With the emphasis on cost and efficiency, another project

that is responding to current healthcare and economic challenges in the US is a large healthcare system in the Harris County Hospital District of Texas, which architectural firm HOK is currently working on. The 900-bed network serves 330,000 patients along the Gulf Coast with three hospitals and 13 primary care clinics.

HOK has developed a strategic masterplan to help streamline facilities through operational efficiencies, moving towards a more integrated health delivery platform by shifting space from acute-based to primary and specialty care. This, says vice president healthcare Ron Smith, will reduce the capital cost by nearly 45% over the period of growth – a key consideration in the current, tight economy.

Another good business proposition, according to RTKL principal Jim McMillen, is investment in technologies such as proton therapy, a precise form of treatment for cancer. McMillen has worked on a number of proton therapy facilities over the last decade. "When I was involved in the development of the proton therapy centre at the University of Florida [which opened in 2006], the predicted saturation point in the US was 20-30 facilities," McMillen comments. "Now I think it is more like 200 – and we will see it going into regional hospitals." The main users of proton therapy, McMillen says, are men with prostate cancer who self-refer, as it is still relatively unfamiliar to many physicians. He is currently involved in the development of the McLaren Health Care Proton Therapy Center in Flint, Michigan, which will incorporate a compact gantry system from manufacturer ProTom.

A different story

Across the border in Canada, it is a somewhat different story – both economically speaking and in the way that healthcare is delivered. With tighter financial regulation, the economy has suffered less



Canada is prioritising mental health facilities such as the Sister Margaret Smith Centre



Zeidler Partnership Architects' Peel Memorial Hospital, a major new ambulatory care facility for Ontario

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St Bartholomew's Health Centre, Lytton, British Columbia

Contract form: Design bid build

Project completion date: March 2009

Cost: C\$6.35m

Area: 1,925sqm

Client: Interior Health Authority

Architect: Stantec Architecture

Main contractor: Mierau Contractors

Structural engineer: Stantec Consulting

Landscape architect: Stantec Consulting



than its neighbour to the south. To help stimulate the economy, many provincial governments decided to go down the path of investing in infrastructure – such as roads, schools and hospitals.

In Ontario, hospital development is happening at breakneck speed. Nine or ten hospitals are currently under development, including five in the mental health sector. Infrastructure Ontario has developed a financial model for procurement based on public-private partnership funding, known as DBFM (design build finance and maintain).

Hospitals currently under development include the Women's College Hospital in Toronto, designed by Perkins Eastman, which

bills itself as a "hospital designed to keep people out of hospital" by focusing on ambulatory care as well as research and education. "With DBFM, you have to be the lowest bidder to get to the table, so you have to be creative," says Perkins Eastman's Susan Black. "We worked as a team to get the contract, working out where to cut and what to add." Phase I of the two-phase development is currently under construction.

The development of ambulatory care facilities is a major priority across the country. Zeidler Partnership Architects is working on two major projects in Ontario for which this is a key focus – Juravinski Hospital in Hamilton (see case study) and the Peel Memorial Hospital, which will help to create a health and wellness district in downtown Brampton.

In Ontario, hospital development is happening at breakneck speed

Mental health is also receiving priority treatment. In northern Ontario, the new Sister Margaret Smith Centre provides residential and non-residential services for the treatment of eating disorders as well as drug, alcohol and gambling addiction. "Northwestern Ontario is comprised of a largely rural population many of whom, for both work and recreation, spend a great deal of time outdoors," says architect Alice Liang from Perkins Eastman. "It was deemed very important, therefore, to create a built environment that had ample access to daylight and a direct connection to the outdoors. The two courtyards, one for residential clients and one for the non-residential clients, provide a safe and secure environment and are an integral part of the therapy." (For more on mental health facilities, see p42.)

It is a similar picture on the west coast where the British Columbia government has set out a three-year C\$2.6 billion plan for new and expanded hospitals around the province.



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*Modern Healthcare survey of U.S. architecture firms

This includes the new C\$239m Jim Pattinson Outpatient Care and Surgery Centre in Surrey which is scheduled to open in June this year, and the C\$448m Interior Heart and Surgical Project which will see Kelowna General Hospital become the fifth hospital in the province to offer a full-service cardiac revascularisation programme.

"There are some interesting projects in smaller communities," says Bruce Raber from Stantec, which designed the new community health centre in Lytton, a town of around 300 people in the interior of British Columbia (see case study), and is currently working on a new emergency department for Nanaimo Regional General Hospital on Vancouver Island that will triple the size of the existing space.

East of British Columbia, the province of Alberta is also investing in the development of its health facilities. This includes new hospitals and specialty care facilities in priority areas such as cancer care, orthopaedic surgery as well as expanding continuing care options and services.

Across the country, developments are also underway to improve the delivery of long-term care to an ageing population and to integrate research and education into hospitals. However, according to Tye Farrow, senior partner

of Farrow Partnership Architects, a shift in thinking is still needed to fully realise the link between design and health. "The discussion is around density and style rather than how it will enhance health," he says. "We need to shift the focus. Practitioners need to have a critical eye." One thread of hope, however, is the start-up of a group in the Royal Architectural Institute of Canada, similar to the AIA-AAH in the US, which will begin to promote the idea of focusing on design and health rather than illness. Farrow admits that there is some way to go, however: "We are still at the very early stages. We need to develop diagnostic tools to measure what buildings are doing to enhance health."

Kaiser Permanente Rohnert Park, Santa Rosa Medical Center, San Francisco, California

With the Kaiser Permanente Santa Rosa Medical Center masterplan, architects Jennings Ackerley aimed to design a series of projects that not only would respond to projected growth but also serve to create a series of spaces that would contribute to patient healing and help to increase employee satisfaction.

The project included the development of a satellite medical building, the Kaiser Permanente Rohnert Park which provides space for 19 acute primary care providers, a pharmacy and other ancillary functions; a US\$28m medical office building which includes four operating rooms, three procedure rooms, a radiology suite with MRI and other outpatient services; and the US\$103m expansion of the Santa Rosa Hospital, doubling the size of the hospital.

Anticipating the facility's likely future needs was vital: "By the time we started construction, Kaiser Membership had dropped," says architect Charles Ackerley. We decided to build the extra floor shelled out so that it would be there for future use. Had Kaiser built the 90,000-square-foot building as originally planned, the hospital would be undersized today. When membership starts to grow again, Kaiser won't have to re-think or rebuild."

Contract form: Design build
Project completion date: Spring 2008
Cost: US\$103m
Area: 13,800sqm
Client: Kaiser Permanente
Design architect/medical planning: Jennings Ackerley Architecture+Design
Production architect: TLCD Architecture
Project manager: Terri Walker
Main contractor: HMM Construction
Structural engineer: KPFF Consulting
Landscape architect: RRM Design Group





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One Team. Infinite Solutions.

In 1990, design consultancy Aesthetics was invited by Blair L. Sadler, the farsighted then-CEO of Children's Hospital & Health Center of San Diego (since renamed Rady Children's Hospital), to develop the arts component and donor recognition elements for the hospital's new patient-care pavilion. When it opened in 1993, it was hailed as ushering in a new era of children's hospital design. Calling it "unique in the world of medicine", *Interiors* magazine proclaimed it as "a place which heals, charms, and inspires patients, their families, medical staff, and all those in healthcare design who wish that hospitals had more to do with healing"¹. *Architecture* magazine cited it as a "new precedent in children's healthcare, which suggests that good feelings and healing should go hand in hand"².

When the hospital began planning a major addition in 2005 – a four-storey, 27,500sqm acute care pavilion that would open in October 2010 – Aesthetics was again asked to participate. Unlike the initial project, when the building was well underway by the time we were engaged, this time we were designated at the beginning as the interior design consultant, art consultant and wayfinding designer. From concept to completion, we worked closely with the project architect, Anshen+Allen, to create an experience that would live up to Rady's description: "State of the art meets state of the heart." Our experiences at Rady and elsewhere have left me with the following conclusions about what we have learned, and what might come next, regarding the meeting of state of the art and state of the heart in children's hospitals.

Integrate art from the beginning

As a result of our earlier engagement on the 2005 project, we were able to help move children's-hospital design to another level of beauty and impact. We developed themes along with the architect so that all the design elements reinforced each other. The overall theme of 'sea to space,' for example, was expressed through the architecture, interior elements, art imagery,

icons, colours and wayfinding. As a team, we carefully created a flow that allowed the combination of interior architecture, colours, finishes and artwork to create inspiring touchpoints within the healing journeys of the young patients and their families.

The 'river of light' theme of the building itself is reflected in the design elements. The interior facade, for example, has a textured wall, visible from outside, spanning all four floors with moving, programmed, coloured LED lighting simulating trickling water; which then turns into a floor mosaic at the first floor and continues outside into a garden containing an interactive play pond with sea creatures.

Early engagement also allowed us to suggest architectural details that could be deployed to add to the overall richness of a child's experience. For example, 40 custom art boxes are designed into the reception desks and nurses' stations, and 60 sculptures custom-designed to reinforce the themes of each floor and patient-wing 'neighbourhood' are displayed in lit vitrines, at a child's height.

I expect that hospital executives will increasingly recognise the importance of retaining arts consultants at the beginning of construction and redesign projects, so that all the benefits of organically integrating art-centred design and architecture can be realised.

Lessons in the healing arts

Having completed two projects, nearly 20 years apart, as arts consultant to San Diego's Rady Children's Hospital, **Annette Ridenour** shares what she's learned about the relationship between art and healing



Rady's 'sea to space' theme comes alive: the suspended mural disguises an acoustic soffit and helps create a more intimate atmosphere



A mural provides welcome distraction in the comfortable third-floor waiting space. Motifs at a lower level help to catch children's eyes

Superficial is not enough

Even though many innovations created by Aesthetics and others have today become the standard for children's-hospital design, we still see art being incorporated in some facilities seemingly as much for show as for its impact. In many children's hospitals, for example, the design becomes duller and drabber the deeper into the hospital one goes. We looked at every corridor at Rady, every waiting room, every treatment room, every rest room, as an opportunity to light up a child's eyes and support his or her healing journey.

There are sound outcome-related reasons (and economic-related reasons) for integrating art throughout the texture of a children's hospital, discussed below. We are increasingly asking ourselves a core question that we hope, for the children's sake, will become the future industry standard: What will make every aspect of a child's stay in this hospital, at every moment, as enjoyable, invigorating and inspiring as possible?

Better design through collaboration

In our work in the early 1990s, Aesthetics and the project architects solicited input from many major stakeholders; the inclusiveness of that process was widely remarked upon³. In the intervening years, we recognised that it is nearly impossible to create too much involvement: important things are learned from each meeting, and the effects of those learnings are cumulative.

When we returned 15 years later, groups of patients, parents and child life therapists, along with Rady representatives from the executive team and all departments, participated extensively with our design team in such decisions as selecting the colour palette and developing the overall themes for the individual floors. Patients helped create and select the final icons and graphics for the wayfinding signage and flooring inlays. A team of Rady leaders and clinical staff, child life specialists, patients and others defined the criteria that informed a regional call for artists, and selected the winning artists. More than 450 pieces of art have been installed so far.

Involvement is not just important for the insight and energy it brings to art-related decisions. Managed properly, involvement creates a true sense of ownership toward the hospital within a broad range of constituencies that include hospital staff, the community in general, the patients and their loved ones, and the artists.

Arts programmes do not overextend resources

Many healthcare leaders mistakenly believe that good original art has to be expensive and that therefore posters must be substituted. Rady's new building was completed on time and under budget, and the total budget for the art programme was less than 0.2% of the construction budget. The Aesthetics team created very substantial savings without sacrificing beauty and distinctiveness by, among other things, commissioning original artwork that was then transferred to custom wall coverings for corridors and patient rooms, and by incorporating hundreds of pieces of original children's art, based on the building's themes and beautifully framed. Moreover, now that

**We recognised
that it is nearly
impossible to create
too much involvement**



Forty custom-made art boxes are recessed into reception desks and nurses' stations

Also, because Rady understands how important the entire family unit can be for a child's healing journey, we created art-filled spaces everywhere that families gather. For example, in one special area, siblings (who sometimes may feel overlooked and even resentful while their ill brother or sister is the centre of attention during treatment) can feel special with playful art features that start indoors and then spill out to the healing gardens, which demonstrably help restore the spirits of adults and youth alike.

I expect that as children's hospitals generally incorporate more arts-related elements, they will increasingly engage in outcome studies to determine the healing-related impacts of those elements, fine-tuning their arts offerings to match the research findings. Based on our extensive experience, for example, we find that in many hospital locations the serene, nature-centred art often recommended by evidence-based-design findings is not as effective for children as more active, more playful artworks can be. We would like to see sound research to confirm or revise this perception; ultimately, everything done by everyone connected with healing should be guided by the best available evidence.

Art can change organisational culture

Each time we returned to Rady over these 20 years to help expand its displayed art and its arts programming, we met with a warm welcome from staff. Often they have expressed the pride they feel from working in an organisation that so vividly 'walks its talk' in relationship to its commitment to the healing journeys of its young patients and their families. They tell us of the pleasure they derive from working in such a vibrant environment; and they say that the smiles and the hope on the faces of children undergoing crucial, often-difficult treatment is energising for them.

Blair Sadler, who during the course of his tenure as Rady's president and CEO from 1980 to 2006 led many of its groundbreaking arts innovations, recalls: "Very soon after engaging Aesthetics, we recognised that the arts could have a powerful positive impact on everything we were trying to do – uplifting our patients' spirits, fortifying their families, and raising staff morale at the same time as they created strong community connections and a distinctive branding advantage for the hospital."

Rady's Vice President of Facilities, Timothy Jacoby, observes that "Aesthetics and the artists it engaged brought a new kind of energy to interior design, one I think we all felt, which raised our awareness of the many ways that healing takes place. The beauty of the facility and the sense that we all had some part in creating it rubs off on your day-to-day attitude toward working here."

As healthcare leaders continue to extol the ways in which the arts help to achieve their organisations' missions and energise their organisations' cultures, we expect the arts to be increasingly embraced as part of all executives' leadership toolkits.

the artwork has been created and installed, the hospital's foundation is finding sponsors for many of the pieces, which will defray the amount already spent for artwork.

Although larger art budgets than Rady's might be advisable, a relatively small budget does not mean that a facility must be bland and uninspired – or uninspiring.

An evidence-based-design revolution

In 1990, evidence-based design was understood to be important, but it was not always the central consideration for architects and designers that it is today. In the new pavilion, our interiors team specified antimicrobial finishes, fabrics and surfaces wherever possible. We were also aware that arts programmes have been shown to alleviate the pain and anxiety experienced by children in waiting areas and to allow certain non-invasive procedures for children to proceed without the need for pharmaceutical sedation⁴.

**Rady's patients
experience the
design as reinforcing
a healing journey**

'Generative spaces' are becoming reality

Healthcare design professionals around the world have been consistently raising their sights as experience shows the impact that their work can have. Creating a beautiful facility is a valuable contribution; creating a healing place whose beauty is integrated into the very fabric of the facility, because the designer and the architect have worked together from the beginning, is a step further. Paying close attention to the needs, interests, and goals of multiple constituencies – from patients' families to compassionate artists to hospital staff and leadership – is yet another advance.

Now we are aiming to further elevate the practice of design by helping leaders create what have come to be called 'generative spaces' – facilities whose overall character promotes community health and supports the flourishing of individuals, organisations and communities.

Because they fulfill such a crucial function, generative spaces become prized by those who engage with them: those people have a deep sense of stewardship for sustaining and improving the space. Think, perhaps, of a special place of worship you have known, or some other place that is sacred to you. Think of a college or university whose graduates value it so highly that they send it money, return to it regularly, and avidly follow its affairs.

For most healthcare institutions, truly generative space is an aspirational goal – but we are learning more and more about how to create it. Rady's deep commitment to arts programmes expresses the extent of its devotion to health and healing, and because the art is organically integrated with the architecture and not an add-on or an afterthought, a deep message is conveyed about how embedded that devotion to healing is. Rady's patients, along with their families and loved ones, experience the design as reinforcing a healing journey that is not just momentous to them while they are in Rady's care, but which will be pertinent to them after they leave: in this sense they will always be Rady 'alumni'.

The extensive use of local artists communicates the subtle but important message that Rady exists within a tangible community of gifted people whose caring and compassion can be seen and felt. Donors help to expand that community.

Involvement by Rady leadership and staff, by patients and families, by community members and others, not only improves designs and programmes, but, as I have discussed, it also builds the understanding that all stakeholders' views are reflected in the design and programmes, and that they are empowered to recommend ways to sustain and expand them to further advance the hospital's healing mission.

At Rady, many elements of an ideal generative space are in place. Aesthetics, along with other design professionals, will continue seeking to discover and set in place all the elements of this transformative concept.

Annette Ridenour is the CEO of Aesthetics, Inc (www.aesthetics.net)
Photography by John Durant



Original artwork in a private patient room helps to personalise the space



Graphics and signage support the building's theme and create an imaginative environment

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Saint John's encourages community involvement by soliciting art from local artists and, shown here, local children

Positive image

Roundtree Visuals' award-winning Welcome Artwall takes digital art to new places and can even pay for itself, claim its makers

Visits to healthcare facilities tend to be overloaded with sensory experience, but not all of them have the positive associations that come from an encounter with Roundtree Visuals' Welcome Artwall. Beautiful as well as useful, this innovative software programme displays images as well as branding messages, wayfinding information or whatever communication is required.

Last year, Roundtree Visuals won the International Academy for Design & Health's award for Best Use of Art in a Patient Environment for its work at Saint John's Health Center in Santa Monica, California. Hospital staff at Saint John's gave the company a unique challenge: to create a cost-effective way to feature the art collections of doctors and other staff members, while also providing information to visitors and creating a welcoming environment in its new building, the Keck Center.

From this challenge, the Welcome Artwall was born. It merges video and digital art using 16 video screens, each of them 50 inches wide, that together make up more than five metres of digital display space. Because

the screens are digital, new images or entire programmes can be changed and uploaded easily. The theme for the inaugural exhibit was 'Spirit of Place', so the artwork used reflected Santa Monica's natural landscape and provided a feeling of place, lifestyle and activities related to life in the area. The Welcome Artwall also featured images from nature with inspiring quotes, video of landscapes from Cape Cod to San Francisco, and photos submitted from the staff and community. In addition, general information and way finding assistance was interspersed with the artistic backdrop to assist visitors to the hospital. Monitors in all patient rooms include an Artwall TV Channel, with the same programming streamed to monitors in public waiting rooms and conference rooms.



Images from nature formed the basis of the hospital's first exhibition, with a 'Spirit of Place' theme

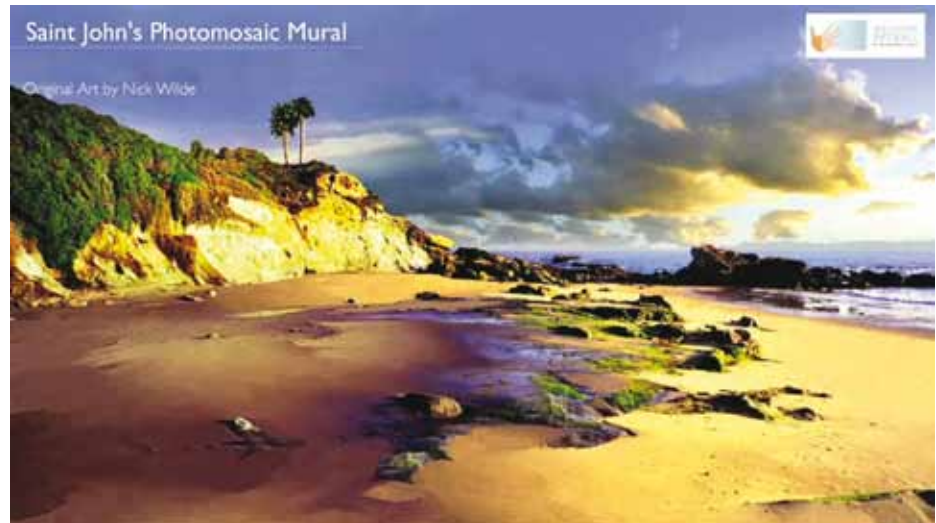
“Typical electronic billboards can make viewers feel blasted by information. When you put that information into art or visuals that create a soothing environment, that’s more inviting,” says Deborah Roundtree, the company’s principal and creative director. “The benefit to clients is that it helps them reach and involve the community in new ways.”

Imagery to relieve stress

Deborah Roundtree’s mission to provide better-quality visuals came as a direct result of her voluntary work, training other volunteers in a hospice. After spending many long nights with families in waiting areas and patient rooms surrounded by blaring TVs and blank walls, she realised that soothing art could be key to helping relieve stress.

Harnessing her experience in interactive and digital imagery for leading private companies, she decided to bring her accumulated knowledge to a healthcare setting.

Roundtree Visuals now has offices in Emeryville, California, as well as Berlin, with projects including digital art programmes, 3D animated wayfinding and digital art for lobbies and waiting areas. The cost of a digital art project can range from US\$35,000-\$600,000 depending on its scope.



By combining useful information with attractive visuals, hospital visitors receive a warmer welcome, while commercial partnerships, with local art galleries for example, may also strengthen donor development

At Saint John’s Health Center, the Artwall installation had a serendipitous outcome – the hospital’s curator gave the programme credibility and soon local art galleries such as the Getty Museum and the Santa Monica Art Museum approached the hospital wanting to collaborate. Now, artwork from these museums is featured on the Artwall, and these partnerships have facilitated a new level of donors and trustees for the hospital, raising US\$610,000 over a three-month period, a sum that has more than covered the cost of the programme.

The Artwall has further helped to integrate the hospital with the community by soliciting artwork from local people. Artists, staff and community members upload photos, video and art via the internet, and pieces are then selected by the programme’s curator. The local community has also been invited to participate in a photomosaic program, which features thousands of personal photographs, creating what Roundtree Visuals calls a ‘moving landscape’. The hospital can easily refresh the content without incurring additional installation and insurance fees.

“What makes the Artwall stand out is the flexibility for clients to create branding messages interactively in art that can be easily updated,” Roundtree says. “We’re always creating a fresh experience. The goal is for the wall to become a destination for the community where schools and organisations can visit to see local artwork, learn more about the hospital, and connect to hospital staff and services in ways not previously possible.

“In the future,” she adds, “we’re going to be seeing a more patient-centred approach where we’re reaching patients in new ways specific to staff, care and clinical specialities. When you have a tool like this, with the flexibility and collaboration it offers, all sorts of doors and opportunities open up.”

For more information, visit www.roundtreevisuals.com



Sixteen video screens make up the Welcome Artwall at Saint John’s Health Center, Santa Monica, which can display artwork as well as information



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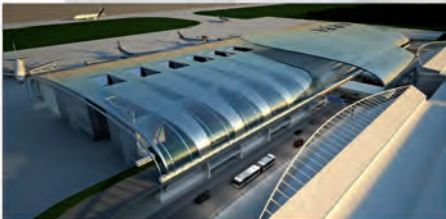
PRIVATE HEALTH CARE

PROJECT: BELLVILLE HOSPITAL
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INTERNATIONAL AIRPORT

PROJECT: ABUJA INTERNATIONAL AIRPORT
ABUJA, NIGERIA



REGIONAL AIRPORT

PROJECT: ENUGU REGIONAL AIRPORT
ENUGU, NIGERIA



COMMUNITY LIBRARY AND CLINIC

PROJECT: ALBOW GARDENS
CAPE TOWN, SOUTH AFRICA
COMPLETED 2000



PRIMARY HEALTH CARE FACILITIES

PROJECT: OPOLLO HOSPITAL
BAYELSA, NIGERIA
COMPLETED 2009



TERTIARY HEALTH CARE FACILITIES

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

Humane resources

Only rarely, it seems, are mental healthcare facilities designed that truly support service users. *Veronica Simpson* explores the obstacles, and unearths recent examples that have taken an evolutionary step forward

People are mesmerised by the idea of madness, fascinated and frightened by it. How else could a recent photography book depicting only the near-derelect remains of some of the most grandiose asylums built in the US in the late 19th and early 20th centuries come to be ranked as one of Amazon's best books of the year? Photographer and architect Christopher Payne's haunting pictures in *Asylum: Inside the Closed World of State Mental Hospitals* (see book review, p 86) reveal the beauty and grandeur of these imposing civic-spirited buildings, some of them created by the leading architects of the day, and evoking clearly the architects' and physicians' noble intentions. The way Payne calmly captures the human detritus – three cheerfully patterned, patient-made gowns still on their hooks, an abandoned beauty salon whose walls still bear images of 1950s movie stars, or a rack of crumbling bowling shoes – delivers a poetic reminder of the lives lived within their walls and the normality these people craved.

However, despite the impressive scale and ambition of the original founders' provisions, it's the sense of isolation and seclusion that dominates. These were "self-contained cities", as the book notes, "where almost everything of necessity was produced on site," and where the inhabitants were hermetically sealed away from anything resembling normal life.

Fast forward a hundred or so years and North America's most recent and enlightened mental healthcare facilities couldn't be more different. Humane and largely domestic in scale, they speak of integration and facilitation, containment rather than confinement – an attempt to create a visual and emotional link to the world left behind, and to which the inhabitants usually hope to return.

Montgomery Sisam's award-winning Toronto's CAMH facility, for example, sees this three-phase project being designed as an 'urban village' to mimic the residential area around it, in form, scale and planning, and with different buildings scattered around neighbouring city blocks. The buildings house up to 24 in each home, in six- to eight-person 'family' apartments, where, through staff and peer encouragement, they assist each other in the recovery process.

With Minnesota's Park Nicollet Melrose Institute (see case study), a facility dedicated to the treatment of eating disorders, Ellerbe Becket has worked with the care team to rationalise and reframe both the architecture and the entire care model, to create a facility that supports both the patient's individual progress and the participation of patient families. It offers three experiential kitchens whose configuration allows for a variety of combinations of patient, therapist, family or large group meal preparation and enjoyment to take place – a crucial part of the

Glenside Campus Redevelopment, Adelaide, Australia

Client: South Australia Health

Architects: MAAAP, together with Swanbury Penglase

Architects, Adelaide

Size: 2,200sqm

Cost: AUD 130m

Schedule: On site

Glenside, part of the Royal Adelaide Hospital, wanted to develop its heritage-listed building and grounds while creating a modern mental health facility. MAAAP was involved in masterplanning the site, and was then asked by local architects Swanbury Penglase to help develop the 129-bed mental health facility, combining acute care, rehabilitation, drug and alcohol withdrawal, inpatient, outpatient, office and admin space.

The 'village' style plan of low-level buildings flows around a shared green space, with car parking removed to the outer perimeter. Each building type has been designed according to staff and clinicians' requirements, while sharing a similar form so that the separate components are seen as part of a whole community. MAAAP's Mungo Smith says: "There's a sense of transparency about the buildings, and the connection between inside and outside is very strong. Gardens are at the centre of each of the houses and in the centre of the whole space." Allotments and spaces for quiet contemplation are also part of the design: non-residents will also have access, achieving the client's aim of greater community integration.



Medical Architecture



Park Nicolett Melrose Eating Disorders Institute, Minnesota, US

Client: Park Nicollet Melrose Institute

Architecture & interior design: Ellerbe Becket

Size: 6,225sqm

Completed: 2009

Park Nicolett Melrose Eating Disorders Institute, Minnesota, US

Don Wong

Park Nicollet Melrose Institute is a new facility for sufferers of eating disorders. Designed by Ellerbe Becket, it's the only one of its kind in the US, with facilities all focused in one standalone building. Intensive consultation with staff, designers and users has resulted in a new model of care which allows a far greater degree of control and support for users within the programme, as well as opportunities to bring family members in as part of the therapeutic process that prepares inpatients to return to the outside world.

Project architect Jessica Vogel explains: "The existing programme had been broken up into five silos, from acute inpatient treatment to outpatient. All of these silos were operating in different parts of the hospital complex... We started asking: what if the treatment programme was more like a curriculum-based model of care?" With greater flexibility for private, group or family therapy rooms, as well as three versatile experiential kitchen and dining facilities, the patient is free to progress at their own pace, be rewarded for their progress, and take more control over their therapy.

The building is on three levels. The first floor is more public, with facilities for daily outpatients and their families, while the second level has individual treatment rooms and group therapy rooms. The third level is the most private, with residential and inpatient rooms. Ellerbe Becket designed a 'universal' consultation and exam room, with an examination table that resembles a recliner, to minimise anxiety. Says Vogel: "Every room has a double purpose. That was one of the suggestions to emerge from staff during the workshop." The exterior reflects local architecture with rustic materials. Says Vogel: "Colour has a really big impact on the psychology of people with eating disorders. We really focused on a warm orangy-reddish tone, and stayed away from bright whites. Views to nature were paramount, and being able to easily navigate the building was also key to creating a calming and restorative space."

establishment of healthy eating habits. Like the asylum of old, it is set within natural parkland, but the nature preserve around the centre predates it and its trails are shared with local citizens.

Sadly, these examples are far from the norm worldwide. In the last decade there has somehow been a shift, particularly in Australia and the UK, towards building more closed facilities – a shift observed with alarm by patient safety and mental health specialist Dr Paul Barach. “It’s a big change,” he says. “We’re not necessarily going back to the asylums, but we are moving back from personal freedom and privacy and engagement. It’s very interesting and nobody knows why. Nobody wants to take ownership of this and the potential implications for wellbeing.”

Behavioural Health Department, Mills-Peninsula Medical Center, California, USA

Construction of a new hospital tower at California’s Peninsula Medical Center meant the relocation of the campus’s behavioural health department, and the opportunity for an the refurbishment of an entire floor of the existing medical centre to create a new, more welcoming, comfortable but secure environment. Perkins Eastman’s design team, according to principal Dan Akol, was inspired by the consultants’ wishes to create a “place of treatment and healing, rather than a place of confinement”, and ensured ample light, good views from the 40 bedrooms, calm, high quality interiors, and the intention that “the community spaces should reflect the community outside they will return to.”

With a 2,000sqm locked inpatient unit and a 1,000sqm outpatient unit for chemical dependency and drop-in services, the centre also had to be separated into adult and adolescent inpatient populations. The resulting design is flexible and each unit is largely open plan, ensuring high visibility for staff as well as legibility for patients. All units have community space, group therapy rooms, an occupational therapy room, kitchen and laundry facilities, nursing stations, a medication room, interview rooms, and a physical examination room. Says Akol: “If you were designing this 15 years ago you would have four to six seclusion rooms, but in this design we have one on each unit. This reflects the changing face of psychiatric care: the staff have learned how to handle potentially violent patients, rather than isolating them.” A hospitality-style setting aims to encourage visits and interaction with family members. Anti-ligature hardware, plus domestic-style but heavily weighted furniture, along with many ‘anti-elopement measures’ help to ensure the safety of patients and staff.

Misha Bruk

Barach, who is senior visiting fellow at the University of Utrecht’s Center for Patient Safety, acknowledges the crisis in community care that has escalated since the shift in the 1990s from institutionalising the mentally unwell to releasing them, where possible, into communities “which were not ready for them”. He speculates that recent rare but high profile cases of violence visited by mental health users on civilians have also played their part in driving the sector towards risk-averse architecture and procedures.

Mungo Smith, director at MAAP Architects, suspects that pragmatism on the part of the health services is also at work: “Care in the community is not about buildings but supporting people in their homes or through GP services or outpatient clinics. There’s a view that as you get better at doing this, fewer people need to spend time in these buildings, and ultimately they will largely be used by the severe cases who need to be hospitalised for a while.”

There is also the political hot potato of where to house the 30% of the prison population who are estimated to be suffering from a mental illness, as prisons become increasingly overcrowded. In which case, the sudden proliferation of closed units might be seen as a bout of future proofing. But the human impact is, as Barach rightly points out, severe for those whose requirements are far more moderate and manageable. “They are still locked in, regardless of the severity of their condition,” he says. “The only way they can get out most times is if someone escorts them out.”

Smith and his colleagues at MAAP have pioneered the kind of mental health building form aimed at providing security as an optional rather than a default setting. He says: “We twigged about 15 years ago that if you designed units to be open but



Behavioural Health Department, Mills-Peninsula Medical Center, California, USA

Client: Mills-Peninsula Health Services

Architecture, renovation, space planning, interior design: Perkins Eastman

Size: 2,975sqm

Cost: US\$12m

Completed: November 2010

Structural engineer: Thornton Tomasetti

Mechanical engineer: Ainsworth Associates

Electrical engineer: Cammisia and Wipf

Consulting Engineers



Sainte-Marie Psychiatric Clinic, Rodez, France

Client: The Sainte-Marie Association

Architect: J Lacombe & M Florinier

Size: 3,495sqm

Cost: €3.9m

Completed: 2007

Quantity surveyor: Jean-Pierre Vignier

Gilles Tordjeman

lockable and with embedded security, then you wouldn't have to build different units, or units that look so ostentatiously secure. The security is more about operational and relationship requirements than physical requirements. This allowed us to create an architecture that wasn't subsumed behind fences and obvious signs of containment."

Despite the initial success of some small, bespoke mental health units that MAAP designed in Birmingham over a decade ago, Smith has not seen a widespread adoption of such humane and flexible models, possibly because they are probably more staff- and skills-intensive than current funding and policy frameworks support. He adds: "There is still a lot of confusion about what type of security is required. So it falls to the lowest common denominator: many of these [new] units aren't designed to have step-up or step-down security within them, so if there are 20 people, most of whom could be managed in an open facility, and only four of whom have to be locked in, they all have to be locked in."

Despite the gloominess of this situation, there are still opportunities for evolutionary shifts, where the client or the staff are supportive of innovation – or where the procurement process doesn't completely stifle creativity. Dealing directly with an enlightened client, extraordinary buildings such as the Saint-Marie psychiatric clinic in Rodez, France, can emerge, thanks to visionary architect Jacques Lacombe and a supportive local authority (see case study).

The consultation process continues to provide both highs and lows in terms of facilitating even mildly evolutionary projects. Even within a restrictive LIFT bid framework, architects Murphy Philipps managed to extract enough valuable insight out of their initial consultation work with the staff at Southampton Hospitals Adult Mental Health Unit to result in a building that staff apparently feel has gone a long way towards meeting their vision (see case study) for a more humane and restorative space – as

Set on the northern side of the Bourran plateau, overlooking the hilltop town of Rodez, the Sainte-Marie Clinic was born of the joint vision of the Sainte-Marie Association's director and its architect. With over a dozen traditional 'asylum'-type buildings dotted all over the country, the Sainte-Marie director wanted to build a facility based on the most recent developments in clinical psychiatry, devoid of any of the negative associations of previous psychiatric buildings. Architect Jacques Lacombe has utilised the magnificent hilltop site to create "a building whose striking form would generate, whether viewed from the outside or the inside, a rich dialogue with the surrounding landscape". It is intended to belong to the community and open out onto it, while framing the everyday small-town life at a healthy distance for its patients, most of whom are suffering from non-acute conditions.

The building is on four levels, with the lower levels embedded in the hillside on one side and the projecting slabs independently supported using a wide-span steel structure. It is H-shaped in plan, providing views into and below the building, with the central 'bar' of the H used for circulation.

All 40 of the patient bedrooms are on the top floor, which projects out at treetop height. Care units and common areas are then placed at strategic points to aid with orientation and spatial punctuation. Immediately underneath are patient dining and leisure spaces, plus group therapy rooms. On the 'ground' floor are a spacious reception, linked to staff quarters, with their own restaurant and terrace on the east overlooking the town and its cathedral, and the medico-psychological centre to the west, with meeting rooms, art, music and therapy spaces cantilevered out, overlooking the trees. The car park and technical premises are at the base of the building. The technical centre is entirely glazed, with bamboo screens shading the south-facing side.

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Any kind of shared vision for what 'enlightened' design for mental health means is still a long way off

well as a highly functional one (it was shortlisted for a BBH best mental health newbuild scheme in 2010).

MAAP's work at Adelaide (see case study) picks up on a strand of opportunity for mental health authorities around the world – a new purpose-built facility constructed within the extensive parkland surrounding a listed Victorian asylum, as part and parcel of a major commercial redevelopment.

Similar opportunities exist in the UK. Devereux has been involved in one such project, with the North East London Foundation Trust, creating new facilities that leave the original redbrick institute free for development as housing (although plans are currently on hold). Their original First Phase building at Chapters House in Goodmayes, Essex, has recently been completed by Sunflowers Court. Comprising two 20-bed adult acute mental health wards, one 20-bed elderly ward, a 150-bed low secure unit and a 16-bed detox unit, its crescent form now completes a circle of buildings, sealing the facility around a 'village green'.

To accommodate tight budgets within the PFI, P21 framework, patient rooms have been placed on the first floor, and Devereux has created secure roof terraces that are freely accessible but also highly observable. Project architect Mark Carter says "the clients tell us that they use this space more than the gardens. People can come and go freely, whereas garden visits require supervision."

However, any kind of shared vision for what 'enlightened' design for mental health means is still a long way off – if it's even achievable. Alice Liang, principal at Montgomery Sisam, points out that while Toronto's CAMH institute is highly progressive, elsewhere in Toronto, three new mental health facilities are being developed which revert to the old fashioned, multi-storey institute model with panopticon-style nursing stations and airlock security at the entrance, which "can only be intimidating for the client's family members, especially if they are coming with children".

Ultimately, building forms can best facilitate healing and recovery when they are designed for a specific patient group. The Clinic Saint-Marie, though highly suitable for short-stay patients suffering minor depressions and disturbances, would surely not work so well for acutely disturbed patients. While Liang feels that the small, residential-style blocks at CAMH do much to engineer and support "a positive interactive environment between care givers and the clients themselves", this must partly be because this initial patient group are in the right sort of mental condition to be engaged in this way –

their next step being integration back into society. But the impact is surely worth it. Research Liang has conducted herself, with the Health Systems Research and Consulting Unit (presented at last year's IODH conference), while inconclusive as to the ultimate environmental factors that differentiate patient responses, still reveals the impact these spaces have had on residents, with their comments including: "The buildings feel non-clinical, inviting, with lots of windows and natural light which makes it less overwhelming"; "When we feel better, we like spending time together in the lounge, which is inviting and comfortable"; and "I appreciate the private bedrooms with en suite bathrooms. I enjoy that my privacy is being respected."

Barach wants more research to establish the impact of enlightened design on mental health users, as well as the creation of standardised design guidelines for mental healthcare facilities. He'd like to set up a global, cross-disciplinary 'learning collaborative' to pool knowledge. MAAP's Mungo Smith may assert that "research does not lead to better buildings" – but it might help to convince the accountants and the clinicians who, by all accounts, still hold the most sway in terms of aspirations for healthcare buildings.

Veronica Simpson is an architectural writer



Sunflower Court, Devereux's recent addition to north London's Goodmayes Hospital site, creates a circular 'village green' next to the existing Chapters House building



The creation of a new adult mental health unit at the Royal South Hampshire Hospital provided a valuable opportunity for practitioners to generate a more humane and welcoming environment than the unit's existing 1950s four-storey block. During a three-month consultation period undertaken as part of the LIFT bid process, architects Murphy Philipps, together with researchers from Oxford Brookes University, clarified the staff vision: to break down the institutional element and create a humane, relaxed and secure setting that would aid healing and recovery. The building itself is broken down into a number of one and two-storey elements, which are clad in wood, brick or simple white render, and are largely domestic in style and scale. A welcoming main entrance 'rotunda' leads into a calm waiting space, with direct access to outpatient consulting rooms and a large conference room. The main residential block is arranged behind this space, and accessed via a bright, daylight 'arcade' that provides comfortable shared seating spaces for families and patients. The five residential blocks behind it are arranged around four internal courtyards. Pathways through these blocks reinforce the sense of the patient's daily journey, from private space through shared living areas and into common social and activity spaces, clarifying choice (of spaces for different moods and needs) and wayfinding. A stimulating and therapeutic environment was created by maximising daylight, access and views to secure and pleasant outdoor spaces (courtyards, gardens and landscaped areas), providing wider corridors and a rich colour spectrum – consultant Frances Tobin created a palette of 30 colours deployed throughout the building to help differentiate areas and individualise bedrooms. Privacy and dignity are also reinforced with careful location and design of bathroom facilities, reception desks and bedrooms to maximise passive supervision and reduce overt security.



Adult Mental Health Unit, The Royal South Hampshire Hospital, Southampton, UK

Client: Hampshire Partnership NHS Foundation Trust and South West Hampshire LIFT (now part of Hampshire LIFT)

Architects: Murphy Philipps Architects

Size: 6,380sqm

Cost: £19m

Procurement system: Fourth Wave LIFT Sample Scheme
Completed: 2010

Main Contractor and QS: Geoffrey Osborne Ltd

Structural Engineer: Thomasons LLP

M&E Design: Cundall & Working Environments Ltd

CDM Co-ordinator: Thomasons Health and Safety

Landscape Architect: Fabrik

Colour consultant: Frances Tobin



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Following a bright star

Research laboratories present their own design challenges, from fire safety to future-proofing. **John Wells-Thorpe** paid a visit to a high-spec new building, The Brighton Centre for Tissue-Mimicry and Aided Regeneration, that hopes to become a model for others



Workstations have been designed as mobile units for maximum flexibility

In his 1958 book of collected essays, *Parkinson's Law: The Pursuit of Progress*, early management theorist C Northcote Parkinson touched a nerve when he maintained that when a well-known organisation felt it had 'arrived', it would build a gleaming new headquarters: thereafter, its competitive edge would be lost as everyone leant back in their new chairs and exhaled. He instanced a well-known research establishment whose groundbreaking work was carried out in a former private house where a crazy wooden corridor led to a corrugated iron hut in what was once the garden. Parkinson maintained that these miserable surroundings only served to stimulate the energy and resourcefulness of the scientists, leading them to produce their most brilliant work.

Today, science research buildings require more than just a hut: they house hugely expensive and sophisticated equipment, in very sensitive environments. The Brighton Centre for Tissue-Mimicry and Aided Regeneration ('Bright Star') is one such example. Occupying two floors of the University of Brighton's new Huxley Building, its research focuses on finding technical solutions to problems linked to the behaviour of cells. Such is the reputation of the team, led by Professor Matteo Santin, that it has already won research grants in excess of £3m from the European Community.

The site

Siting was governed by scarce land availability and ease of access from the adjacent railway station and nearby halls of residence.

The rail link is particularly important as the university also has accommodation on campuses some way away. Ease of access is equally important for the school's industrial partners, whose needs were included in the brief.

Design brief

The brief was drawn up following meetings where key academics worked as project champions for various areas of the building to ensure that the new facilities could accommodate the teaching requirements of the next 10-15 years. Functional and critical adjacencies were examined against the perceived need for ongoing flexibility, not just for the university but also for collaboration with industrial partners. Interviews were conducted by architects Llewellyn Davis Yeang, which has more than 50 years experience in healthcare and laboratory design, aided by the concept engineers and the University's Estates and Facilities Management team.

The plan

The layout of the laboratory and teaching areas gives a sense of spaciousness and flexibility, giving good visibility for demonstration and supervision while maximising options for future reconfiguration. Sliding doors provide separate environments for classes of different sizes, while workstations have been designed as mobile units. State-of-the-art AV facilities have been installed in the teaching hubs to help students develop practical skills.

Space allocation

While the scientists wanted to maximise functional territory, the concept architects had to consider wider issues not just limited to aesthetics, including scale and legibility, overall massing, vehicular access, landscaping and, most importantly, the creation of a civilised and uplifting working environment. The resulting give and



take means that some departmental support accommodation is sited more remotely than the scientists would have wished.

Problems were also experienced in accommodating electrical equipment under the bench units and in fitting anti-fire systems in the microbiology suite. It was felt by some academic staff that the pressure of meeting the delivery deadline might have compromised some of the final effectiveness of the building. It is suggested that even earlier consultation at the design brief stage would have eliminated such issues – but compromise is inevitable with such a complex design. A post-occupancy appraisal will take place 12 months after commissioning, which will help others trying to perfect such a demanding type of building.

Equipment

An Advanced Medical Products Suite (AMPS) includes safety cabinets with double HEPA filters that allow work with primary cells and blood; the suite's two ISO2 GMP units are mobile, for maximum flexibility. The AMPS will be available for teaching and research, as well as third-stream activities with the school's industrial partners.

Electrical and mechanical services

A full range of electrical and mechanical services is provided, including standby-generated electrical power in case of failure in the electrical supply, vacuum system or air-conditioning. Each laboratory has its own electrical consumer unit with balanced electrical loads and the facility to expand circuits if and when needed. A reverse-osmosis water ring main runs throughout the laboratories giving a pure water supply in the region of ten megaohm. Services rise from floor level, which allow clear views across the laboratories.

Health and safety

A new Salto access system has been installed and managed centrally, although access settings take account of the school's requirements. Due to the nature of its activities, the building's fire prevention systems were also examined closely. Special consideration has been given to refuge areas in case of fire for disabled persons and each fire lobby has a telephone system linking it to the evacuation control centre.

Green specification

The new block has a sedum roof, and produces hot water from solar thermal tubes installed at the same level.

John Wells-Thorpe is an architectural historian, writer and consultant

The Brighton Centre for Tissue-Mimicry and Aided Regeneration ('Bright Star')

Client: University of Brighton

Concept architects: Llewellyn Davis Yeang

Concept engineers: Hulley and Kirkwood

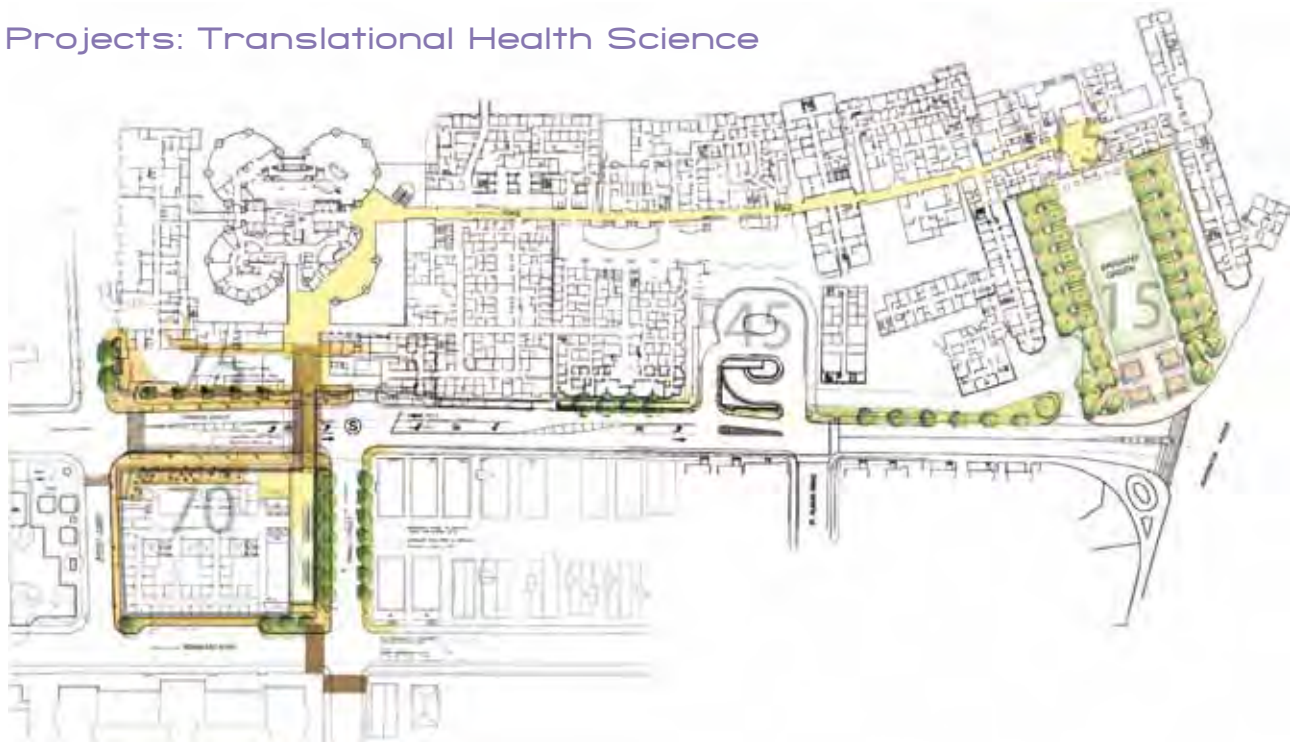
Main contractor: Morgan Ashurst (now Morgan Sindall)

Mechanical sub-contractor: J Hopkins

Electrical sub-contractor: Lauren Lloyd

Cost: £24m (construction and equipment)

Completed: February 2010



The space between

Closer relationships between healthcare disciplines can prove an important catalyst for medical discovery, and the way in which health environments are arranged has an important role to play in getting those disciplines to mix. *Michael Roughan* reports

The fundamental paradigm of medical care has for hundreds, if not thousands, of years been about the primacy of the doctor and patient interaction. The practice of the medical arts has been about the ability of the general practitioner to intuitively understand and respond to the symptoms that the patient has presented to them. Only in the past century have we been able to use devices to supplement the physician's knowledge. Today, with the promise of genomics, we have the opportunity to practice not just the medical arts, but medical science, and the dilemma we face is not a lack of knowledge but the inability to apply this knowledge.

Health information management

No one would argue that the first step in managing all of this new health information technology is to replicate the success that, say, Google and Facebook have achieved in improving our ability to network and manage data. However, these internet sites are simply the means and not the end. What has made them so successful is their acceptance as the common destination and subsequent evolution of content. This Darwinian selection process is the antithesis of recent failed attempts at creating health information management (HIM) standards. In both the UK and US, billions have been spent on the implementation of electronic medical records, only to be stymied in the morass of misapplied consensus, particularly regarding the conundrum of confidentiality versus transparency. Combined with that are debates over 'pull' versus 'push' systems, governance on a national, institutional or personal level, expansion into computerised physician order entry (CPOE) or the promise of clinical decision support systems (CDSSs), all of which have helped stand in the way of the adoption of electronic medical records.

We need the same sort of magic bullet that internet communications protocols have provided. Their model of a layered and packet-based technology that tolerates packets getting lost and promotes encapsulation is what we need to emulate for HIM. The US Government's 'meaningful use' initiative, which offers financial incentive for those that become certified users of its HIM system, will hopefully set new standards (and for the sake of this article, it is assumed that will be the case).

Figure 1, above: Harvard School of Medicine's Brigham Pike, which connects up research and hospital facilities

Translational health science

Success in acquiring and transporting health information electronically is only the first step. The real challenge is to what to do with the information. Translation of information and discoveries to patient benefit is the critical step: it has been the goal of many institutions, but is rarely fully realised, and requires significant thought beyond the simple tagline of 'bench to bedside'. Compounding this dilemma has been a complete lack of evidence-based design information about how the physical space can impact this process. Facility responses labelled 'translational' have until now been largely basic, creating an adjacency between clinical spaces and basic research without making the complex connections necessary to integrate across disciplines, across professions, across institutions and between the stages from understanding a disease through discovery to patient benefit and then feedback to verify and improve on those discoveries.

The dilemma we face is not lack of knowledge, but the inability to apply knowledge

This integration requires changes in traditional organisational models and ways of working. The evidence suggests that facilities can play a strong role as a catalyst for organisational change, shaping behaviour and creating the dynamic integrations required to support translation.

The physical environment, from individual workspaces, to buildings, right up to campus scale, can either inhibit or enable translation. In particular, the built environment can be a catalyst to take change from the top, down through many layers of an organisation, to those whose daily work creates and transfers the knowledge required.

The phrase translational health science has been adopted for both the process of moving discoveries to patient benefit and also the use of knowledge gained with bio-banking and bio-informatics to promote comparative effectiveness research. This evidence-based approach to medicine requires a reinvention of how we house clinicians, researchers and medical educators.

Transformational healthcare implies a transition from palliative and curative treatment to preventative. Can we positively impact people's behaviour to move from treating diseases to preventing them? This salutogenic approach requires that future research is better translated to the benefit of the population than it is now. The promise of personalised medicine now available through genomics allows for caregivers to move from intuitive decisions based on proven precedents to a more objective, individualised, data-driven intervention. This transition from medical arts to medical science will have a profound effect on how health facilities are designed, as well as on the relationship of today's caregivers with those charged with improving and reinventing care for the future.

Recent research

HDR Architecture has spent two years researching the issues of translational health sciences and in particular, how facilities can move discoveries more quickly from research to patient benefit. HDR has been working with global leaders in health and science to define the problems, and create a compendium of operational and facility solutions. It has been meeting with leading translational institutions, holding roundtable discussions and uncovering previous research into issues important to translation, as well as performing post-occupancy evaluations of facilities designed with translation in mind.

HDR has uncovered a better understanding of the role that facilities have in promoting translation. In particular, the typology of translational health science facilities is evolving from simple diagrams that stack labs above clinics, to a complex interrelationship among researchers, caregivers and the population they serve (see overleaf). The disruptive changes that pervasive electronic medical records promise, coupled with the advances in personalised medicine, have unbundled the translational facility from a single edifice to a complex network of purpose-built facilities, interconnected by electronic data exchange and the deliberate interaction of experts from multiple disciplines.

The concept of multidisciplinary interaction in healthcare was popularised in the late 19th century by the Mayo brothers, co-founders of the Mayo Clinic, who felt that a group of health professionals was

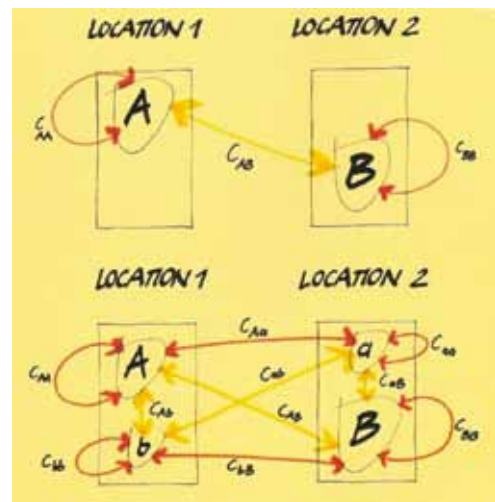


Figure 2: Research from MIT shows that by mixing Group A and Group B, the number of interactions increases exponentially. From *The Organization of Innovation* by Allen and Hersh

better able to diagnose and treat complex illnesses than any individual clinician. This concept also works for promoting the discoveries inherent in translational medicine: it is articulated with a diagram from MIT (Figure 2), which effectively postulates that by intermixing Group A and Group B, the number and levels of interactions increase exponentially.

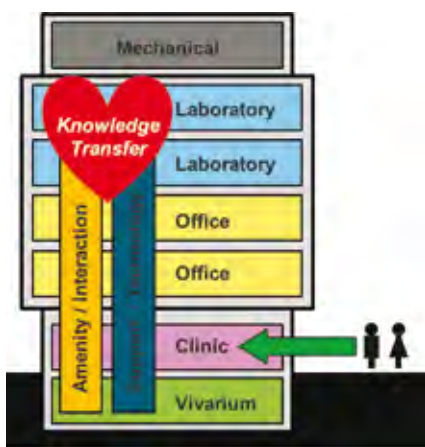
This concept has been categorised by HDR as ‘trans-disciplinary interaction’, with the use of the prefix ‘trans’ intended to emphasise that it is the cross-disciplinary nature of the interface that promotes discoveries.

One of the participants in HDR’s research is a thought-leader in UK healthcare, Sir Cyril Chantler of University College London, an Academic Health Science Centre (AHSC). His suggested solution to the problem of integrating the AHSC with the community, for their mutual benefit, is the polyclinic – an ambulatory environment that allows multidisciplinary specialists to practice closer to the patient, so that not only clinical care, but also research and medical education, are moved away from the AHSC. The benefit of this, although not yet apparent to GPs and Primary Care Trusts, is to move medical science into the community. That translation is not just occurring in AHSCs, but expanding through tertiary healthcare systems into secondary and primary healthcare systems. This translation occurs as bio-banking evolves and genetic databases expand, extending clinical trials deeper into the community. Translation also involves collaboration between the public and private sectors. Not only can corporate research entities help develop drugs and therapies discovered in academic research institutes, academia can help validate discoveries emerging from commercial organisations.

Stephen Smith, chief executive (health) at Imperial College, London, is another champion of translational health sciences. He is promoting the invention of biomedical devices for patient good, and his colleagues have demonstrated significant success in micro- and nano-technology, which allow for minimally invasive techniques to benefit patients without the traumatic side effects of massive open surgery.

Translational facilities for different environments

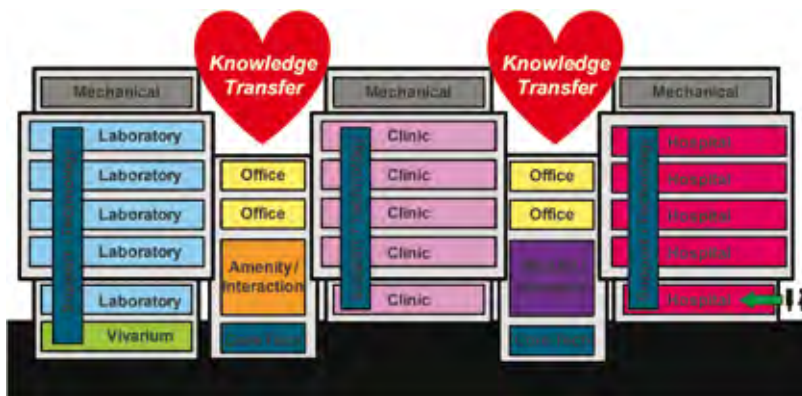
Figure 3, right: this model creates a ‘specialty silo’ that integrates components within one discipline (such as cancer, cardiac or neurosciences). Excellent examples of the above are the Winship Cancer Center at Atlanta’s Emory University, and Hershey Cancer Center at Penn State University. In a multi-disciplinary environment, however, the scale of activity means that this model needs to evolve into a campus, or even a system, solution.



Creating a translation-friendly facility

So how can facilities within an institution or health system be organised to promote translation? HDR’s research uncovered some predictable responses as well as some unforeseen opportunities. The concept of a translational health science facility that stacked wet labs over clinics has been implemented numerous times at prestigious academic medical centres (see Figure 3). In the US, thanks to the National Cancer Institute’s promotion of Comprehensive Cancer Centers (CCCs), this model of vertical integration is pervasive for the singular specialty of oncology. However, on closer inspection and in part based on post-occupancy evaluations, the presumption that proximity breeds interaction is not entirely factual. What HDR has found in several CCCs

Figure 4, below right: a multi-disciplinary environment respects the integrity of each component’s programmatic idiosyncrasies, allowing the wet labs to be stacked over other labs and to allow hospital inpatient space to be consolidated to minimise excessive circulation. What is innovative here is the components that bridge these institutional stereotypes. HDR’s research suggests that moving ‘thought leaders’ into flexible and adaptable space allows trans-disciplinary interaction between scientists, educators and clinicians in both formal and informal settings. These adaptable environments (offices, small meeting spaces, simple examination space or dry research space) act as a bridge between the wet labs and the inpatient hospital, and the communication/circulation between the disparate facility types can be celebrated. One of the best examples of this communication link is the Brigham pike that connects the Harvard School of Medicine and Research facilities on one end, and the inpatient hospital on the other end (see Figure 1).



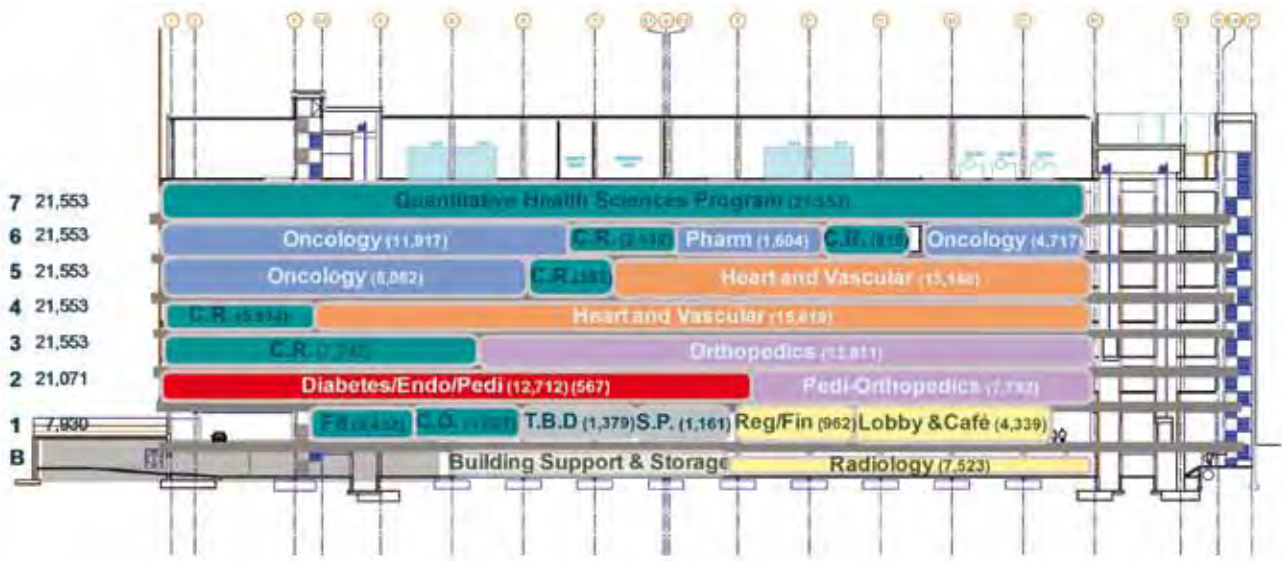


Figure 5: UMass Advanced Center for Clinical Care, Education and Science, which fuses clinical and meeting space to promote inter-departmental encounters

is that the clinicians covet the scientists' space and vice versa. These turf battles are often exacerbated in facilities that have been programmed to meet the specific users' needs, but without contingency or common space. Stacking wet labs over clinics can quickly demonstrate how different the two typologies really are. This does not bode well for conversion of one use to another at a later time. HDR's recommendation is to provide buffer space that houses both the clinical and research thought-leaders (see Figure 4), as well as medical education space.

An exemplar

The adaptable building that could be called the home of translational development is the UMass Advanced Center for Clinical Care, Education and Science (see Figure 5). Its concept was to infuse an ambulatory clinical facility with preceptor and small group meeting space for medical education, and to include clinical trial space and dry research space throughout the facility to promote moving translation to the population. The building's design was led by Andy Sussman MD, whose visionary idea was the seamless integration of clinical practice adjacent to areas dedicated to clinical trials, dry research and medical education. He is now the president of CVS MinuteClinic medical clinics – walk-in health centres that promote primary care medicine in retail environments. By using nurse practitioners to provide prescriptive medicine, CVS is implementing urgent care more cost-effectively, more conveniently and potentially more pervasively, in a decentralised environment. CVS is assembling robust medical records for millions of patient encounters: translational medical science will surely benefit from this data.

So how do we best promote translation of discoveries for the benefit of the population? HDR's research suggests that it is the revision of facilities on the academic campus that will allow for better transdisciplinary interaction, but it is more than that. As Stephen Smith postulates, it's recreating the industrial entrepreneurship that takes biomedical ideas and turns them into beneficial devices. It's Sir Cyril Chantler's concept of moving care – and more importantly, wellness and prevention – out to the population. It is Andy Sussman's concept of providing prescriptive primary care in the neighbourhood. Perhaps ultimately it's the notion that all care is personal, and that through personalised medicine, we can provide everyone with the choice to be healthy or not.

Michael Roughan is a healthcare principal in HDR's Boston office

**The built environment
can take change from
the top down to
those whose daily
work creates and
transfers knowledge**

It is surprising that the founder of the National Health Service in the UK, Aneurin Bevan, has never, until now, been honoured by having a hospital named after him. Sixty-three years have passed since this Welsh Labour politician (one of 13 children of a miner) introduced the revolutionary NHS to post-war Britain. He had established a reputation as a brilliant, irreverent and frequently tempestuous orator, and it needed someone with that unstoppable spirit to launch an historic scheme that transformed universal healthcare and, to this day, is still the most highly valued institution in public consciousness.

Design innovation

Ysbyty Aneurin Bevan is the first publicly funded new hospital in Britain providing 100% single-bedroom accommodation. Located in Ebbw Vale, South Wales, a constituency represented by Bevan in the 1929 General Election, the 107-bed community hospital is one of the first 'pathfinder' projects to be delivered through the 'Designed for Life: Building for Wales' procurement framework set up by the Welsh Assembly in 2006. Architects Nightingale Associates were selected as preferred supply-chain partner by construction company BAM Construction.

Residents have strong ties to the site's heritage and it has a huge impact on local communities

Strong principles

Named after the founder of the National Health Service, Ysbyty Aneurin Bevan is the UK's first publicly funded, all-single-bed hospital. *John Wells-Thorpe* sees if it lives up to its namesake

The site

The new two-storey hospital, which will bring improved and modern health services closer to local communities, is one of the first public buildings completed as part of the larger regeneration of the former Corus steelworks site, now rechristened The Works. Located at the southern edge of the site, the new hospital enjoys views both up and down the valley from its elevated position. Its distinctive 'zig-zag'

plan form reflects the layout of the three interconnected 32-bed single-room wards and maximizes the benefits of natural light, ventilation and views for each room. As a key public building the main entrance of the new hospital faces a new public square along the Works' central boulevard. As such the hospital has effectively two sides in both form and material terms. The eastern 'public' face is more formal, with detailing and materials that draw inspiration from the site's industrial heritage, creating a strong urban edge to the new boulevard. The western face has a domestic scale and finish more appropriate to inpatient and staff areas and reflects more closely the immediate and distant landscape.

User connection to the site and landscape is fundamental. Residents have very strong ties to the site's heritage and it has huge impact upon the local communities. In what can be a harsh environment, Nightingale has responded with framed views and positive external spaces that are an important extension to the user's domain. Patients are constantly aware of the bright courtyards and gardens, which aid orientation, give sheltered access to sunlight, fresh air and therapy activities and allow a new perspective on the local landscape.

Plan arrangement

The new hospital and its 96 single bedrooms, all with en-suite bathrooms, is designed to aid recovery by giving patients a greater level of privacy and dignity and also reducing cross-infection. Following extensive consultation with the Aneurin Bevan Health Board, inpatient accommodation is organised into eight-bed nursing clusters, focused around a nurse base. As such, each 32-bed ward comprises four clusters, providing greater flexibility for separation within, and between, wards. These wards are grouped around two large open courtyards giving direct views of the carefully designed landscaping. Each ward has a



A zig-zag plan allows for the creation of two secluded courtyards



Charlotte Wood



Ysbyty Aneurin Bevan, Gwent

Project Architects: Nightingale Associates

Client: Aneurin Bevan Local Health Board

Form of contract and/or procurement: NEC3 Option C

Cost: £46.2m

No of beds: 107, all single rooms

Structural engineer: Arup

Services engineer: Balfour Beatty Engineering Services

Quantity surveyor: Turner and Townsend

Planning supervisor: Arup

Main contractor: BAM Construction Ltd

Fire Consultant: Arup

Acoustic Consultant: Arup

Landscape Architect: FIRA

communal lounge with dedicated access to an outdoor terrace overlooking the courtyards. The large windows in individual bedrooms provide high levels of natural light and cross-ventilation.

The layout of each single bedroom has been arranged around identical services and equipment, such as bed-head to medical services and storage of individual patient support items. This approach was specifically adopted to reduce potential nursing error; thereby increasing patient safety. The clinical hand-wash basin is located diagonally opposite the bed-head and immediately adjacent to encourage hand-washing on entry. All bedrooms have large glazed screens with integral blinds which allow good observation from the nurse-base, but also gives the patient a level of control over privacy.

Related activities

The scheme also includes 11 dedicated mental health inpatient single bedrooms (including one larger extra-care room), each with an en-suite facility, alongside outpatient MHU crisis care, daycare units and a dedicated garden. Further facilities include urgent care, radiology, pathology, outpatients, therapies, a birthing unit, and non-clinical support. All outpatient facilities benefit from access into the main landscaped courtyard and therapy patients are also given access to a dedicated 'Activity of Daily Living' (ADL) garden.

User response

Karen Jones, project manager from Aneurin Bevan Health Board, says: "The building has more than met our expectations, creating a modern, light and airy environment, with plenty of space to allow staff to provide services in a safe and efficient way. The staff and patients have now moved in and are absolutely delighted with their new

We shape a better world



Medicover Hospital, Warsaw, Poland



Ysbyty Aneurin Bevan, Blaenau Gwent, UK



Kaiser Medical Center, California, USA



Richard Desmond Children's Eye Centre, London, UK



Tseung Kwan O Hospital, Hong Kong, China



Princess Alexandra Hospital, Brisbane, Australia

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

Charlotte Wood



A glimpse into one of the 107 same-handed single rooms

facility.' Project clinician Dr Liz King feels that the building's strength centres around the use of good-quality natural materials and that future-proofing, especially in the imaging and mental health units, is very evident. Along with many others, she regards the plan to provide 100% single rooms as being "a brave decision" which has proved to be fully justified. Her only reservation was that the therapy department has been sited furthest from the car park, which could make it difficult for patients with limited mobility who walk from their cars.

At an operational level, senior nurse Anita Davies is deeply aware of the light and splendid views not just for patients but for staff as well. She also feels that recognition of a patient's dignity and privacy has been fully understood in the overall design. Her only small reservation is that she would have liked the windowless isolation room to have received natural light so that, when not in use, it could be used for another purpose.

Engineering services

The scheme is heated throughout by a biomass boiler and overall U-values demonstrate a 31% improvement on Building Regulations requirements, contributing to a NEAT 'Excellent' rating, and an 'A' rated Energy Performance Certificate. The hospital was also quoted as being an 'exemplary' scheme by Secured by Design and was completed on time and within budget to receive its first patients last October.

Sustainability

A local landscape and biodiversity management plan, as well as a travel plan and sustainable energy strategy, were submitted at the outset of the planning process. The hospital also directly incorporated a number of sustainable design principles:

- the cut and fill of the gently sloping site was carefully calculated to ensure no excess material was removed from site
- a biomass boiler provides all heating, hot water and underfloor heating to selected locations
- a mixed-mode ventilation system uses natural ventilation where possible with mechanical supply or extract to appropriate clinical areas. All patients have the facility to moderate their immediate environment
- large areas of glazing to communal rooms, as well as individual bedrooms, provide maximum natural day-lighting and allow excellent views to and into either landscaped courtyards or extended views along the valley
- an external brise soleil provides shading to south east and south west facades
- materials were selected to be recycled where possible and/or recyclable and the timber used is FSC certified. The average U-value is 0.38W/m²K. Contractor waste was minimised during construction and operational waste is separated on site for collection
- the completed building achieves an air-permeability rate of 3.3m³/(h.m²) at 50Pa and annual CO₂ emissions of 22.6KgCO₂/m².

Conclusion

The Principality of Wales now possesses a healthcare facility worthy of its illustrious name. The finished project has sprung from a determined and enlightened initiative by everyone concerned – commissioning authorities, clinical lead and architects alike. It will inevitably be seen as an excellent example for others to follow.

John Wells-Thorpe is an architectural historian, writer and consultant

Anatomy of the Single Bedroom:





Liverpool extended

One of Sydney's most rapidly developing areas has a newly extended hospital to serve its growing population. Liverpool Hospital's new clinical services building, known as CSB2, forms part of the overall redevelopment of the campus, extending the facilities of the existing CSB to provide 45,000sqm of specialised new clinical accommodation and around 240 new beds. A tight urban site presented a unique planning challenge for architects Rice Daubney: the masterplan provides new vehicular public access to the north-eastern corner of the campus, aimed at easing the pressure on the existing approaches. In addition, a new over-rail bridge provides service vehicle links, and an elevated air bridge provides staff access from a carpark directly into the new building. CSB2's centrepiece is its main concourse, a dramatically glazed, double-volume public space that ensures clear intuitive wayfinding for users while providing an important sense of place.

Breaking down barriers

Hidden behind a fence and described as "cold, dark and unwelcoming", Ballarat Acute Mental Health Facility in Victoria, Australia, was in dire need of modernisation. Architecture firm Billard Leece Partnership has now unveiled its AUD\$4m renovation and extension to the existing building, which brings it a new sense of inclusion with its community. While maintaining the existing number of beds, the renovation has provided a warm, light-filled, welcoming facility with large open spaces for activity and leisure (such spaces were almost non-existent in the original building). A new entrance with an open timber fence allows the facility to portray a more open and engaging presence; a double skin of timber battens allow glimpses from the street into the entry courtyard, which also means that patients can see out into the wider community while maintaining their security and safety. Domestic-scaled living quarters replace impersonal spaces with shared bathrooms, and a private secure 'backyard' was reimagined with a new glazed brick facade.



Art in every corner

More than 400 pieces of art have been installed at a new 44,000sqm Texas hospital. Working with architects PageSoutherlandPage, consultants Skyline Art Services devised the programme for The Methodist West Houston Hospital: more than half of the artworks are original works of art or photography, and three-quarters of them have been sourced regionally. The project creatively combines a variety of media not typically found in hospitals, including hand-made glass, wood, ceramic, sculpture, metal and giclée prints, as well as custom patient care boards that incorporate art at the footwall. "It was very refreshing to see a depth and diversity in the collection," says Marissa Yu, vice president and director of interiors for PageSoutherlandPage. "The Skyline Art team worked with the client and with our design team to provide art pieces that blended well with the clean lines of the interior architecture, while promoting a warm and soothing environment for patients and staff."

Cesar Rubio



WELL done

California State University has opened a facility on its Sacramento campus that unites fitness, medical care and social activity spaces under one roof. Designed by Hornberger + Worstell and Ellerbe Becket, The WELL (Wellness, Education, Leisure, Lifestyle) is a 14,000sqm centre that services 28,000 students and 3,400 faculty and staff. Its amenities include a rock climbing wall, four basketball courts, exercise studios, a pharmacy, a lab, and offices for physical therapy, nutrition, optometry and mental health. The WELL will be the first building on the Sacramento campus to pursue LEED Gold certification: sustainable features include the use of FSC certified wood (92%) and the implementation of a landfill waste diversion program (84%). “We wanted to design a place of memorable form and strong identity – a place where students will feel a sense of belonging,” says Hornberger + Worstell’s Burton Miller.

London landmark

South-east London has a new landmark civic building. The Waldron in New Cross replaces an anonymous single-storey health centre with a five-storey building that incorporates a street-level cafe. Lewisham Primary Care Trust and architects Henley Halebrown Robinson had no smaller ambition than “to change people’s perception of healthcare” for the £13.4m project: the 6,000sqm centre is a clad in a warm, distinctive cherrywood-coloured veneered rainscreen, while louvres on the east and west elevations act both as solar protection and acoustic baffles. Its bronze-anodised windows are variously proud, flush and recessed to provide visual interest. The sculptural character of the building is emphasised by its elevated sign, spelling out its name in large capital letters. The ground, first and second floors are all publicly accessible, with GP practices on the first floor, and dentistry, sexual and reproductive health and a multifunctional clinical suite on the second; private meeting rooms and staff/office accommodation are on the third.



Out of the lab

Set to be completed at the end of 2012, Woods Bagot’s South Australian Medical Research Institute (SAHMRI) has been designed as world-class medical facility for Adelaide. The 25,000sqm building will accommodate the institute’s 675 researchers, with flexible space organised as nine research modules consisting of one-third dry and two-thirds wet laboratory space. Open public spaces, cafes and retail stores also form an integral part of the plan: the design brief was for a facility that will rejuvenate the local area, showcase sustainable urban planning strategies and interact with the city’s public transport, walking and cycling networks. The context of the site – its solar orientation, views and parkland – was a crucial driver for the building’s form, which is raised from the ground to increase the public area and create an attractive forecourt. Clear glazed atriums allow a visual connection to the precinct and help to communicate the building’s function.



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Safe, secure, energy efficient

Fenestration expert Britplas has launched a new slimline aluminium profile window for its award-winning Safevent system. It offers neater sightlines while maintaining outstanding strength and durability, and its uniquely designed double-thermal-break ensures improved thermal properties, taking U-values below 1.9W/m²k. The new design means that even more natural ventilation passes in through the mesh of the open window (while maintaining a high level of security) and less heat is lost out of the window when closed.

www.britplas.com

Protection from harm

Much has been done in recent years to ensure that mental health facilities afford their patients privacy and dignity, providing secure accommodation with a homely feel. Balancing safety demands with ease of use and aesthetics is often difficult, however, and products that do all three in this challenging environment are rare. Primera's anti-ligature door and window fittings are one such example: designed solely for use in environments where there is risk of self-harm or suicide, they remove any ligature risks while also being easy to operate for both service users and clinical staff. A 'Secondary Barricade Override' system is a further groundbreaking feature: it means that the door can be relatively quickly unlocked, even if the keyhole is blocked from the inside, without damaging the door or the mechanism.

www.primeralife.co.uk



Anytime, anywhere

Physicians in the US are benefiting from a new Android application that puts real-time, accurate patient information in the palm of their hand. MIAA (Medical Information, Anytime, Anywhere) is the first of its kind to be developed by a healthcare system in the US: its technology enables physicians to access medical information – lab reports, radiology images, patients' drug allergies and more – on mobile devices such as phones and tablet computers. The application has been developed by Palomar Pomerado Health (PPH), which operates two hospitals in San Diego, California. "This new technology will improve patient care by taming the complexity of health care, and reducing the current hassle inherent in a highly fragmented industry," says Ben Kanter, MD, chief medical informatics officer and pulmonologist at PPH. "Physicians who are on the go, at home or on call, will have the ability to access real-time information in context. This will lead to more accurate medical judgments, ultimately improving patient care."

www.pph.org



www.medical-architecture.com/

medical architecture

STRATEGIC CONCEPTS MASTERPLANNING HEALTHCARE DESIGN

This new mental health, drug and alcohol care facility in Adelaide, Australia, continues Medical Architecture's focus on creating healing environments. Glenside Campus Redevelopment is designed in partnership with Swanbury Penglass Architects and currently under construction.

Arranged as a small village around a central healing garden, the design provides a positive message for a sometimes stigmatised patient group.

Design & Health Scientific Review

Three faces of evidence-based research



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

More and more designers and environment-behaviour scientists are embracing evidence-based decision making. This issue's articles reflect three definitions of evidence: theory building, meta-analysis, and direct data gathering and analysis. None are more or less inherently evidence-based.

Readers have three responsibilities in interpreting how evidence-rich an article is: determine what type of research project the article represents, be aware of the qualities that

determine a successful research presentation, and evaluate the actual quality of the evidence itself.

Theory building: Lindström and Eriksson propose Antonovsky's salutogenic theory as the best organising principle for planning and evaluating "life-promoting settings." Other theories, they say, lack "sound scientific theory base", while theirs employed "an extensive systematic and analytical review" of salutogenic research. They passionately stress the values of wellbeing, quality of life and human rights embedded in this approach. What qualities are necessary for such research to be considered evidence? **Empirical basis** – is the theoretical framework based on analysis of data without prejudice for a predefined theory? **Explanatory** – does the proposed theory explain more than previous frameworks? **Value agreement** – are the values expressed by the theory explicit and do they reflect the reader's own values? Whether this article reflects these principles well is up to the reader to decide.

Meta-analysis: Behbod analysed more than 50 sources linking urban design and asthma. He makes a compelling case that reducing exposure to environmental triggers of asthma can substantially improve quality of life and cut societal costs. He lays out an analytic framework, includes a discussion of the cost/value tradeoff of interventions and ends up with practical suggestions.

What qualities are necessary for such research to be considered evidence? **Thoroughness** – does the author include a representative sample of available research? **Clarity** – does the author clearly reflect the data that other sources have gathered? **Logic** – does the author logically connect the sources into a cohesive argument? Whether this article reflects these principles well is up to the reader to decide.

Data gathering and analysis: Anderson and Todd studied whether multi-disciplinary hospital rounds team members prefer discussing cases at the patient's bedside or in a conference room. Most team members preferred the patient's bedside. The study employed behavioural observation, group focused interviews, questionnaires and archival plan analysis.

Later we learn that the conference room in this particular hospital is located one floor below patient rooms so that nurses in these meetings have to leave the patient floor to take part and that families and patients do not take part in conference room discussions. What qualities are necessary for such research to be considered evidence? **Robustness** – do the research topic and questions yield informative and useful answers? **Appropriate selection and use of methods** – do the authors employ methods that fit the research topic and are the methods employed according to the scientific principles they were designed to serve? **Analytic cohesiveness** – does the author's analysis of data hang together and make sense? Whether this article reflects these principles well is up to the reader to decide.

In sum, these articles provide us the opportunity to practice being responsible readers – to determine, to be aware and to evaluate.

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Health Promotion:

The salutogenic approach to planning and health promotion
Bengt Lindström, Monica Eriksson



76-79

Public Health:

A prescription for the prevention and treatment of childhood asthma?
Behrooz Behbod



80-85

Critical Care:

Designing for multidisciplinary rounding practices in the critical care setting
Diana C. Anderson, S. Rob Todd



From healthy settings to sustainable healthy societies: **The salutogenic approach to planning and health promotion**

In its relatively short lifespan, health promotion has increased our understanding of the relationship between people's health and a range of external factors. What can salutogenic theory add that will help deepen that understanding?

*Professor Bengt Lindström, Monica Eriksson
 PhD*

“Salutogenesis is on the leading edge of a class of academic movements that wish to emphasise human strengths and not just weaknesses, human capacities and not just limits, wellbeing and not just illness.”
 (Professor Maurice Mittelmark, immediate past president of the International Union for Health Promotion and Education)

Three years ago we wrote an article entitled *A Salutogenic Interpretation of the Ottawa Charter*, where salutogenesis was used to give health promotion a theoretical framework¹. This article elaborates on the issue, giving a special focus to the 'setting approach' – targeting schools, workplaces and other healthy settings for living.

Health promotion is the youngest and perhaps the most radical branch of the international public health movement, established on a global level as late as 1986 when WHO launched the core document and principles of health promotion through *The Ottawa Charter*². Besides describing the principles of health promotion there were five action areas included, one of them the 'setting approach' focusing on both the built and the living environment in all its dimensions³. This approach also became the leading innovation for the many projects that developed based on the Ottawa Charter. Foremost is the Healthy City Project⁴, one of the flagships of health promotion, which has been ongoing as a global project since 1986 and later on a European level as the EU's Metropolis project (see www.metropolis.org).

What is the conceptual content of the setting approach? Whitelaw and colleagues try to bring together a range of perspectives

on settings, emphasising a re-orientation from the risk factor perspective to the nature of systems and organisations⁵. Based on different forms of settings activities they identified five models:

1. a passive model (focus on problems within the individual, the setting is seen as neutral and passive just transforming information about health);
2. an active model (the problem is still seen as individual, focus on change of behaviour);
3. a vehicle model (trying to move from an explicit individual behavior to a broader setting approach and development within the setting);
4. an organic model (based on the assumption that individual behaviour is a product of the over-arching system, problems are seen to lie within a wider system); and finally
5. a comprehensive model (emphasis on broad settings policies and strategies)⁶.

The common denominator of all five models is the orientation towards solutions. In this paper we are proposing a sixth model, the salutogenic, focusing on peoples' assets and health resources.

Assets or health resources can be identified on different levels: individual (social competence, resistance skills, commitment to learning, self-esteem and sense of purpose), community level (family, friends, social networks, affinity groups, religious tolerance, harmony) and the organisational or institutional (the environmental resources necessary in order to promote physical, mental and social health, safe and pleasant housing, political democracy and participation opportunities)⁷.

However, one of the weaknesses of early health promotion was the fact it was only based on principles and values rather

than on a sound scientific theory base. The need for theoretical advances in health promotion was again underlined in an editorial in *Health Promotion International*^{8,9}. A systematic review of the literature STRÖK on 11 peer-reviewed journals demonstrates that policy research in health promotion is still largely atheoretical¹⁰. It concludes that the field has to acknowledge critical concepts that would help to shed light on policy processes for health promotion. In this paper we introduce a theoretical framework, salutogenesis, serving as an over-arching theory for health promotion research and practice.

Through an extensive systematic and analytical review on salutogenic research, we now have a grip on the effectiveness of salutogenesis¹¹. As a consequence, the International Union of Health Promotion and Education (IUHPE) set up a Global Working Group on Salutogenesis (GWG-SAL). This group initiated a website including a database (www.salutogenesis.fi). Over the past few years it has clearly been demonstrated how effective the salutogenic approach can be in health promotion even in a life course perspective and in the development of core settings of health; in the living environment such as family, school, workplace and community, cities. This paper will focus on the values and philosophy of health promotion.

Public health, health promotion and post-modernity

While modern public health has a history of about 170 years, health promotion has existed only 25 years. Public health was developed as a reaction to the many health problems that occurred during early days of the industrial revolution, when health problems were mainly related to infectious diseases that spread like epidemics among



Figure 1: The renowned waterfalls at Trollhättan. The city is part of Sweden's Healthy Cities Network, one of the flagship projects of health promotion

workers in cities due to overcrowding, bad housing and sanitation. For many 19th-century industrialists, people were seen merely as the fuel that kept the machinery going – there was always somebody else who needed a job if others dropped out. This phenomenon can still be seen in the developing world, and in the margins of urban society all over the world. It is expressed by contemporary sociologist and philosopher Zygmunt Bauman in his metaphor of 'the tourist and the vagabond': modern Western man is 'the tourist', with enough money to do what he wants, buy what he wants and travel wherever he wants; he is mobile and wealthy. When he has satisfied his personal needs or when he is getting bored he moves on somewhere else or returns home, never bothering to reflect on what he has caused and what has happened in the setting he visited¹².

How much of Bauman's thoughts are mirrored in our structured urban habitat and in urban planning? According to Bauman there is an "interplay between

ethics, culture and politics that form and create coherence" in society¹³. Another post-modern philosopher, Anthony Giddens, says post-modern society faces two dilemmas^{14,15}: first, because of contemporary development such as increased mobility and the strong emphasis on individuality, life can become superficial and isolated. It is hard to keep ones deep nurturing relationships alive; people lose their context and become lost and rootless. The close relationships in previous times gave resonance to our inner thoughts and developments; interaction gave us an inner trust as well as security and connection to our historical context, giving us the confidence necessary to manage life. Today, life has become more and more hectic, there is an overflow of information and impulses in ever-changing scenarios. People become insecure: they have to rely on experts to get the answer to the tiniest minor questions in life, leaving post-modern man as a historically lost and dependent little figure in a fragmented

chaotic world without any sense of context or coherence. We dwell on this issue here because of the close links between human conditions, human rights and health as related to the context of living and setting. It is also important to think on how one can construct settings that can operate against these conditions and promote health.

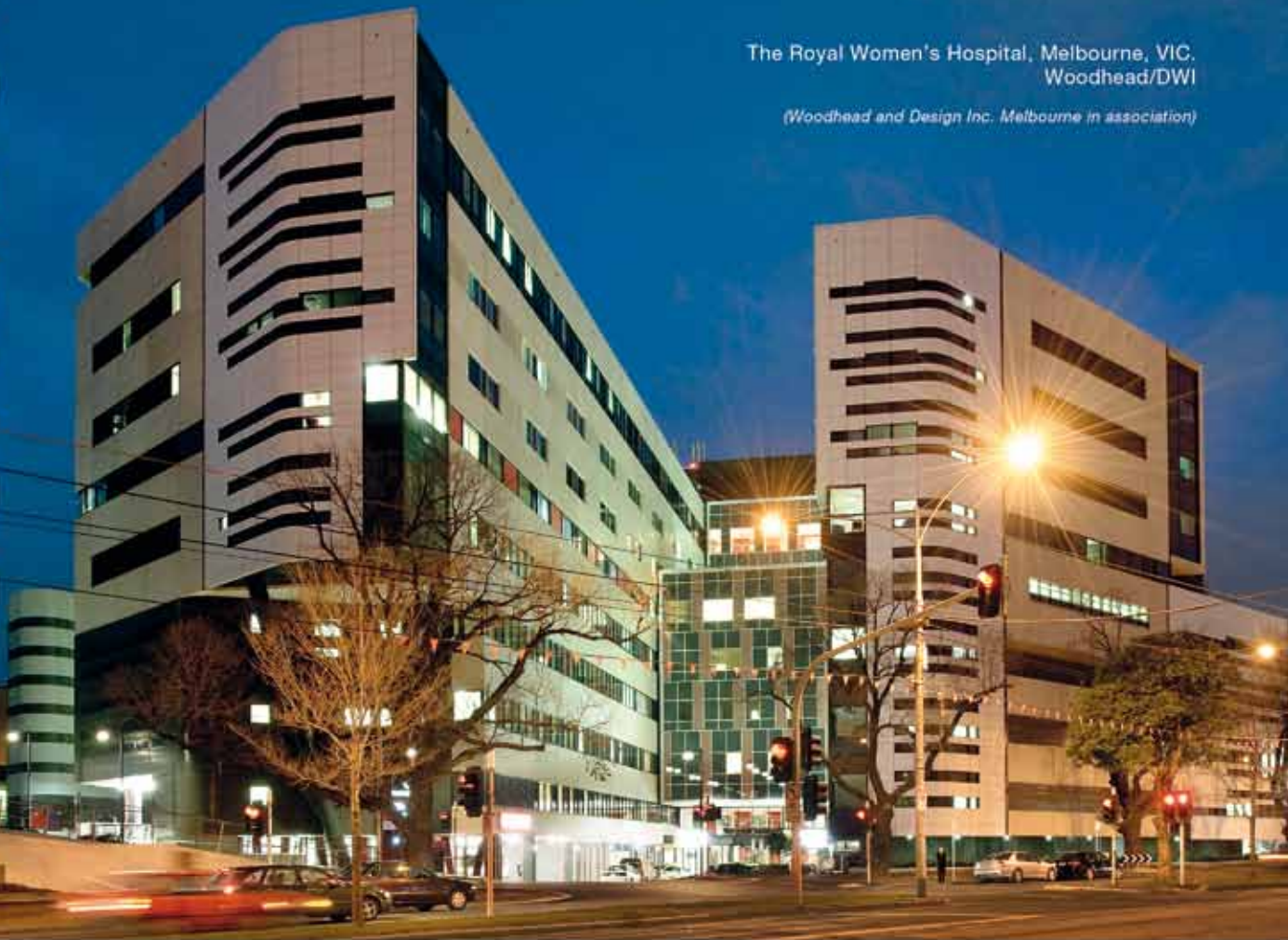
Health promotion

The development of health promotion in relation to public health and the new approach salutogenesis has been presented by us earlier¹. Modern public health had a second start after the Second World War with the declaration of Human Rights and the foundation of WHO. Health was defined and described in terms of wellbeing, not simply absence of disease. The late 1970s brought change when a Canadian Health Ministry report turned the focus outside the health sector, towards urban planning, the macro economy, transportation, agriculture, law and public policy, which seemed to have a stronger overall impact on health¹⁶. The

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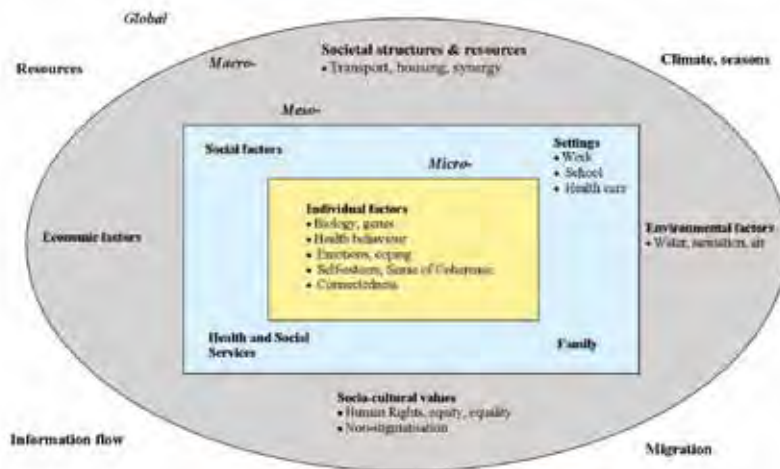


Figure 2: The determinants of mental health. Modified after Cattani M, *Mental health promotion – a life span approach*



(or Health-Promotion-Is-The-Process-Enabling-People-To-Gain-Control-Over-Their-Health-Determinants-Thereby-Improving-Their-Health-In-Order-To-Be-Able-To-Lead-An-Active-And-Productive-Life)

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Figure 3: The 'genetic code' of health promotion

health sector faced drastic change initiated by WHO, with 1984's 'Health For All by the year 2000' Global Health Strategy and the first global policy for health¹⁷, probably the most important and influential change of health policy ever. The Ottawa Charter followed, which declared health promotion as a separate framework within public health, declaring in its principle statement the 'genetic code' of health promotion¹⁶. Just to demonstrate how broadly one now had to think in ecological terms, Figure 2 is included above explaining just one dimension of health (here mental health).

The principles of Health Promotion were expressed in the Ottawa Charter stating H-P-I-T-...: "Health promotion is the process of enabling people to gain control over their health determinants thereby

improving their health in order to be able to lead an active and productive life"¹⁸ (see Figure 3). The basic idea was to make people active participating subjects in their own life, empowered, understanding what determinants are important for their health and through this process be able to use the resources to develop their health. The principles stand on the fundament of The UN Declaration of Human Rights where the human being is seen as a free and autonomous subject in life and an "active participating subject". In addition, the five action areas of the Ottawa Charter were:

1. reorienting health services (towards primary health);
2. strengthening personal skills (changing health behaviour);

3. building supportive environments (the Settings approach);
4. strengthening community action;
5. building healthy public policy (the overarching principle that binds the others together in coherent action).

These areas were built in to the Ottawa charter's logo, based on the shape of a Nautilus shell; it has appeared in a slightly different form in each of the seven WHO Health Promotion Conferences¹⁹, the latest held for the first time in Africa in Nairobi, Kenya in November 2009. The five principles of health promotion were slightly renewed and reformulated for the 2009 Nairobi meeting's final document, the Nairobi Call to Action (NC2A). This is shown in Figure 4, where the five action areas of the Ottawa Charter are compared to the Nairobi Call to Action jargon.

As can be seen, the Ottawa Charter's powerful expression 'building supportive environments' – the 'settings approach' – has been reformulated into 'community empowerment'. Perhaps worse, 'healthy public policy' has become diluted into 'partnership and intersectoral action'. It remains to be seen whether the Nairobi Call to Action will have the same influence and impact on health promotion as the original Ottawa Charter. However, it is necessary to underline the fact that the Nairobi Call to Action is strongly committed to the UN Millennium Goals for a Sustainable Global Development.

It was interesting to see, at the time of early health promotion development, how much easier it was for some professionals to see and understand the advantage of this way of thinking compared to the traditional health sector. Many architects and people with an ecological understanding of health (such as environmentalists and biologists) found it much easier to understand how important they were for the overall development of health promoting settings. Many of them were involved in the early formation and transitions towards the new practice of health. At the same time it was clear there was reluctance from the traditional health sector to accept this influence, a classic interdisciplinary problem: the struggle for leadership and power. Unfortunately many of these new disciples were eventually pushed out into the cold again and their interest and knowledge was

1. & 4. Peel Memorial Centre for Health & Wellness, Brampton 2. & 3. St. Thomas Elgin General Hospital, St. Thomas 5. Erinosa/Kios, Etobicoke 6. & 7. St. Joseph's Healthcare Hamilton - West 5th Campus



1.



2.



4.



5.



6.



7.



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Health Promotion	Ottawa Charter	Nairobi Call to Action
Overall objective	Improve health and quality of life Reduce health inequality and poverty	
Mission	Equity and sustainability Closing the implementation gap	
Action levels:		
Individual level	Developing personal skills	Health literacy and health behaviour
Community level	Supportive environments	Community empowerment
Health system level	Reorienting health services towards primary care	Strengthening health systems especially primary care
Policy level	Healthy Public Policy	Partnership and intersectoral action
Strategies	Enable, mediate, advocate	Putting evidence into practice

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Figure 4: A comparison of the objectives and action areas as expressed in the Ottawa Charter 1986 and the Nairobi Call to Action 2009

died suddenly, which slowed the process towards a synthesis. Research continued but there was little international coordination. From the health promotion side not much more than ideological rhetoric was expressed in salutogenic terms. Nobody investigated the potential of the field.

Now, there is a revival of salutogenic thought and practice through the work undertaken in Helsinki within the core of the IUHPE GWG-SAL, founded in 2007. This group was formed by IUHPE to put the coordinates back towards the original intentions and planned direction of health promotion: a focus on health promotion as an asset and resource for life. The publication of an extensive systematic research synthesis gave solid evidence and demonstrated the effectiveness of the salutogenic approach to health and health promotion¹¹.

The IUHPE's 20th World Conference in 2010 put an emphasis on salutogenesis, presented in seminars, symposia, workshops, oral presentations and posters. In the conclusion and in one of the final presentations of the conference it was even stated that "salutogenesis is the future of health promotion". The IUHPE's Global Working Group on Salutogenesis thereafter established a core group of ten research centres to strengthen the basis of research and collaboration and published a research report, *The Hitchhiker's Guide to Salutogenesis*, where the salutogenic framework and the contemporary scientific knowledge base were brought together¹⁷.

Different approaches

Traditionally, the difference between the biomedical model and the public health model has been described through a

lost. There is a similar discourse regarding health promotion itself. Traditional public health and healthcare sectors were envious of the early successes of health promotion and wanted to regain power.

One of the most influential public health figures today is Sir Michael Marmot. He is one of the scientists behind the Whitehall Reports in UK and has later been involved in key research on social determinants of health and studies behind the causes of inequity and health²⁰. Later he chaired WHO's work on the reduction of inequity, aiming at 'closing the gap' in one generation^{21,22}. At one of two presentations in Nairobi, he strongly criticised the health promotion movement for not being able to perform according to the Ottawa Charter's intentions. He stated: "It is not a question of not knowing what to do, it is a question of not doing it"¹⁸.

Salutogenesis

At the time when the Ottawa Charter was declared, no theoretical foundation was used. However, there would have been a theory base that could have matched its intentions. Afterwards, making a comparison between the charter and salutogenesis, it is surprising they developed separately¹.

The salutogenic framework originated from sociological research where Aaron Antonovsky, involved in stress research, turned around the question of "What causes disease?" into the question of "What creates health, or what is the origin of health?"^{23,24}. His original discovery came after studying victims of the Holocaust, realising

that, in spite of their horrible experiences as prisoners in the most inhumane conditions, some were able to carry on with a full capacity of life. (Note the historical link to the Declaration of Human Rights and the constitution of WHO.) He named this direction the salutogenic direction, and gave birth to a completely new way of approaching health.

A few years later, Antonovsky met with the core actors of WHO's health promotion movement to discuss what could be a theoretical foundation for health promotion if the salutogenic approach is used²⁵. At the time there was not very much evidence on the effect of health promotion or salutogenesis, because research was only just beginning and hard to evaluate. However, the similarities were seen in the way of thinking. If one compares salutogenesis and the Ottawa Charter in depth, the match is almost perfect. However, shortly after, in 1994, Aaron Antonovsky



Figure 5. The two directions of health research

metaphor of a river. The following stages are described moving up the river: cure or treatment of diseases; health protection/disease prevention; health education; and finally, on top, health promotion.

The latter holds a rather different perspective relating to resources for health and life not primarily risk and disease. All approaches ultimately strive to improve health, but the health concept is constructed from the understanding of disease, illness and risks, while the health promotion approach brings the focus upstream, finding resources and initiating processes not only for health but wellbeing and quality of life. In the salutogenic approach, however, we focus on progress of health in the direction of life, shown in a modified graph, health in the river of life (Figure 6).

Here the main flow of the river is in the direction of *life* while illness, disease and risks are seen as disruptive forces one will encounter once in a while – life is still, as such, the main force and direction.

Antonovsky explicitly talked about resources for life and constructed a life orientation questionnaire, the Sense of Coherence (SOC) questionnaire. Antonovsky's ease/dis-ease continuum is placed vertically. At birth, we drop into the river and float with the stream, and over our lifetime, learn how to swim.

Some are born at ease, where the river flows gently, there is time to learn and the prerequisites for life are good, with many resources at their disposal such as being born into a welfare society. Others are born close to the waterfall, at dis-ease, where the struggle for survival is difficult and the risk of going over the rim is much greater.

The river, just like life, is full of risks and resources: however, our outcome is based on learning through our life experiences thus acquiring an ability to identify and use

the resources necessary to improve our options for health and life.

Antonovsky's theory with the core concept of a Sense of Coherence is the first and presently best-researched salutogenic model. However, there are many other theories and principles that use a similar approach focusing on what processes and resources lead to improving health. They stem from different disciplines still having a common salutogenic approach. WHO has recently launched what it calls 'an asset approach to health', using a term more affiliated to policy and management⁷. However, in their core model, salutogenesis according to Antonovsky is included as a central theoretical component in the asset framework.

What does the evidence prove?

The overall effect of the development of a strong SOC is here synthesised into one image (see Figure 7). The global systematic review has served as its foundation.

Health outcomes for people who generate a strong SOC is a longer life, an inclination towards more constructive health behaviours (exercise, food habits, etc) less health-damaging behaviours (alcohol, smoking, etc) a higher stress tolerance and finally, coping more successfully with acute and chronic disease.

It seems that people who learn how to develop a strong SOC experience a better quality of life and perceived health and better mental health more or less as a side effect¹¹. In salutogenic terms, the key seems to be how they themselves, in interaction with their settings, approach life as a whole and find life meaningful, rewarding and challenging on a deeper level. This is a question of the interaction between two actors, people and their context in a mutual 'healthy learning process'.

The setting approach

The 'setting approach' in health promotion is often a combination of the name of the setting and the word 'healthy' or 'health promoting' – healthy cities, health-promoting schools, health-promoting hospitals or healthy prisons, for example. It has also been used in policy making – a healthy public policy. Life events are mirrored in previous knowledge and experience, finding what capabilities/resources are available internally or, who and what to engage externally to find a solution.

Being able to project the possible solutions into the future, evaluate what would be best approach in the long run, and maintain the confidence the problem can be solved with or without the support of people and the context, develops action competence²⁶, giving a broader repertoire to deal with life²⁷.

This is a deep process engaging the whole human experience of life, as such rather far from traditional health education.

Schools as health-promoting settings

Schools can be considered as the workplace for young people, arenas that make a substantial contribution to health and wellbeing. This has been recognised by many international initiatives, including WHO's Health Promoting Schools (HPS) and the European Network (ENHPS)^{28,29}. Ten principles are essential for HPS: democracy, equity, empowerment and action competence, school environment, curriculum, teacher training, measuring success, collaboration, communities and sustainability³⁰. All these characteristics could easily be integrated in the salutogenic framework.

Salutogenic research on the relationship between learning processes and health among young people is limited. However, some findings can be reported. What are then the essential characteristics of health-promoting environments? According to Knoop³¹ the learning process becomes most effective when:

- it is based on students' strengths and personal resources;
- it creates meaning and the new knowledge can be implemented in practice;
- the students are committed to taking responsibility for their learning;
- the environment is democratic and the learning is process-oriented.



Figure 6. Health in the 'river of life'

© Bengt Lindbom, Monica Erikson, Peter Wli



Bluewater Health | Sarnia, Ontario, Canada
Associate Architect: Starke Architects
Photo credit: Mac-Ly Lai, Bluewater Health

How do we use design as a catalyst for health?

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

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Figure 7. The impact of the Sense of Coherence (SOC) in a lifetime

All the characteristics coincide with the values and foundation of health promotion and salutogenesis. Paulus³², describing the development from health-promoting school to the 'good and healthy school', puts salutogenesis as one of the core principles, together with participation, empowerment, internal and external networking and sustainable initiatives for school development. Nilsson discusses in a doctoral thesis and an article the relationship between health problems and school success³³. According to Nilsson health promotion can be seen as school development³⁴. In the WHO's

Health Behavior in School Aged Children study among Norwegians (11-15 year olds), factors essential for the development of a strong sense of coherence were explored, such as a supportive school environment, adequate learning conditions and school-related stress³⁵. The results showed that a strong sense of coherence was the most important factor in explaining a good health development.

Workplaces as settings for health

Research results on salutogenesis and workplace health are generally encouraging

and will be useful in workplace health promotion practice. There are many studies demonstrating the impact of a strong sense of coherence on workplace stress³⁶⁻⁴⁰. A longitudinal study exploring the health promoting impact of the SOC in combination with the exposure to adverse working conditions showed an association between the SOC and work-related psychosocial factors³⁷. The main finding was that the SOC was strongly related to job demand-control, indicating that SOC is correlated to psychosocial work characteristics. Further, nurses employed in mental health services are reported to be at high risk for developing symptoms of mental distress because of occupational stress⁴¹. A strong SOC served here as a buffer, protecting the nurses against the development of mental health problems⁴².

The organisational climate and salutogenic ability correlates significantly with SOC^{43,44}. The findings showed that the individual's experience of a positive organisational climate was related to a strong SOC (comprehensibility, manageability, meaningfulness). Further, the SOC has an impact at the individual and group level in organisations. The SOC was used in group relations training of managers⁴³. People with a strong SOC had a better understanding of group dynamics, were better at using their generalised

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resistance resources to cope with anxiety and finally, found their experiences more challenging and meaningful than people scoring weak on SOC. In a recently finalised literature review in the Nordic countries on interventions of workplace health promotion and empowerment, the overall impression was that the participatory setting approach was seldom used⁴⁵. All this knowledge is encouraging and will be useful in workplace health promotion.

Policies as health promoting settings

As a sociologist, Antonovsky was well aware of the impact of social conditions within a society on people's health. There are mechanisms in a society that favour people with a better education, a good economy, a good social support and social integration. This elite will have better opportunities, which again may influence their structural SOC, although it does not automatically build a strong SOC.

However, if one promotes the ethical aspect of equity in relation to SOC, the scenery is different. In a lecture at the Nordic School of Public Health in Gothenburg in 1993, Antonovsky explicitly pointed out the responsibility of society to create conditions which induce the strengths of coping, ie, SOC. Eventually, coping well is not a question about the freedom of individual choice: the key is embedded in society, and

people who care about each other⁴⁶.

A further potential for the salutogenic framework on a societal level is to use it in the creation of Healthy Public Policy as a basis for realising Health in All Policies^{2,47-49}. This means the policy frameworks are used to construct the coherence needed to form healthy societies based on salutogenesis. The societal effect goes far beyond the health sector; affecting not only health services but all other key sectors simply by focusing on what factors and structures can produce a sustainable, coherent healthy direction in society.

Discussion

Since the early days of health promotion, the settings approach has been one of the most innovative and successful strategies of the Ottawa Charter. Globally, some of the largest ongoing and best-evaluated health promotion projects stem from the setting approach, such as the Healthy Cities project. In its early stages, many professionals outside the health sector participated and found it easier to understand this new approach than traditional health professionals. However, it has been hard for the latter to allow other professions to intrude in matters of health. Therefore one would need to introduce and use new concepts, such as quality of life, to open the health arenas for all. There is a further

need to improve health-promoting settings, because life continues to be more hectic and fragmented in the 21st century. New trends, largely unexplored from a health promoting settings perspective, are virtual settings such as social media (Facebook, Twitter etc). What is now needed is to put more emphasis on how the world – real and virtual – can form an entity towards coherence, improving their quality of life and giving people a sense of integration and belonging in the context of health and life.

We have here presented the theory and evidence of a salutogenic framework through Antonovsky's Sense of Coherence Theory as a new approach to health-promoting settings. At present this approach stands with the strongest evidence base for health-promotion effectiveness. Further research is needed to understand how settings-interventions in detail function within the salutogenic framework. However, the potential is there to move into a broader world than traditional health – perhaps engineering a New World looking for, not only health, but life-promoting settings.

Authors

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Healthy Homes and Cities: **A Prescription for the Prevention and Treatment of Childhood Asthma?**

Environmental factors have been shown to play an important role in the prevention of childhood asthma. Moving beyond successful interventions within patients' homes, community-based initiatives are now gaining ground

Dr Behrooz Behbod, MB ChB MSc

Asthma is the leading cause of hospitalisation in children, and the most common reason for days lost from school in developed nations, with its prevalence steadily rising over the past three decades. It has been estimated that about 300m people worldwide have asthma, increasing to 400-450 m by 2025^{1,2}.

Genetic predisposition alone cannot explain this trend, highlighting the importance of environmental exposures³. Traditional pharmaceutical approaches cost \$37.2 billion annually in the US⁴ and £7.7bn (~\$27bn) in Europe⁵. Can we use home- and community- based interventions to modify exposures, optimise respiratory health, effectively prevent and treat asthma, while at the same time saving money?

In 2009, the acting US Surgeon General published a call to action to promote healthy homes, stating that they are "sited, designed, built, renovated and maintained in ways that support the health of residents"⁶. On average, we spend at least 90% of our time indoors, where levels of many airborne pollutants may be much higher than that found outdoors⁷. The Institute of Medicine has identified several indoor environmental exposures that are associated with asthma, including pet, cockroach, and dust mite aeroallergens, fungi, and environmental tobacco smoke (ETS)⁸. A recent Harvard study suggests that volatile organic compounds (VOCs), commonly found in household cleaners and paints, may increase risks of asthma and other allergic diseases⁹. A holistic perspective includes the psychosocial¹⁰ and nutritional¹¹ environments, as well as physical inactivity and obesity¹², all known to be associated with asthma.

Strategies for prevention

Approaches to prevention can be classified as primary (elimination of risk factors before causing disease), secondary (early diagnosis and treatment of existing disease) and tertiary (limitation of disease effects). Such interventions have typically targeted children born to asthmatic or allergic parents, and therefore vulnerable to developing asthma. While we know that allergen exposure can lead to sensitisation, we still have insufficient evidence of a direct relationship between allergen exposure and the causation of allergic disease. Furthermore, exposures may also act as respiratory irritants, while questions surround the possibility that certain doses and times of specific exposures may be protective, and therefore their reduction



Anshen + Allen's Great Ormond Street Hospital, London: asthma is the leading cause of child hospitalisation



The Asthma and Allergy Foundation of America named Atlanta the worst city for asthma sufferers to live in: can the city's \$2.8 billion BeltLine project, which will see the redevelopment of a former railway corridor to provide parks, trails and a new public transport system, help to turn the tide?

may lead to unwanted increases in the risk of asthma. Primary prevention is therefore very controversial, with current studies still in their infancy¹³⁻¹⁸. Nevertheless, it is worthwhile following their long-term results before we consider recommending their widespread use for at-risk children.

The secondary and tertiary prevention of childhood asthma has gained more acceptance by the medical community, with many notable studies offering remarkable results. The Inner City Asthma Study included 5-11 year-olds across seven US inner-city areas with high levels of poverty¹⁹. Each child suffered from physician-diagnosed, poorly controlled moderate-to-severe asthma together with at least one positive skin sensitisation test. They were administered a one-year intervention, tailored to the child's sensitisation and exposure status, and included advice on the reduction of ETS exposure along with the education of the parent or caregiver. The active group

was given allergen-impermeable mattress/pillow encasings and high-filtration vacuum cleaners, while the control group was not given a placebo. Over a two-year period, the active group showed significant reductions in dust mite and cat allergen exposures, along with more symptom-free days, predominantly in those children with at least 50% reductions in allergen levels. Furthermore, during the intervention year, there were significantly fewer emergency room visits in the active group.

In another key study in Seattle, a continuum of strategies operating at multiple socio-ecologic levels was employed to reduce exposure to indoor environmental exposures in the homes of low-income families with asthmatic children²⁰. The Seattle-King County Healthy Homes Project included two levels of home visits by community health workers (CHWs). In the high-intensity intervention group, the CHW conducted initial structured home

environmental assessments, formulating and prioritising specific actions for each family. The CHWs were responsible for assistance in gaining approval for required landlord repairs and referrals to Public Health Environmental Inspectors for exposure reduction protocols. The CHWs returned to these homes on seven subsequent visits to encourage caregivers to comply with their action plans, provide additional education and offer social support. On the other hand, the low-intensity intervention group received only one CHW visit. As expected, the high-intensity intervention yielded significantly greater benefit in caregiver quality-of-life, with a significant decrease in urgent health services. An excellent innovative project from this group, the Medicaid Assisted Program for Children²¹, illustrates an option for physicians to prescribe environmental interventions for asthmatic children from low-income families.



Effective urban planning should encourage healthy behaviour such as walking

The Task Force on Community Preventive Services recommends the use of home-based multi-trigger, multi-component environmental interventions for asthmatic children and adolescents, based on their effectiveness in improving overall quality of life and productivity²². The overall goal of these interventions is to reduce exposure to multiple indoor asthma triggers, including respiratory allergens and irritants. In a systematic review of 23 studies, they found significant improvements in asthma control, including a median decrease of 21 symptomatic days and 12 fewer missed

school days per year. Based on an economic review of 12 cost-benefit studies, minor-to-moderate remediation showed a return of \$5.3 to \$14.0 for each dollar invested (2007 US dollars).

Outside the home

It is imperative to highlight the 2009 Surgeon General's emphasis that the "surrounding neighbourhood and community are also important aspects of healthy homes"⁶. International studies have shown that asthma is more common in urban than in rural areas²³⁻²⁸. Such differences may be

due to urban environmental exposures, as was observed during the reunification of East and West Germany in 1989, providing the opportunity to compare two genetically similar populations that have been exposed to highly different levels of air pollution²⁹. Efforts to reduce downtown traffic congestion in Atlanta during the 1996 Olympic Games resulted in decreased traffic density, which was associated with a prolonged reduction in ozone pollution and significantly lower rates of childhood asthma exacerbation³⁰.

Along with increasing urbanisation, deforestation and our dependence on fossil-fuel sources of energy, there is also a serious threat from global climate change (GCC), due to the well-established link between climate and many aeroallergens³¹. Increased atmospheric carbon dioxide levels, warmer temperatures and earlier springs may promote faster and prolonged plant growth together with increases in pollen quantity and allergenicity. GCC may therefore indirectly aggravate the exacerbation and development of asthma³².

Although urban environments consist of respiratory risk factors, there is also growing evidence in favor of the 'hygiene hypothesis'^{33,34}, suggesting that microbial exposures associated with rural lifestyles may promote the healthy development of infant immune systems and protect against

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asthma^{35,36}. As we may not all be able to live on farms, it is worth considering the salutogenic model^{37,38} for urban community design³⁹. The principles of healthy built environments are well described⁴⁰⁻⁴³, and have been advocated by the American Academy of Pediatrics⁴⁴. This approach focuses on wellness factors targeting child health, which intrinsically address the multiple risk factors associated with asthma, such as increasing social connection and sense of community, which may help alleviate crime and psychosocial stress¹⁰, improving access to healthy food¹¹ and opportunities for physical activity to prevent obesity¹², as well as enhancing air quality to promote optimal respiratory health and contribute to the mitigation of anthropogenic climate change.

Encouraging healthier lifestyles

In their book *Nudge: Improving Decisions about Health, Wealth, and Happiness*⁴⁵, Richard Thaler and Cass Sunstein discuss an example of 'choice architecture', where healthy foods are placed at eye level in a school cafeteria, while less healthy junk foods are positioned in harder places to reach. As a result, children are 'nudged' to select the healthier foods, without completely removing their freedom of choice. Policies that help make communities more conducive to healthier lifestyles have

been encouraged by the US Department of Health and Human Services' Healthy People 2020 programme⁴⁶.

Assistant Secretary for Health, Howard K. Koh, MD, MPH, was in Boston recently, where he previously served as the Massachusetts Commissioner of Public Health, to launch the Act FRESH Campaign⁴⁷. Sponsored by Senator Jamie Eldrige, the bill aims to promote healthy community design through comprehensive zoning plans, including mixed commercial-residential districts that promote walking and cycling and improve access to healthy food. While Boston is known as America's 'walking city' and may already possess good public transportation networks, The Atlanta BeltLine, Inc.⁴⁸ illustrates an excellent use of integrative urban design approaches in a city known to suffer from urban sprawl, traffic pollution, and high rates of childhood asthma. A principal feature behind the success of this project has been the community's engagement in all aspects of its design and implementation.

In conclusion, the health and economic benefits of home-based environmental interventions for the secondary and tertiary prevention of childhood asthma have been demonstrated. Future research is required to explore the marginal contributions of particular components, as well as the required intensity for effective programmes.

While this may apply to architects designing homes and medical facilities for asthmatic children, the broad application of exposure modification strategies for the primary prevention of asthma cannot yet be endorsed. Community-based approaches are now gaining traction as a result of the effective multi-disciplinary collaboration between architects, engineers, healthcare scientists and practitioners, policymakers economists and the general public. Through the use of rating systems⁴⁹ and health impact assessments^{50,51}, we can continue to identify, implement, evaluate and improve the efficacy and efficiency of urban design strategies for the prevention of asthma and the promotion of optimal pediatric health.

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Patient care

Designing for multidisciplinary rounding practices in the critical care setting

Rounding is critical to developing integrated care plans, and there is a trend for moving daily rounds from the bedside to conference rooms. This study's aim was to document staff preferences for the location of rounding practices, and to determine the effect of available space on those preferences

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Medical rounds provide healthcare professionals with the opportunity to develop an integrated plan of care¹. In this forum, the goals are to share information, address patient problems, plan and evaluate care, increase learning opportunities for team members, and ultimately enhance the quality of patient care². It is often the only opportunity for the patient and their family members to be informed of various care issues and to have the opportunity to ask questions of their care team³. Therefore, medical rounds serve as the foundation for information exchange between parties invested in the patient, and thus effective collaboration during this process is critical to enhancing decision making and the quality of patient care⁴.

In the intensive care unit (ICU), rounds



Figure 1: Conference-room rounds



Figure 2: Bedside rounds

occur in various formats, including daily multi-disciplinary rounds⁵, where members of the disciplines represented include the attending physician, residents, medical students, nurse practitioners, bedside nurse, charge nurse, respiratory therapist, pharmacist and nutritionist. Services such as case management, social work, physical therapy, occupational therapy and the chaplaincy may also be represented⁶.

The demands on healthcare professionals to provide safe, effective, high-quality patient-centred care, in addition to maintaining a teaching culture and meeting the educational requirements of medical students and residents, are increasing. Given this increased emphasis on patient-centred care, it has been proposed that new models for hospital 'work rounds' need to be developed⁶. The rounding team must often contend with noise, repeated interruptions and, frequently, a corridor for a classroom⁷.

The primary aim of this study was to determine the preference of the Surgical ICU (SICU) multi-disciplinary team for either bedside or conference-room rounds. Conference-room rounds were defined as an initial exchange of patient data and education in a conference room with all members of the multi-disciplinary team being present, including the attending physician, residents, medical students, nurse practitioners, bedside nurse, charge nurse, respiratory therapist, pharmacist and nutritionist, followed by bedside rounds with the attending physician, residents, nurse practitioners, bedside nurse and the patient (with or without their family) being present (Figure 1). The conference room where rounds occurred was outside of the SICU. Bedside rounds were defined as the above occurring solely at the bedside and within the unit corridors between patient rooms (Figure 2). We hypothesised that

the team would prefer conference-room rounds. A secondary aim was to determine if physical space played a role in this preference for rounding communications. We hypothesised that physical space would play a role in this preference.

Materials and methods

This was a prospective observational study designed to evaluate the multi-disciplinary rounding practices in the SICU at The Methodist Hospital, a tertiary care academic referral centre in Houston, Texas. The SICU is a 27-bed adult unit that serves a diverse group of patients including critically ill general, vascular, oncologic, transplant, thoracic, orthopaedic, plastic, urologic, and head and neck surgical patients.

A multi-method research design was used, including focus groups, an online survey and direct observations. Study participants included members of the SICU Team (attending physicians, a nurse practitioner, bedside nurses, charge nurses, respiratory therapists, a pharmacist, a nutritionist, a case manager, a social worker, a physical therapist and a chaplain).

Focus groups were conducted over two sessions (attending physicians were interviewed separately from the rest of the multidisciplinary team in order to limit potential bias due to any workplace hierarchy). The questions centred on the definition and process of rounds, the patient care model and the physical environment (Figure 3). The sessions were audio/video recorded for accuracy and transcribed verbatim for subsequent analysis which followed a seven-step method for the analysis of qualitative research based on phenomenological methodology⁸.

The survey was subsequently developed based on the focus group themes. Data surveyed included participant demographics,

a general characterisation of the SICU rounding practice, a comparison of bedside and conference room rounds and the identification of environmental factors that promote or inhibit the rounding process.

Rounding practice observations were used to confirm the aforementioned. Surgical ICU multi-disciplinary rounds were observed on two separate occasions. The observations were documented and recorded in the form of a journal. This process allowed for descriptions of experiences and events as they occurred, along with interpretations, enabling critical reflection of the rounding process within the unit's physical space. This multi-modal technique provided strength in the research design, enhancing its validity by compensating for any inadequacies of the individual methods or measures presented in the study.

Data were also collected on the SICU's architectural design, including computer-generated floor plans, which were used in a room-by-room area analysis to document the detailed functional programme with net square footage of each room and departmental gross square footage of the unit. Protocol for the area take-offs was based on the *Analysis of Departmental Area in Contemporary Hospitals: Calculation Methodologies & Design Factors in Major Patient Care Departments*⁹.

Descriptive statistics will be reported as mean ± standard deviation for normally distributed continuous data, medians with inter-quartile ranges for non-normally distributed continuous data, and percentages for categorical data. The study was approved by The Methodist Hospital Research Institute Institutional Review Board.

Results

The focus groups were attended by all five attending physicians who practice in the SICU and, separately, 12 non-physician SICU multi-disciplinary team members with representation from nursing, respiratory therapy, nutrition, social work and chaplaincy. Analyses of the focus groups identified five themes (with sub-themes) for further survey. These included patient safety, communication, information technology, efficiency and inefficiency (Figure 4).

Fifty-four SICU multi-disciplinary team members completed the online survey, a 65% response rate. The mean age of

Focus Group Questions	
1) Can you define the process of rounding from the viewpoint of your role in the ICU?	
2) How are daily rounds conducted in the surgical ICU?	
What time do they begin? How many times per day are rounds conducted? How long do they last? Who determines how rounds are conducted? How many people generally participate in this process?	
3) For those people who have been working in the surgical ICU for the past 8 years, how has the process of rounding changed over time?	
4) How is the multidisciplinary team accommodated during rounds?	
5) Is there family involvement in the rounding process?	
In what way is this an advantage? In what way is this a disadvantage?	
6) What are some factors that <i>inhibit</i> the rounding process in the physical environment?	
7) What are some factors that <i>promote</i> the rounding process in the physical environment?	
8) Do you think the existing unit allows all members to participate equally on rounds?	
9) How do you think the rounding process contributes to quality in patient care delivery?	
10) How do you think the rounding process promotes patient safety?	
11) For those people in the room who have worked in the field less than 5 years, what features of the rounding process contributes most significantly to the learning process?	

Figure 3: Focus group questions

Focus Group Themes	
Safety	A condition that is safe from medication errors and misdiagnosis.
Communication	The transfer of information from one of the multidisciplinary team members to another regarding the status of a patient in relation to the formulation of a care plan.
Information Technology	Equipment used in the healthcare setting which electronically stores and communicates information regarding the patient's physiologic status.
Efficiency	The undertaking of a certain task or procedure that contributes to the timeliness in patient care delivery and a patient's transition of care.
Inefficiency	Any action or condition that impedes the timeliness of care or transfer of information from one multi-disciplinary team member to another regarding the patient status and care plan.

Figure 4: Focus group themes

respondents was 39.3±10.7 years and 83% were female. The majority of respondents were bedside nurses (46%) with 7.0±5.8 years of experience in the SICU. Figure 5 shows the participant breakdown by clinical speciality. In characterising the SICU rounding practices, participants indicated that 9.5±3.0 SICU multi-disciplinary team members attended daily rounds that lasted for 3.3±1.1 hours.

Fifty-seven percent (57%) of respondents felt that all SICU multi-disciplinary team members shared in the decision-making process during rounds, while 64% reported open communication during the process. Perceived barriers to effective communication included background noise

(92%), lack of physical space (90%) and the size of the SICU multidisciplinary team (95%). Twenty-eight percent of respondents indicated that upon the completion of rounds, they always understood what work needed to be accomplished to get the patient to the next level of care; similarly, 12% stated that they always had a clear understanding of the care plan/goals for each patient at the end of rounds. That being said, only 50% of SICU multidisciplinary team members were 'very satisfied' or 'satisfied' with the care-planning outcome of rounds the majority of the time, and 50% wished to change the SICU rounding process.

Regarding the physical environment of the SICU, the width of the hallway (75%),

size of patient room (48%), rooms with multiple patient beds (82%) and background noise (70%) were listed as major inhibitors to the bedside rounding process. Figure 6 outlines the architectural barriers/facilitators to bedside rounds identified by SICU multidisciplinary team members through the survey process.

Fourteen survey questions specifically compared bedside to conference room rounds. Overall, bedside rounds were preferred except in regards to providing adequate space for the entire SICU multi-disciplinary team during rounds and avoiding Health Insurance Portability and Accountability Act (HIPAA, 1996) violations where conference room rounds were preferred 88% and 77% of the time respectively (Figure 7).

Discussion

Rounds provide healthcare professionals with an opportunity to develop an integrated plan of care and thus serve as the foundation for information exchange between parties invested in the patient, and thus effective collaboration during this process is critical to enhancing decision-making and the quality of patient care⁴.

In the ICU, rounds occur in various formats, including daily multi-disciplinary rounds⁵. The cornerstone of multi-disciplinary rounds is communication. Communication is critical to patient safety. In an analysis of 646 ICU safety incidents involving adult medical patients and 707 incidents involving adult surgical patients, problems related to communication, clinical management, and ICU management were a factor greater than 50% of the time¹⁰.

In the study, the majority of survey respondents felt that bedside rounds were

preferred over conference-room rounds with respect to encouraging communication with other physician consultants (72%), facilitating patient transfers (41%), facilitating the formulation of a diagnosis (44%), providing the most efficient patient care (49%), promoting communication with family members (82%) and improving overall patient safety (38%). Focus group comments reinforced these aspects.

Numerous studies have documented the benefits of multidisciplinary rounds. Sisterhen et al. demonstrated reductions in cost and length of hospital stay and improved provider satisfaction with communication when comparing bedside interdisciplinary rounds to physician-only rounds on general medicine units⁶. An increased frequency of multi-disciplinary rounds has similarly shown reduced mortality rates⁵. The benefits of having a pharmacist on rounds have also been documented on both general medicine units and ICUs¹¹⁻¹⁴. Not surprisingly, in 2005 Vazirani et al. demonstrated that multi-disciplinary rounds in an acute care setting improved ones' satisfaction with the care delivered for physicians, nurses and patients¹⁵.

A study of critical care nurse-physician interactions demonstrated that each communicated in different spatial locations within the unit⁴. The effect of both space and mobility on the rounding process was noted in this analysis: nurses tended to conduct their work at the bedside, where their communication was interspersed with constant interruptions, whereas physicians carried out patient care decisions in private spaces, free from such interruptions.

Our study results are concordant with this finding. It also most probably explains the repudiation of our primary hypothesis

that SICU multi-disciplinary team members would prefer conference room rounds. In the study, the conference room where rounds were conducted sits one floor below the unit, making it near-impossible for the nursing staff to attend the conference room rounds. Furthermore, many of the bedside nurses did not feel comfortable leaving their patients' bedside. With 46% of our respondents being bedside nurses, this swayed our results.

This also explains our results surrounding the ability to hear what is being said during both rounding instances, as shown in Figure 7. We presumed that noise would be a negative factor during bedside rounds, thus leading the SICU multi-disciplinary team to prefer conference-room rounds in this instance. Interestingly, 63% of respondents felt that bedside rounds allows one to hear all that is being said during rounds, versus only 22% for conference-room rounds.

With this knowledge, it is understandable why bedside rounds have created conflicts in regard to these dynamics, as interruptions to patient-care activities affect the extent to which bedside nurses can participate in the ongoing patient care dialogue. As such, observational studies have documented a decline in bedside rounds beginning in the 1960s^{16,17}. By the 1980s, a trend had begun to move clinical teaching away from the bedside and into the conference room.

Design considerations

While the impact of the physical environment on teamwork among caregivers is emerging, earlier studies on the physical space in corporate offices and research laboratories have documented an association between physical design, communication and teamwork¹⁸⁻²⁰. According to Rashid (2006), the layout of an ICU is arguably the most important design feature affecting all aspects of intensive care services, including staff working conditions. Layout determines the location and configuration of different spaces and/or functions within a unit, impacting how a function is performed and how internal and external functions relate²¹.

The current study was conducted in an ICU built in 1982, which is 'racetrack' or 'double-corridor' in design typology, implying service areas in the centre and patient beds on the perimeter with a loop corridor space in between (Figure 8). Patient rooms are single occupancy, with two open wards

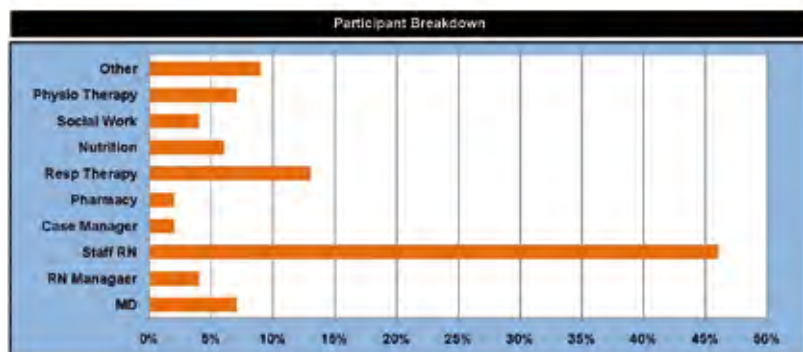


Figure 5: Participant breakdown

containing five and six beds respectively. This design results in missed opportunities for the attending physicians to interact with primary physicians and consulting physicians. This issue was expressed in both of the focus groups and the survey results.

Many newer ICUs have been designed to incorporate conference rooms within the unit itself. Examples include two recently renovated ICU projects in the US, Emory University Hospital Neurosciences ICU in Atlanta, Georgia, and Memorial Sloan-Kettering Cancer Center's ICU in New York, New York. Both units were acknowledged to be best-practice examples of critical care unit design as winners of an annual ICU design competition²².

A recent analysis of the ICU design competition winners included 12 adult ICUs built between 1990 and 2007. The study identifies trends in critical care design, one of which includes the incorporation of more administrative and meeting spaces directly within units in order to limit staff travel distance when meeting to discuss patient care²³. The study notes that space allocation for administrative and educational areas within units appears to be on the rise, most notably in academic medical centres where teaching is an integral part of daily ICU activities. Conference and rounding rooms incorporating advanced technology to allow for remote patient care planning is likewise being seen more frequently²³.

Staff work areas are a fundamental part of ICU design, and although the culture of ICUs has always encouraged improvements for patient care, it has not always attended to staff working conditions²¹. The role of user group sessions in order to identify rounding practices and preferences can be important within this complicated design context. At Emory University Hospital Neurosciences ICU, one of the attending physicians prefers a mobile rounding method featuring wireless computers on wheels (COWs), in addition to rolling stools and writing surfaces, while another uses the decentralised positions outside pairs of patient rooms, and then takes the entire multi-disciplinary team into a conference room for a thorough discussion of cases. The design of this award-winning unit allowed for spaces to accommodate both rounding styles²⁴. The location of staff work areas in relation to patient care areas does not appear to be fully resolved in an analysis of

best-practice example ICUs²¹. It is perhaps not yet known which unit configurations most effectively balance patient care with staff needs, especially with the changing nature of rounding to include technology and large multi-disciplinary teams.

Although previously published ICU design guidelines²⁵ do not emphasise the practice of rounding, recent revisions (currently under peer review) call attention to work areas that accommodate multi-disciplinary staff, recognising the benefits to quality of care, in addition to a subsection describing "documentation and review", where the process of rounding as an integral activity to the daily functioning of a unit is discussed²⁶.

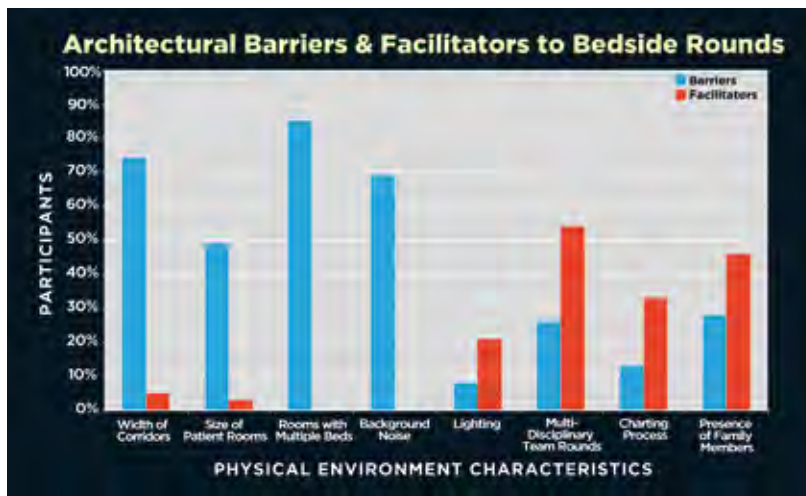


Figure 6: Architectural barriers and facilitators to bedside rounds

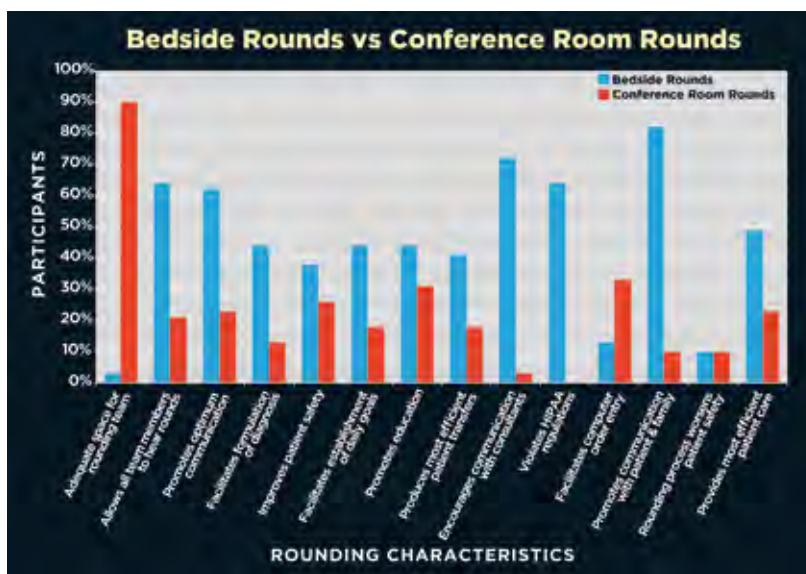


Figure 7: Bedside rounds versus conference-room rounds

Study limitations

There were several limitations to this study. First, the SICU where the study occurred is an outdated unit in terms of its overall design and space allocation per patient. The unit does not meet current hospital design standards with respect to patient room size, according to the 2010 Facility Guidelines Institute (FGI) *Guidelines for Design and Construction of Health Care Facilities*, used by the majority of architects and planners in the US and Canada. The guidelines stipulate that each critical care patient space (whether separate rooms, cubicles, or multiple-bed space) shall have a minimum clear floor area of 200 square



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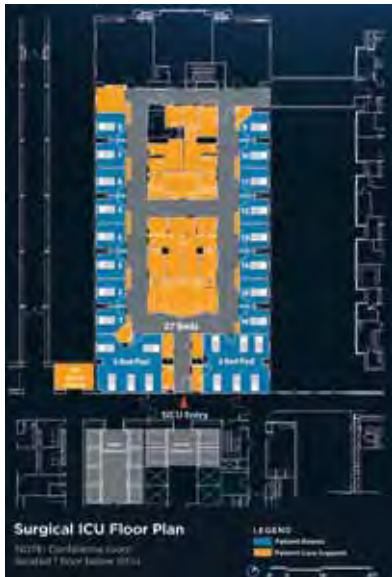


Figure 8: The floor plan for the ICU in the study

feet for all new construction, with every effort to meet these minimum standards for renovation projects²⁷. The SICU in this study had an average single patient room size of 170 net square feet, defined as the clear, usable floor area, measured as the space within the walls of a room⁹. The area for beds within the two-ward rooms on the

unit averaged 150 square feet per bed, also below current standards. Corridor widths in the SICU are 8'-0" clear, which comply with the International Building Code (IBC) minimum means of egress requirements for patients in a healthcare occupancy²⁸, but were felt by staff to be inadequate for bedside rounding practices.

Given the smaller spaces and the large size of the SICU team, rounding in open wards or within the corridor becomes a challenging exercise, which may have influenced results. An additional limitation may be the fact that nursing staff, who are unable to easily leave the bedside to attend rounds in the downstairs conference room, comprised the majority of the survey respondents: this may be one of the reasons for the unexpected results obtained for the bedside rounding preference.

Conclusions

Multidisciplinary rounds are a patient-centred model of care, emphasising safety and efficiency, which enable all members of the team caring for patients to offer individual expertise and contribute to patient care in a combined fashion.

Flexibility in the design of the critical care unit is necessary to promote teamwork

during rounds and adaptability. The relevance of this study approach provides a greater understanding of spatial requirements in order to allow for and accommodate these flexible spaces. Given that variation in the practices of unit round delivery was found within the same unit, the notion of requiring flexibility in designed spaces is supported.

The current study demonstrates multi-disciplinary staff preferences for rounding to occur at the bedside, in close proximity to the patient. Further study is needed to determine if bedside rounds may still be preferred when a conference room is located within the ICU. Further investigation specifically exploring the reasons staff did not feel satisfied with their understanding of care planning at the completion of rounds is needed. Larger samples in a number of different ICU settings may yield more information on rounding preferences.

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When asked to review this powerful, exquisite visual essay on the history of the world of mental illness, I considered the parallel perspective of a 'lay person' and that of my own as an architect who has been working extensively in the field of mental healthcare.

Haunting, sad, melancholy, disturbing, frightening, horrifying and cruel are all words that reflect how most of us imagine the mental health institutions of the old days, through the depiction in films such as *One Flew Over the Cuckoo's Nest* or *Amadeus* – fictional accounts that reinforce and perpetuate the stigma of mental illness.

For anyone approaching this book with the common wisdom that "one can not judge a book by its cover", Christopher Payne's provocative photograph of a straightjacket overlaid with the word ASYLUM conjures up all the stereotypical images normally associated with the subject matter that still remains taboo. Ironically, *Asylum's* coffee-table-book appeal invites one to venture beyond the cover, albeit with a twinge of unease in anticipating its content. The book's most significant contribution, more than its poetic visual presentation, is how it opens our eyes to mental illness. It confronts us with our lack of understanding, empathy and awareness of the life of someone afflicted with mental disorder.

From Oliver Sacks' enlightening essay we learn that the original 'insane asylum' was the gift of high-minded philanthropists to create a true place of refuge for those suffering from mental disorder. Based on a model established in Europe at the beginning of the 19th century (the model of 'moral treatment'), Thomas Story Kirkbride instigated the 'guidebook' for the construction of most American mental hospitals at the time. As a hospital superintendent, he believed that a well-designed

and beautifully landscaped facility, often in a working farmstead setting, could heal mental illness.

This ideal notion of a therapeutic environment failed miserably when the state asylums became severely overcrowded and understaffed. Oliver Sacks' essay quotes Erving Goffman, author of the book *Asylums*, who describes these mental hospitals, by the 1950s, as "total institutions" where "there is an unbridgeable gulf between staff and inmates, where rigid rules and roles preclude any sense of fellowship or sympathy, and where inmates are deprived of all autonomy or freedom or dignity or self, reduced to nameless ciphers in the system."

Seen through Payne's eyes as an architect, the evocative photos of sunlit and silenced corridors, abandoned personal belongings, courtyard gardens overgrown with ivy, the cage-like enclosure on

The book confronts us with our lack of understanding, empathy and awareness

the forensic ward and the unclaimed urns of ashes on shelves – a world closed within the walls of these grand and stately institutions – compel one to ask: what went on and what went wrong?

From an architectural perspective, the historic pendulum-swing in clinical treatment approach to mental disorder has been met with 'reactionary' and ever-changing design solutions over the last two centuries. The poignancy of Payne's eerily beautiful documentation speaks volumes about the lessons we can learn from the era gone-by.

The evident shortcoming of the original asylum concept being its formulaic template, creating massive institutions that do not foster a normalised experience for those receiving treatment. It is not conducive for creating a sense of community in a more intimate setting. However, the positive aspects of the physical environment – "high ceilings, lofty windows, spacious landscaped grounds providing abundant light and fresh air, promoting physical exercise and wellbeing" – continue to be the essential planning and design priorities today.

Two thought-provoking images are the juxtaposed photos of an open nurse station and one that is enclosed, each positioned with different degree of 'visual observation' of the wards. This element of frontline clinical care, more than a century later, continues to be at the forefront of ongoing discourse about planning and design. As an architect fully immersed in this dialogue over the past ten years, I can hear the echo of the discussion in the corridors of peeling paint and abandoned work stations in Payne's images.

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Asylum: Inside the Closed World of State Mental Hospitals

Christopher Payne

MIT Press, 2009

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