



A Narrative Essay on the Relationship Between the Biopsychosocial Model of Health and the Built Environment

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Abstract

A correspondence between a Designer and a Neurologist, presented as a narrative essay on the relationship between the biopsychosocial model of health and the built environment. The discussion addresses how architecture, specifically that of the hospital, can apply scientific principles to understand how designed environments shape health behaviours and outcomes, bridging the gap between medical treatment and the architectural framework that supports it. It examines the benefits of utilising design as the ‘third carer’—enabling it to actively support a patient’s medical team (first carers) and family and friends (second carers) facilitating nurturing interactions and anticipating the needs of its occupants—exploring its potential to create inclusive clinical spaces that are adaptable, sensorially engaging, domestic in scale, colour and tactility, well-lit, acoustically controlled, and permeable to the natural world. The scientific understanding of illness has moved beyond strictly molecular and surgical models to a realisation that health is a combination of

biological, psychological, and social factors. Therefore, the essay investigates the notion of the hospital as a tool for urban regeneration and the connections between the socio-economic and environmental factors that are vital to the success of medical treatment and the larger goal of health creation, exploring how our understanding of these connections can help re-imagine a built environment with the power to give users greater agency, better care and more control, enhancing health, welfare and quality of life.

Keywords

Healthcare · Hospitals · Neuroscience · Biophilia · Sustainability · History · Future

27.1 Introduction

In the video introduction to this conference, architect Jan Gehl recounts the story of the mid-19th-century cholera outbreak in Copenhagen. In the decades preceding that outbreak doctors had warned about overcrowding and unsanitary living conditions in Europe’s city centres but Copenhagen, bounded by a city wall and building restrictions, was unable to adapt. When cholera hit on 11 June 1853 the loss of life was rapid and catastrophic. By October of that year, 7,219 people had been infected, of whom nearly 60% died.

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It is important to contextualise the science here. In the early nineteenth century germ theory was still in its infancy. The idea that tiny invisible creatures could invade our bodies to cause illness was, to most physicians, laughably unscientific. It was not until 1880 that Louis Pasteur would demonstrate the role that living microorganisms played in disease, and several decades more until this new understanding of hygiene would be widely accepted beyond the laboratory.

In that setting, a collaboration between doctors and architects must have been a revolutionary act. Bridging the cultures of science and design would have required open-minded curiosity, a sensitivity to language, and an ability to set aside short-term thinking in favour of long-term solutions. The housing development that resulted from this collaboration, Gehl tells us, remains one of the most successful urban developments in Copenhagen today.

The conversation that follows pays homage to that spirit of transdisciplinary collaboration. Ab Rogers is a designer and the principle of Ab Rogers Design, and Ash Ranpura is a neurologist and cognitive neuroscientist. Here, Rogers and Ranpura examine the historical and cultural forces that have shaped hospitals in the past and how changes in the scientific understanding of disease will shape the hospitals of the future. They then discuss specific details of their 'Living Systems' health centre design, which offers practical solutions to some of these theoretical concerns. Finally, the pair offer an optimistic view of the hospital as a 'Third Carer,' in collaboration with medical teams, families and the community, an institution integrated into the city rather than adjacent to it. Their dialogue concludes with a discussion of where we place value, both economically and morally, in the public space.

27.2 Neurologist: Part One

I'd like to start our conversation by thinking a little bit about the history of hospitals, to give us a sense of where we've come from and where we're going.

The word hospital shares its roots with the words hotel and hospitality, and it implies a place of rest and refuge. For centuries, this is about all hospitals were able to provide. While the wealthy could pay physicians to visit them at home when they were sick, the poor had to rely on charitable social institutions. In 1123 A.D., St. Bartholomew's Hospital opened in London under the cumbersome title of 'House of the Poore in Farringdon in the suburbs of the City of London of Henry VIII's Foundation.' At the time, Bart's (as it is now affectionately known) offered little more than a clean bed and decent food for the poor. Given the squalor these patients would otherwise have faced, the clinical environment that Bart's offered, however humble it may seem in hindsight, saved lives.

With the success of the Industrial Revolution in the early nineteenth century hospitals began to change from simple places of rest into technological factories for health. Doctors imagined the body as something like a mechanical device, operating by means of biological levers and gears and hydraulic tubes. Surgery became the dominant activity in the hospital—often with dire consequences for patients, whose post-surgical care was not generally considered an important part of the process. The hospital was no longer a place of rest and refuge but a clinical-industrial site where heroic doctors defied fate with dramatic and often bloody interventions.

The twentieth century brought us new optimism and the dizzying progress of the Atomic Age. Medicine first became cellular, then molecular, then nuclear, and most recently genetic. Nearly 900 years after its founding as a house for the poor, Bart's today is a centre of science and technology, where advanced diagnostic techniques can visualise the hallmarks of disease straight through flesh and bone, and keyhole surgery is performed with robots and lasers. And while the progress of medical technology at a hospital like Bart's is astonishing and undeniable, I can't help feeling that something important has been lost along the way. We have forgotten about the hospital's social mission.

Slowly and haltingly, a new era is dawning in medical practice, one in which clinicians seek to

take advantage of technological progress without forgetting the lessons of the past. Rather than an industrial age mechanical model of disease or an atomic age molecular one, clinicians today understand sickness and health using a ‘biopsychosocial’ model. In this conception, sickness results when a biological factor affects a patient within a psychological framework situated within a social and political context. So, for example, a shift worker with few other options ends up working nights. This results in a circadian rhythm disturbance and mild immune dysfunction. Perhaps they smoke and suffer from a poor diet as well, leaving them susceptible to the occasional viral respiratory infection. Unable to take time off work to rest, the worker may have a very prolonged recovery period during which they are vulnerable to bacterial superinfection. Ultimately this would lead to pneumonia and severe cardio-respiratory disease. On presentation to the hospital, what is the doctor to say caused their illness? The bacterial infection? The viral infection that preceded it? Smoking and the psychology of addiction? The relentless tyranny of overnight shift work and disrupted sleep? Or the socio-economic circumstances that put them at risk in the first place?

This sort of joined-up, multifactorial thinking represents the next evolution in medical science. We no longer need industrial factories that manufacture health, and we are starting to see the limits of gleaming clinical temples devoted to science and technology. The healthcare of the future will focus on relationships: the relationship between the patient and the healers, and the relationship between the hospital and the community around it. Doctors and architects have to come together to devise new solutions built on this new understanding of sickness and health.

27.3 Designer: Part One

I agree that working together with doctors and architects can achieve a lot for healthcare—as evidenced in Copenhagen—and I think this collaborative approach can go even further, building a collective intelligence sourced from patients,

doctors, nurses, engineers, designers, urbanists, architects, artists, acoustic, and lighting specialists and cultural producers, to generate solutions as complex and faceted as the people they serve.

Only the expanded vision afforded by a fully collaborative approach can enable us to consider the hospital from inside to out, exploring its potential as a public institution and as a conduit of care, examining every element of its user impact—from patient experience and staff welfare, outward to its role and influence on our cities and communities.

The latter is more vital than ever given the move towards a biopsychosocial model of health. As you explain, the connections between a person’s health and their socio-economic and environmental circumstances are vital to the success of medical treatment and the larger goal of health creation. A greater understanding of these connections can help re-imagine a built environment with the power to give users greater agency, better care and more control, enhancing health, welfare and quality of life.

To serve this approach to our health the hospital cannot continue to function as an isolated machine solely dedicated to delivering clinical services and logistical processes. It must focus on the humans at its heart, sitting at the centre of their community, supporting staff, facilitating nurturing interactions, and anticipating the needs of its occupants.

We can think of a patient’s care as being primarily provided by a medical team (their first carers) and through the presence and support of their family and friends (their secondary carers). In developing ‘The Living Systems Health Centre’—our winning proposal for the 2021 Wolfson Economics Prize, we considered how a health centre itself might become a patient’s ‘third carer,’ (Fig. 27.1) supporting doctors and nurses in delivering the science of treatment as well as the art of care.

This health centre is fuelled by a marketplace that sits on the ground level, while above, a raised public park offers access to nature—space to contemplate, relax, socialise, and exercise. This level also holds outposts that support a holistic approach to health creation through

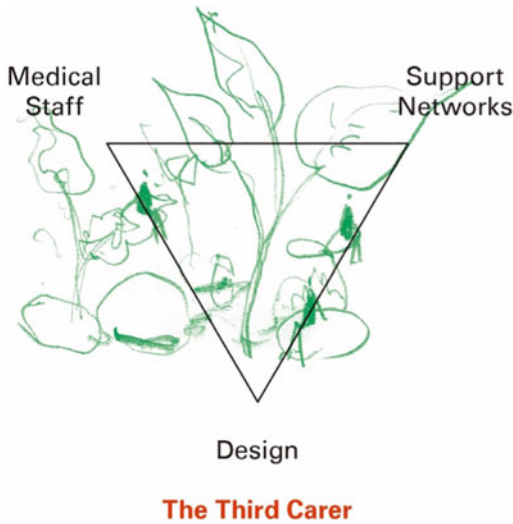


Fig. 27.1 The relationship between the three elements that make up the Third Carer/Ab Rogers Design and DRU+

social services targeting issues like debt, diet, and housing. Above this level is the tower of ward floors and surgeries, which are laid out in a repetitive circular plan.

The wards are built on a domestic scale and are full of tactile materials and calming and engaging colours. Each ward bed faces a window, and each window has a view out to nature.

Within the wards of the health centre a programme of sensorial engagement and nurturing moments of biomimicry—called the ‘hospital clock’—has been designed to stimulate patients’ circadian rhythms and fight isolation, inertia, and monotony. The programme is a series of nudges dotted across the day; natural soundscapes like bird song at dawn, light changes in synch with the sun’s path outside, acoustically protected areas for rest, activities to get patients up and out of bed where possible, pocket parks between wards to give all access to fresh air and daylight. It seeks to give patients a sense of control over their day, to keep them connected to the outside world and help them to feel seen, considered, human, encouraging them to fight for their health.

As well as looking inward to the care of its citizens, the hospital must also reach outside its walls, expanding its sphere of influence, output

and ambition, and becoming an active civic hub committed as much to prevention as to cure.

To fully utilise its power and position as a public institution, it must function as a regenerative tool, a catalyst for change, delivering a programme not only defined by its areas of specialty but by the social, political, geographical, environmental, and architectural needs of the communities it serves. It must champion localism, adopting an approach to hospital governance that sees it owned, staffed, and supplied by the very people who rely on it—employing local chefs, cleaners, and gardeners in place of anonymous subcontractors and inviting local volunteer groups to help in key areas. Broadening its focus activates the hospital as an anchor institution, enabling it to empower its citizens, improve their health and generate supportive investment in the local area.

The Living Systems Health Centre developed a network of engaging public spaces designed to dissolve the boundaries between the institution and its surrounding environment and encourage more open, relaxed behaviour. The marketplace at the base of the podium aims to bring healthy citizens to the grounds of the hospital, fostering a wider culture of care. It generates a hive of positive activity, inviting people to cluster around stalls selling fresh local produce, to sit and eat, to wander while examining dry goods and crafts. As well as helping strengthen local businesses, these interventions are recalibrating how people traditionally act in a hospital, reimagining it as a site of social, and cultural engagement.

For the hospital to function this way, it must be physically embedded in its local community, with activity, energy and life spilling out and infiltrating the world outside. If you put a bench in a park, people will sit. If you pedestrianise the streets, energising them with provocative, playful architectural interventions like tactile street furniture, raised platforms for pop-ups, generous piazzas for performance and public use—people will stop, gather, listen, dance, interact, and feel welcome and the wider landscape of the hospital will lose its negative stigma, becoming a backdrop for daily life. These landmarks can work

with other green interventions, planting and trees, to disturb routine, ignite curiosity, and create memorable moments.

A network of green corridors (Fig. 27.2) can further help disperse the third carer philosophy from the hospital out into the surrounding environment. Organically formed from seasonal foliage to bring changing colour and scent, they can act to soften architecture and frame views. Linking key spaces, they will gently guide visitors, creating a natural flow of foot traffic between the city and the hospital so that entering it feels like permeating a welcoming, porous space rather than being dwarfed by a menacing monolith.

Radiating out across the living systems health centre's public park and popping up across the city, a family of pavilions containing different community-based activities continues this drive to offer more support and stimulation to citizens. Whether filled with community kitchens to help families and build supportive networks, urban allotments that encourage the growth of fresh produce, offer food education, and hold group activities, or performance spaces and makers studios that promote creativity and culture, these interventions can function as outposts for the

hospital, spreading the art of care, encouraging connectivity, and drawing people out to enjoy their city.

27.4 Neurologist: Part Two

I love the idea of the hospital that reaches outwards, connecting to the community around it. Why don't hospitals and clinical spaces already do this now?

Where I live in Somerset, we have a thriving art and food culture. There is an active interest in local produce, farming, and community activities. Yet our GP surgery reflects no knowledge of or interaction with the local community. There are no collaborations with local arts organisations and no role in the many local food fairs or village festivals in the area. There is tremendous clinical expertise there and it is an exceptionally well-run practice, but it sits adjacent to our community rather than within it. Similarly, mid-size acute care and diagnostic facilities and larger hospitals tend to occupy industrial sites, outside of city centres in areas with massive car parks and good access to large roads. Hospitals are not really a part of our everyday lives, they are on the outskirts.

Fig. 27.2 Sketch of the Living Systems Health Centre in relation to the city surroundings, creating a green corridor/Ab Rogers Design and DRU+



Clinical spaces always imply an understanding of medicine. We build our clinical facilities in this way because we imagine that the body is a mechanical device and that illness is a technical disruption in our normal state of good health. We imagine that the solutions to this disruption must also be technological and likely industrial. This mechanical understanding of the body has enabled us to make tremendous progress in health care over the last century, but it is beginning to show its limitations.

We have highlighted the shift towards a biopsychosocial understanding of disease, and I think in the future we will move even further, towards what I call an ecological understanding. By 'ecological' I mean a few things. First, that the body doesn't flip between binary states of health and sickness, but that like all living systems it strives to maintain balance—what biologists call homeostasis—relative to its environment. Sickness is what we experience when homeostasis fails. Second, the causes of disease are never singular or mechanical but involve a disruption of complex regulatory systems. Disease is therefore always 'multidisciplinary' in terms of traditional medical categories. Finally, by ecological I mean to emphasise the relationships that are involved in regulating body processes. The biopsychosocial model is one example of ecological thinking: it is the relationships between a biological risk factor or pathogen with psychologically-driven behaviours and attitudes in the setting of social and cultural realities that create dysfunction.

How does ecological thinking differ from mechanical thinking? Imagine, for example, if we came upon a couple of trees in a forest with signs of leaf disease. We would certainly look at those individual trees to understand what was happening, but we would also be thinking about the environment around the trees. We might soon broaden our investigation to look at changes in insect populations, and perhaps changes in the predators that regulate those insect populations. We might consider changes in the fungal networks underneath the trees and whether changes in nutrients or even climate played a role. But no matter what approach we

took, we would be unlikely to conclude simply that two trees had a disease—at minimum we would understand that the entire community of trees, possibly the entire species, might be at risk. Our concern would be for the forest.

In this way, human beings are no different from any other living organism. When we are healthy, we are in balance with the world around us. When that balance tips, it manifests as disease. We capsize. When that happens, the role of the hospital is to first right the ship, but then to make sure that balance can be restored. But that means clinical staff need the resources to support patients in non-medical ways and to play a leadership role in health promotion.

If we begin to think about our own bodies in ecological ways, as living systems rather than as mechanical ones, then I think the flaws in modern healthcare design and the advantages of the Living Systems Health Centre start to become apparent.

First, the Living Systems Health Centre is designed around the needs of patients rather than the needs of the institution. This is a radical, and admittedly very difficult position to adopt. For example, there is no space for car parking, so the hospital depends on public transportation and taxis for most of its traffic flow (of course with special access for ambulances and emergency services). The hospital is then allowed to sit in a beautiful park, so the building becomes integrated into its environment rather than imposed upon it. Patients and their families, not vehicles and industrial equipment, dominate the landscape. It is a human place and not an industrial one.

Second, the Living Systems design prioritises the needs of the staff. People who work in an acute healthcare setting are always under stress and time pressure. Providing a market with fresh groceries enables staff to pick up healthy food on their way home, allowing the hospital to relieve some of the burden of long and often anti-social hours. Emphasising cooking with multiple kitchens also enables staff access to high-quality fresh food where they are working, instead of the standard rushed high-fat, high-calorie fast food

options they are typically offered. Careful consideration has been given to quiet places for staff to work, chat and relax in privacy. This design recognises the ecological nature of a complex institution like a hospital—staff will tend to treat patients as they themselves are treated.

Finally, the Living Systems design places gardens and ecological thinking in the centre of medical practice. In order for the pocket gardens to function well, consideration will have to be given to local wildlife corridors and which species of plants and insects are already present in the environment. Water and sunlight become crucial parts of the design process. More significantly, interaction with the garden becomes part of the clinical process. Informally, patients would have easy access to an outdoor space directly from the ward, encouraging early mobilisation. Families would have a space to sit and relax, without leaving the immediate vicinity of the patients. Formally, activities in the garden could replace more traditional rehabilitation activities, providing meaning and joy that can't be found in a gym. Overall, the incorporation of these gardens in a functional, rather than simply an ornamental way, allows the hospital to move away from industrial to ecological healthcare.

Regardless of whether hospital design moves in the direction of Living Systems, things must change. Healthcare spending is rising exponentially, while at the same time healthcare outcomes are declining. All around the world, medical staff are doing more with less and suffering from burnout. This results in medical errors, loss of staff through early retirement, and ultimately fewer young people seeking jobs in health care. Those staff that are in the system must find workarounds to meet their needs—the special computer trick that enables a doctor to enter a lab test that can't otherwise be ordered, the nurse that knows how to cobble together an infusion line when normal supplies have run out, the janitor that re-arranges the tiny supply closet so that boxes don't sit in the corridor. The ecosystem of the modern hospital is dysfunctional, and it is held together with heroic effort by hospital staff. We all deserve better solutions.

27.5 Designer: Part Two

I enjoy the clarity of your interpretation of our health as an ecology, constantly seeking balance in the face of change and flux. It helps to be able to visualise this ongoing battle for equilibrium across disparate but connected elements and it puts me in mind of my favourite permaculture quote on the topic of attacks on one's vegetable garden—'it's not that you have too many slugs, but rather that you don't have enough ducks.' Where our current hospitals fail is in the lack of communication and connection across the different elements and the resulting imbalance.

During our work in hospitals, where we are often tackling small, contained projects, we find ourselves facing isolated, internally divided factions and a general feeling of resistance to change—positive or not. As you describe, staff are asked to do so much with so little and the resulting status quo is so fragile that anything different is perceived as a threat. Everyone wants to work in a welcoming, comfortable, high-functioning workplace but currently, no one feels ownership over either the space or the challenges it faces. Working recently on the design of a cancer day-care centre for a PPE hospital, we discovered the existing site was a corridor with 24 chairs in a line against one wall. For patients there was no privacy or dignity and there was no sense of care or protection for these vulnerable people. When we asked the consultant in charge how something so inhuman and unfit for purpose had been allowed to come about he said he was not shown the plans until the scheme had been signed off and there was no opportunity for comment.

We can only change the environment if we can change the culture within it. As Paul Farmer said 'beauty...Is the ultimate vehicle for the distribution of dignity.' If we want to inspire ownership and investment, we must offer people spaces that make them feel valued, that they can believe in and take pride in. An environment that is loved and cared for will inspire those emotions in return—if someone walks into a toilet that is clean, comfortable and well-lit, they will treat it with respect, but if they go into a dirty, battered,

broken space there is little impetus for care and consideration.

I believe this spirit of reciprocity and belief in the art of care is taking root and that the inner city is going through a radical, human-focused moment of change. We are starting to understand the power of our built environment to further health creation, and to fully harness the positive influence of biophilia and biomimicry both on mental and physical health and as an outward proponent of care and investment. These are not token or purely aesthetic gestures, but suggestions of an integral change in the way we view our cities and their impact on our lives.

To maintain this positive momentum in the future we must place the value of well-designed and considered public environments above their cost, recognising, as Florence Nightingale did, that the object and colour in the materials around us actually have a physical effect on us, on how we feel and assessing their cost accordingly, not as the sum expended on initial completion but on what it will amount to over the following decades.

Economist Mariana Mazzucato said ‘What happens when we confuse price with value? We end up undervaluing care.’ When we build a hospital with the main priority of keeping cost per sqm low, that hospital is obsolete before it is

completed. Only when we look at its impact on the city and long-term value as a public institution, an anchor for health creation, a place of healing and a tool for community regeneration, can we truly assess what it is worth to its citizens.

27.6 Conclusion

The conversation between Rogers and Ranpura evokes an integrated and socially conscious conception of hospitals and of medicine. It moves beyond a focus on the mechanical aspects of health care—diagnostic imaging, surgery, drug delivery—to a focus on healing and recovery.

The line that Ranpura describes between hospitals as historical places of refuge, through the morass of the modern techno-industrial factory, comes back full circle to Rogers’ notion of the Third Carer. The pair’s descriptions of the practical implications of their view form a clear vision of what hospitals of the future might look like: patient-centric, flexible, and ecologically connected to the communities around them. It is an exciting, sweeping vision that encompasses not just a transformation of the hospital, but a celebration of health and of life itself.