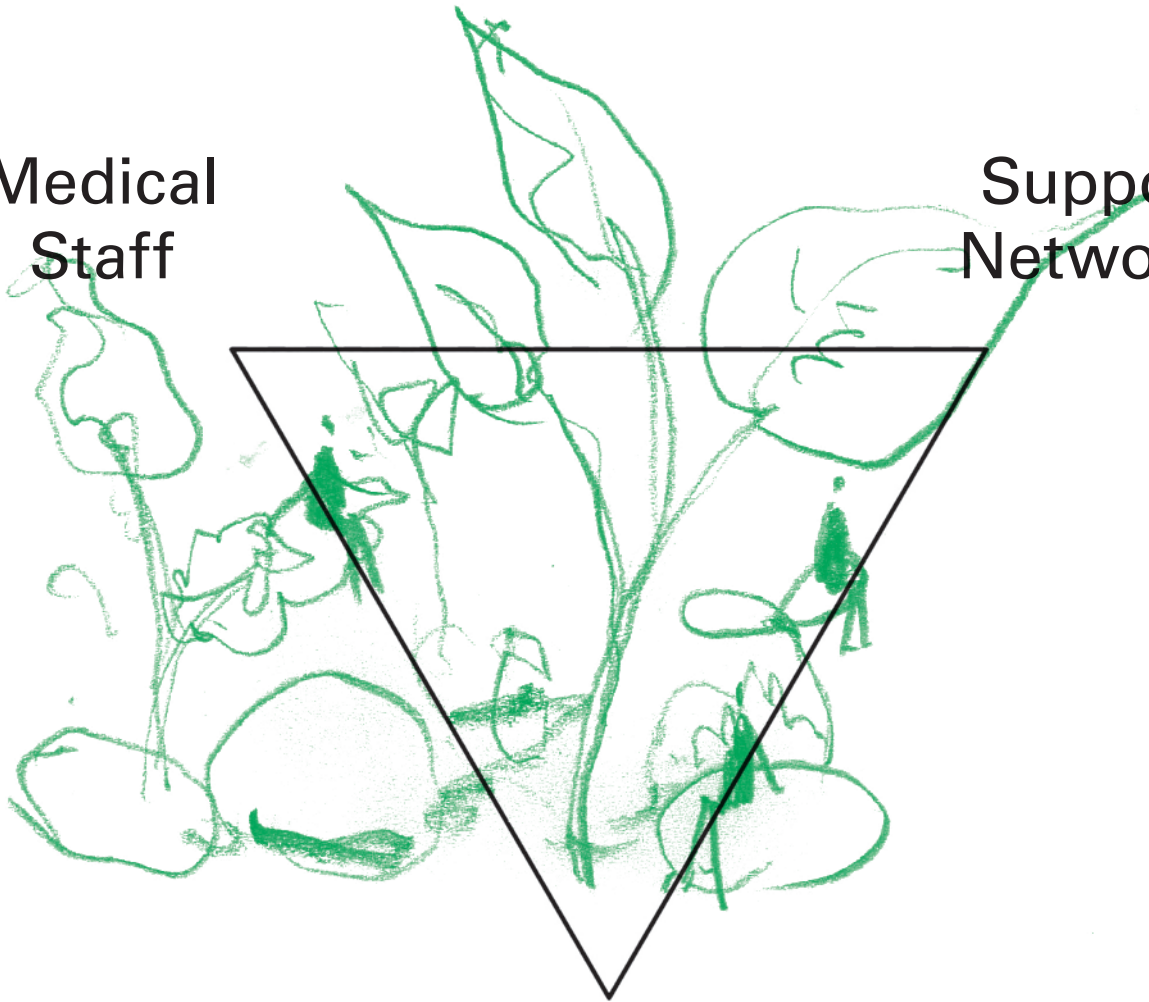


Ab Rogers Design **The Third Carer**

Medical
Staff

Support
Networks



Design

The Third Carer

Contents

1. Introduction	1
The Living Systems Health Centre	3
The Third Carer	5
2. Evolving the Vision	9
The Pillars of the Third Carer	11
Human-Centred	12
Community-Focused	18
Nature-Driven	23
Flexible and Future-Proof	25
Ideas Still to be Explored	30
3. Collective Intelligence	35
Introduction	37
Roundtable Discussions	38
Expert Opinions	49
Expert Report	62
4. Making it Real	65
Urban Context and Environment	67
The Architecture	70
5. Zoning	75
Podium	77
Park Level	86
Flower-Shaped Tower	88
Rooftop	100
Area Schedule Summary	102
6. Technical Performance and Maintenance	103
Mechanical and Electrical Engineering	105
Structural Engineering	107
Landscape Design	108
7. Value and Economic Viability	111
Value	113
Economic Viability	114
8. Conclusion	117
The Living Systems Health Centre and Beyond	119
Team	120
About ARD	122

1. Introduction

The Living Systems Health Centre

'Our proposal for a hospital of the future is a Living Systems Health Centre fuelled by a marketplace that sits on the ground level, while above, a raised public park offers access to nature and space to contemplate, relax, socialise, and exercise. This level also holds outposts that support a holistic approach to health creation through 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. Sensorial engagement in the wards is designed to stimulate patients' circadian rhythms and fight isolation, inertia, and monotony. Each ward has access to a pocket garden – maintained by staff and patients and irrigated by water collected by the building – with trees, fragrant plants, and places to sit. Each ward bed faces a window, and each window has a view out to nature. The roof of the building supports an urban allotment that provides fruit and vegetables to feed both the health centre kitchens and the marketplace.'

Ab Rogers





Perspective of Living Systems Health Centre – fuelled by biophilia and a marketplace in its local urban context

The Third Carer

'Architecture should defend man at his weakest.'

Alvar Aalto

Our work is founded on the idea that architecture can meaningfully contribute to the improved happiness and wellbeing of those who use it. Healthcare design is perhaps the most significant area of architecture in which to demonstrate the potential of this proposition.¹ Beyond the essential considerations of medical services, we believe that healthcare design should facilitate caring interactions and generate a supportive atmosphere for its users.² A hospital designed with these ambitions can satisfy its users' principal needs while also providing social interaction, community engagement, social prescribing services, holistic healthcare, education and support on diet, exercise and mental health, and access to nature and outdoor space.³

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 our proposal for the 2021 Wolfson Economics Prize, we considered how a healthcare centre itself might become a patient's 'third carer'.

The culture of care is incredibly strong throughout the NHS. However, this culture needs to be embodied by its physical spaces, rendering them places where nature, human biology (the preferences determined by our physical make-up) and the built environment are interwoven. In this way, our hospitals can support doctors and nurses in delivering the science of treatment as well as the art of care.⁴



1. Alan Dilani, 'Psychosocially Supportive Design: A Salutogenic Approach to the Design of the Physical Environment' (2008).

2. Annemarie Mol, Ingunn Moser, and Jeannette Pol, eds., *Care in Practice: On Tinkering in Clinics, Homes and Farms* (2010), and Rob Imrie and Kim Kullman,

'Designing with Care and Caring with Design' (2016).

3. Escobar-Tello M C. (2016) 'A New Design Framework to Build Sustainable Societies: Using Happiness as leverage'. *The Design Journal*, Volume 19, Issue 01, p.93–115. DOI: 10.1080/14606925.2016.1109206

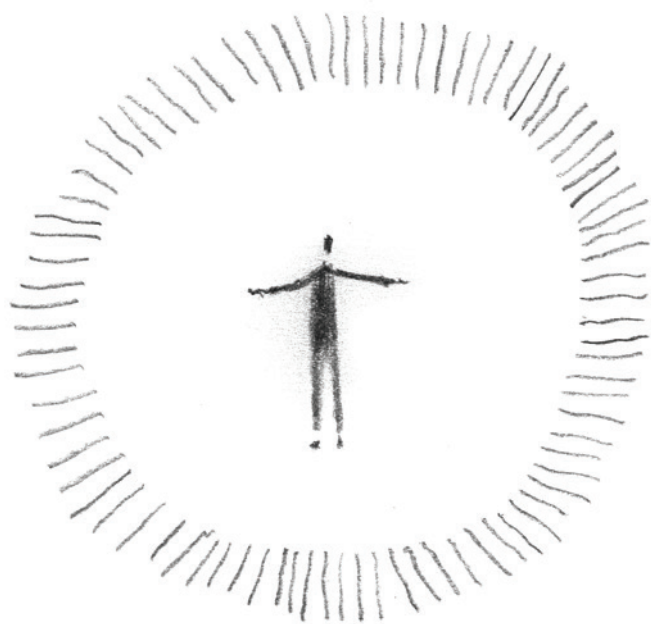
4. Gayle Souter-Brown, 'The theoretical basis of well-being as a motivation for design,' *The Journal of Biourbanisam* Vol. 5. (2017), 201–18.

‘As a third carer, the building will facilitate nurturing interactions and anticipate the needs of its occupants. When the building functions in this way – as an active part of the healing process rather than as a passive stage on which the theatre of medicine is performed – patients will naturally come to associate the building itself with improved health. Just as temples and cathedrals can create a sense of spiritual calm, even without their attendant rituals, so too can this new type of hospital create a sense of wellbeing independent from and in parallel to the practice of health care.’

Dr Ash Ranpura, Neuroscientist & Clinical Neurologist

‘These spaces need to serve hospital workers, patients, and visitors. We must nurture all users, protecting them from insidious stresses and strains through caring details like human-centred furniture and stimulating, biophilic environments formed on a domestic scale and designed to combat monotony.’

Ab Rogers



Today, we know that patient experience is the most reliable predictor of clinical outcomes and that social, economic and environmental factors are vital to the success of medical treatment and the larger goal of health creation.⁵ This broader understanding of health and the external factors – like debt and poor housing – that contribute to its inequalities, have increased our awareness that ‘people and communities have better health at all ages when they achieve a sense of purpose, hope, mastery and control over their lives and their immediate environment’.⁶ This recognition, along with an emphasis on prevention rather than cure and the newfound benefits of giving patients greater agency and control, make the need for a health centre of the future abundantly clear.

The design outlined in the following pages results from extended considerations of how best to materialise these paradigm shifts. Our proposal seeks to replace the archetype of the hospital as a hermetic machine with a dynamic healthcare centre that not only fulfils a hospital’s traditional functions but also actively engages and serves its communities as a lively civic hub.

To improve patient experiences, clinical outcomes, and staff wellbeing and integrate these elements within wider health and social care, the health centre of the future must be more than an isolated monument to science and efficiency – it must activate an outward-looking culture of care, reaching beyond its walls to the communities it serves and addressing the non-medical determinants of health. There is no better way of achieving these ambitions than through design that reimagines our healthcare spaces as holistic, human-centred, and responsive environments that, as third carers, play an essential part in creating better health and wellbeing.

5. See Dr Ash Ranpura’s essays ‘On Placebo’ and ‘The Role of Design in Clinical Spaces’ on pages 57–58 of this publication.

6. ‘Get Health Creation Done – a New NHS Alliance Manifesto’: (www.thehealthcreationalliance.org/wp-content/uploads/2019/11/Get-Health-Creation-Done-a-New-NHS-Alliance-Manifesto.pdf)

ARD's Multidisciplinary Approach

Ab Rogers Design (ARD) works internationally across the health, culture, hospitality, and residential sectors, with a focus on caring spaces, sustainability, and inside-out design. We design active, supportive, engaging environments that inject narrative and purpose into the everyday through sensual colour, tactile materiality, and rigorous detailing.

Our proposal for the Living Systems Health Centre is informed by our diverse professional experience and cross-sector approach to design. Our work in the cultural sector has given us the ability to create spaces able to keep pace with a programme of rapid change, while through our retail experience, we have demonstrated how design can be used to encourage engagement, influence behaviour, and forge a sense of community.

Our experience in wellbeing design is exemplified by our 2019 scheme for the Maggie's centre at the Royal Marsden and multiple projects for the London hospitals of St Mary's, St Thomas', Queen Charlotte's & Chelsea, and Charing Cross. Our hospital projects have shown us first-hand the struggles involved in attempting to retrofit inflexible spaces that are the result of hastily implemented short-term solutions with no scope for future improvement. These challenges have allowed us to understand the complexities of hospital design and appreciate the capacity of good design to address underlying issues. In our Maggie's centre, we harnessed the power of domestic scale and tactile materials to humanise the space, enacting the true meaning of design as a third carer.

Inspiration

National and international hospitals and other community and social care projects based on the principles of health creation helped inform the development of our Living Systems Health Centre.

We learned from the empathic design of Alvar Aalto's Paimio Sanatorium (completed in 1932), the generosity and scale of Piero Palagi Hospital in Florence (completed in 1985), and João Filgueiras Lima's rehabilitation facilities in Brazil (built in the 1990s) that responded to the natural elements and introduced biophilia as part of a programme of positive patient distraction.

Alder Hey Children's Hospital in Liverpool demonstrates how design can actively harness the positive influence of nature. The site physically connects a hospital and a local park – the grass of the landscape coming up and over the building's curved roof, and its three main prongs reaching out into the landscape – tying both back into the community. Horatio's Garden, a national charity that creates and nurtures beautiful gardens in NHS spinal injury centres, exemplifies the benefits of facilitating a connection to nature, bolstering patients facing long stays in hospital.

Inspiring support centres like Maggie's at the Royal Marsden, which opened its doors to NHS frontline workers during the pandemic, offering them a caring environment and access to psychological support staff, demonstrate the importance of looking beyond the usual parameters of service and reaching out to a community in crisis.

The wisdom and insight of Florence Nightingale – specifically her volume 'Notes on Hospitals' – was another formative influence. Her unique combination of humanity, practical experience, and empathic insight demonstrates the importance of truly engaging with the needs of the people at the heart of the building.

We have absorbed and expanded upon the teachings from these influences and applied them to the specific challenges of the UK's healthcare service both today and in the future.

Collective Intelligence

We have developed our vision for the health centre of the future in close consultation with a wide cross-section of the community, gathering knowledge from hospital staff, patients, visitors, and experts from other fields. All have been instrumental to the design, function, and programme of our healthcare centre, and we would like to acknowledge their valuable and generous contribution to the production of this document.

As well as our team of medical advisers – which include nurses, paediatricians, neonatologists, cardiologists, and neurologists – we have sought additional advice from a range of experts from the fields of urbanism, economy, engineering, art, digital technology, and construction. The specialities of these collected individuals and businesses have enabled our design to be repeatedly surveyed with fresh eyes and for innovative solutions to be presented. With their diverse backgrounds and experiences, this group is united in their fervent desire to improve our healthcare spaces. Their dedication has allowed us to view the healthcare centre of the future from micro to macro, inside and out, considering its long-term and short-term impact on its users, its value and contributions to society, and all the ways it can offer support to its local community.

‘Gathering and nurturing collective intelligence means assembling methodologies and data from different fields, from theory as well as from practice-based disciplines, from the hard sciences, the humanities, the arts, and from civic activism to expand our vision, test our questions, and attempt solutions that are as layered as the problems. Healthcare, in its most expanded sense, seems to be yet another facet of our global crisis in dire need of a collective intelligence approach, and ARD are adopting this approach at the very foundation of their thinking and doing.’

Francesca Bertolotti-Bailey, Curator & Cultural Producer

The Living Systems Design

This combination of shared learning, experience, and unbiased ingenuity has taught us there is no fixed, stand-alone solution to the design of the health centre of the future. It’s requirements are complex and at times antithetical. It needs to utilise centralised production while supporting localism; to create clinical spaces that deliver technical operations and prioritise care; to provide wards that give people privacy while encouraging them to seek support through social interaction; and contain spaces that engage the senses while allowing for rest and sleep.

These dichotomies and more are why the Living Systems design is the answer. Through its ability to contribute to health creation as much as healing, embrace its internal and external communities, and switch responsively between multiple gears, it can ensure all users feel cared for, no matter their requirements.

2. Evolving the Vision

THE HEALTH CENTRE OF THE FUTURE WILL BE

HUMAN- CENTRED

The design will place the human being at the heart of the experience; empowering the individual to take ownership of their mental and physical health, and combatting the detached, inhumane and inflexible nature of contemporary hospitals.

COMMUNITY- FOCUSED

Operating both as a community in itself and as a vital part of the local community surrounding it, it will be defined by the needs of the people it serves, supporting patients, staff and visitors alike.

NATURE- DRIVEN

It will optimise the use of time, space, money, energy and materials, and harness the benefits of biophilia and biomimicry to positively impact on patients, users and staff.

FLEXIBLE & FUTURE-PROOF

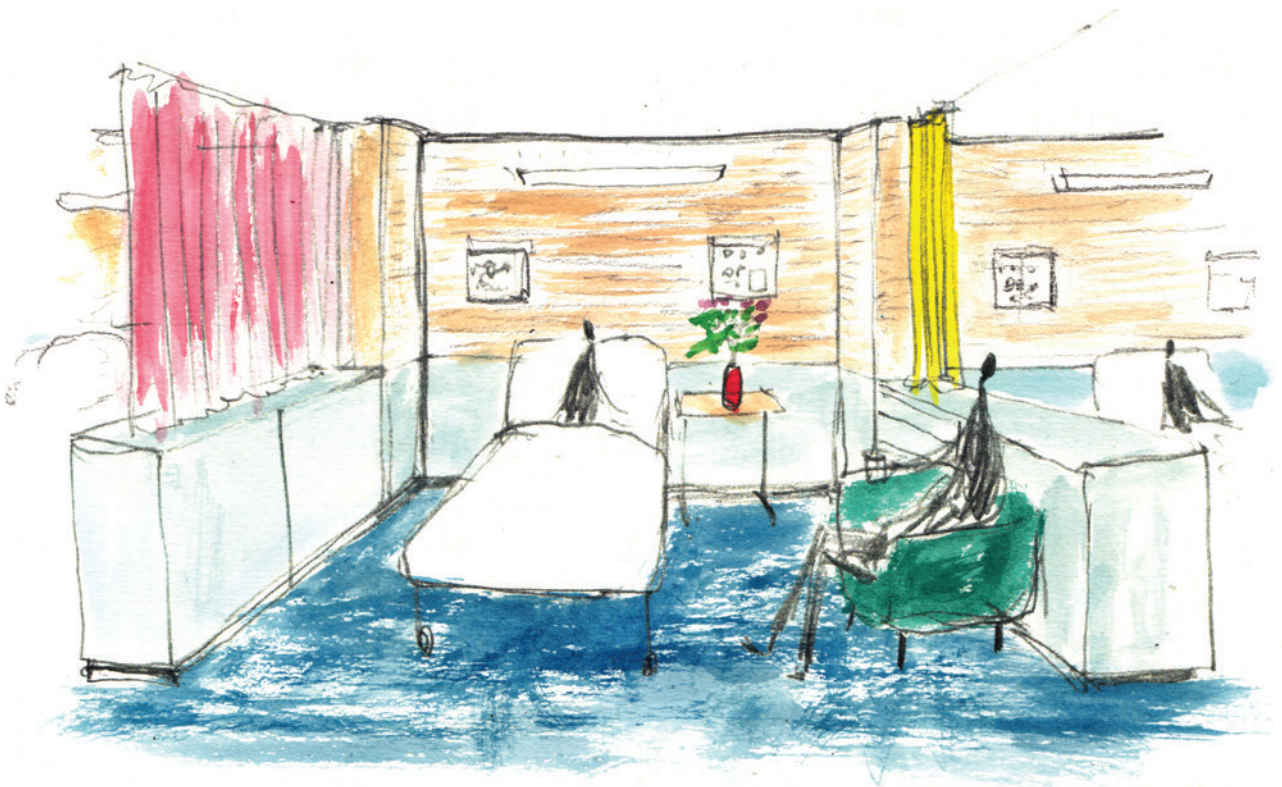
The design will invest in adaptability and sustainability, remaining fit for purpose in an ever-changing world.

Human-Centred

'Clinical buildings today still reflect the monumental scale and gleaming efficiencies of the industrial and chemical eras. Now that we've arrived at the biopsychosocial model of disease, we need a new type of clinical building to support it. This building must function on a personal scale, offering privacy but also community. It must facilitate health interventions that are biomedical as well as those based on diet, exercise and social needs. The building must reflect a change in the way we deliver health care from an intervention at a point in time (a surgery, a prescription) to an ongoing interaction between an individual and a comprehensive care system.'

Dr Ash Ranpura, Neuroscientist & Clinical Neurologist

Designed around intersectionality, the Living Systems Health Centre puts people – not just illnesses – at the centre of its activities, harnessing scale, rhythm and the senses within spaces that are comfortable for those of all genders, races and mental and physical abilities.

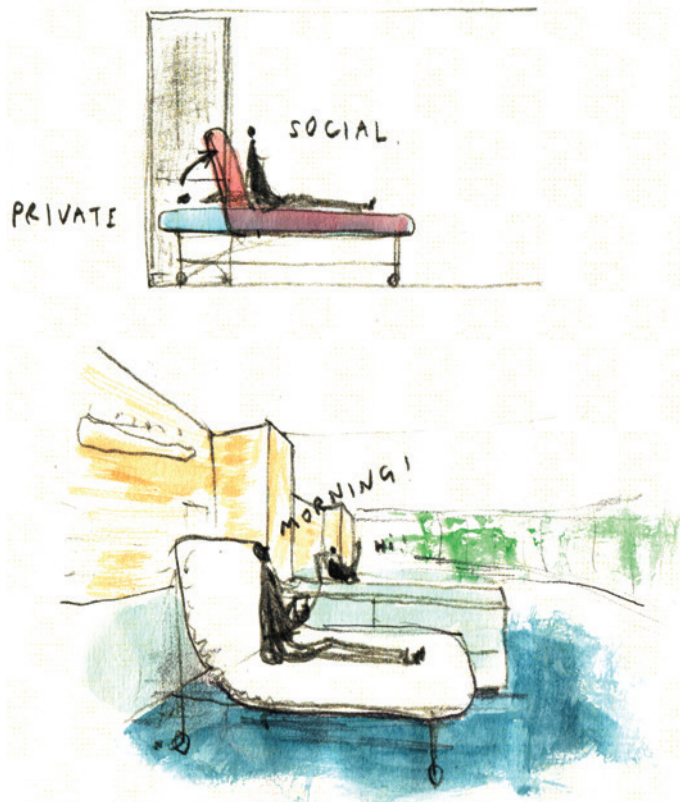


Shared ward bed with visitor

Human-Centred: Scale

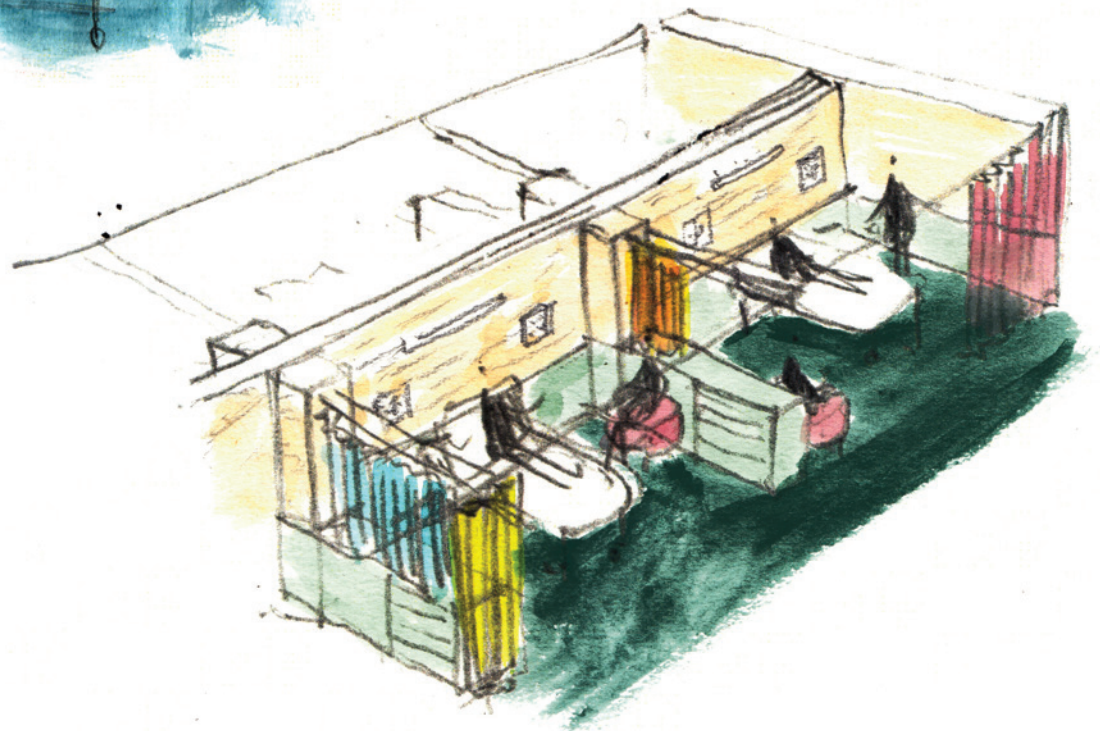
'It seems strange to think about feeling at home in a hospital, but for staff and patients, creating an environment that feels as close to home as possible helps morale.'

Paul Nulty, Architectural Lighting Designer



Our consultations with clinicians and other medical professionals have revealed a pressing need to make clinical spaces warmer, safer and less intimidating, as hospitals can often make users feel ill at ease. As a studio, we are exceptionally well placed to rectify this, as we specialise in designing hard-wearing public buildings that harness a domestic scale to imbue a sense of place and belonging in their users.

As such, we propose a hospital that is generous yet compact with the capacity to accommodate approximately 200 beds within domestically scaled wards that follow a circular floor plan designed to eliminate long corridors. This approach will also maximise efficiency of circulation, ensuring that most parts of the health centre can be reached in a short distance and that users always feel oriented in the building. This scale seeks to make the health centre feel like a place designed for people rather than one that primarily caters to scientific and technological demands.



Hand-drawn isometric showing domestic scale of the wards and transition from private to shared space

Human-Centred: Rhythm

'I find it boring and soulless being in bed all day. There's nothing worse than just lying there.'

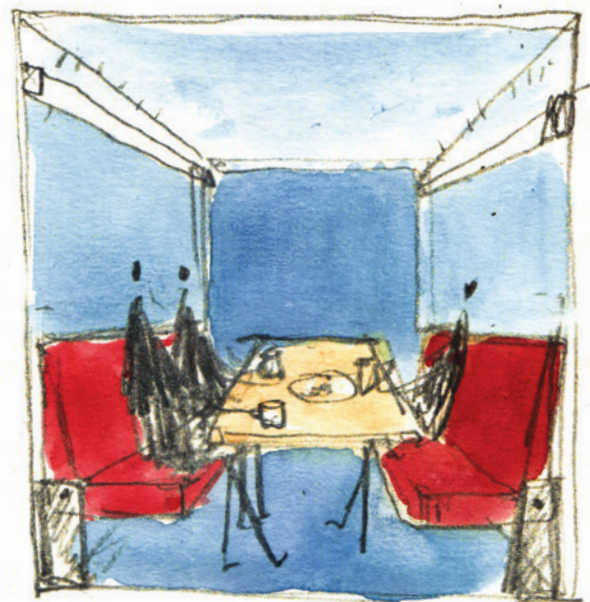
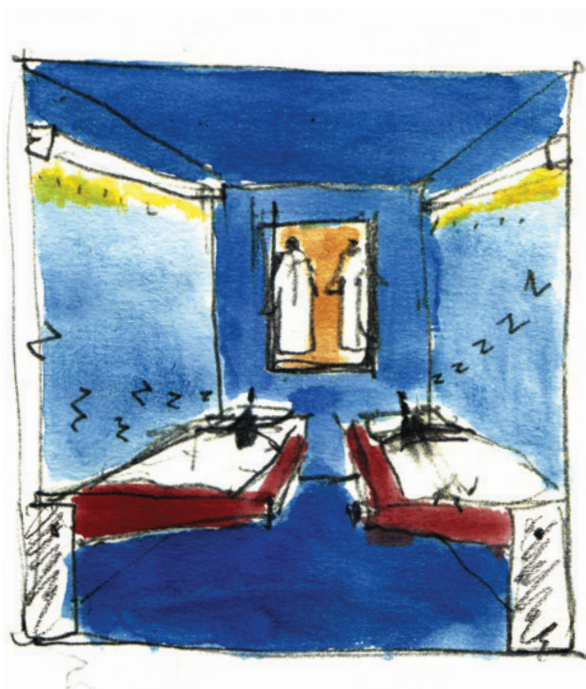
Grace, Hospital Patient

'Anything we can do to demarcate the day in a hospital is helpful.'

Dr Ash Ranpura, Neuroscientist & Clinical Neurologist

Unstructured time can be disorienting to patients and the design of the health centre must help to differentiate time throughout the day, introducing a hospital clock that nudges and engages in a way that synchronises with users' circadian rhythms. This can be achieved via markers or milestones articulated through changes in light and sound and through activities such as eating, walking, socialising, gardening and spending time outdoors. These activities have the added benefit of normalising the hospital environment, helping users to associate it with enjoyable everyday pursuits rather than with crisis, unpredictability and fear.

An interactive art programme, that goes beyond commissioning and display including performance and dance, can play an important role in provoking engagement in patients, giving them a voice and an active role in transforming their public spaces.



Staff couchette which transforms from a silent dormitory for two to a meeting room for six

Human-Centred: Sleep

‘Several studies describe in detail the primary causes of disruption to patients’ sleep: noisy equipment and staff, unpleasant lighting, uncomfortable beds, room temperatures and timing of procedures.’

Ugo Faraguna, Associate Professor of Human Physiology, University of Pisa Medical School

‘I tried to advocate for more protected time in hospital wards, usually about two hours after lunch, when there are no visitors and when doctors are not allowed to interact with patients or go on rounds, it’s just quiet time.’

Dr Laura Benjamin, Neurologist and Principal Clinical Research Fellow, University College London

The importance of sleep for good health and recovery is well known.¹ The building’s design will help to counteract the disturbed sleep cycles patients often experience in hospital,² managing environmental conditions such as light levels and acoustics, to support patient rest.

Reducing interruptions throughout the night – such as nurse monitoring and the triggering of patients’ bedside alarms – are other ways to support patient rest. The latter can be achieved with remote sensors and soft technology that would obviate the need for intrusive physical interactions at night. Patients’ bedside alarms could also be redirected to signal at nurses’ stations instead.

For the hospital’s shift workers – whose inadequate sleep patterns are known to contribute to medical error³ – the building’s design will help them to balance their own circadian rhythms through an adapted version of the cycle described previously as well as via recuperation supported by onsite local accommodation such as soundproof couchettes or sleeping pods.

1. Growth hormones, responsible for physical repair and renewal, are primarily secreted during sleep and, even in healthy people, the immune system is weakened by sleep deprivation.

2. Sleep disturbances frequently occur in patients after surgery. These can stem from factors such as postoperative pain, environmental stress and type of anaesthesia. These sleep disturbances can produce harmful effects, leading to a higher

risk of delirium, increased sensitivity to pain and poorer recovery. The benefits associated with good sleep can help decrease the recovery time of patients post-op, and the improved state of mind that comes with it can increase compliance of patients to treatment, increasing their willingness to accept a doctor’s proposal. Medical experts have confirmed that if a treatment is accepted and engaged with positively, it has an improved chance of success, and this can all link

back to how they felt when it was first presented to them.

3. Research has conclusively concluded that ‘failure to obtain adequate sleep is an important contributor to medical error.’ With lack of sleep ‘significantly impair[ing] speed and accuracy, hand-eye coordination, decision making, and memory’. (www.ncbi.nlm.nih.gov/books/NBK2645/)

Human-Centred: Senses

‘Stimulating other capacities is key to the rehabilitation of someone in hospital who can’t walk.’

Dr Laura Benjamin, Neurologist and Principal Clinical Research Fellow, University College London

Hospitals are often places where the senses are simultaneously overwhelmed by the effects of medical treatment and under-stimulated by homogenised design.

We will use design to counteract the tedium many patients experience in hospitals’ often antiseptic environments and to deal with the hypersensitivity felt as a side effect of their treatment. Modulating users’ sensory experience is key to making patients feel cared for.

Sight

The Living Systems Health Centre will utilise colour to animate the building’s interior and engage the onlooker.

Cool, calming colours will be used in potentially stressful waiting areas, and warm, engaging colours will be used in public, social spaces.

All patient beds and staff breakout spaces will provide access to natural light and views to green space. Carefully framed internal views with minimised visibility of intimidating medical equipment will also help patients to feel more at ease. The beds are arranged in a herringbone pattern so the patients can stare out of the window at the sky and the trees, rather than only at other patients, which is uncomfortable for all. If they want social interaction, they can raise the back of their bed and turn to their neighbour for conversation.

‘Stimulation through light and maintaining a balance of the circadian rhythm are really important. They speed up discharge times and the lack of them has been linked to psychotic episodes.’

Dr Ash Ranpura, Neuroscientist & Clinical Neurologist

The building’s orientation around the sun’s path and maximisation of natural light, will help to keep patients and staff connected to the world outside, allowing the cycle of natural changes – seasons and weather, shifting light and lengthening shadows – to permeate the health centre. Maintaining this connection will help prevent disorientation and isolation as well as supporting healthy sleep patterns and combating depression.

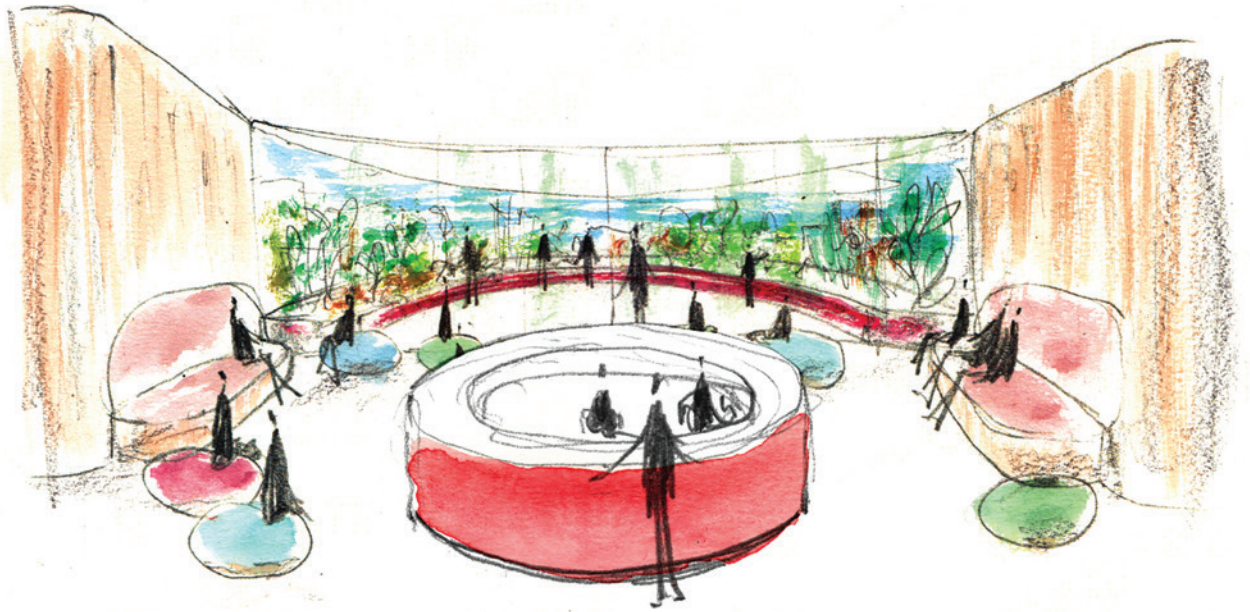
Hearing

Applying acoustically absorbent materials to increase acoustic comfort between ward beds, creating sound-proofed pods for doctors and situating the health centre in a public park will help absorb and filter noise pollution, which is known to be detrimental to people’s health.⁴ The park will create a natural sound barrier and allow the sounds of nature to permeate the building, supplying habitat and food to local birds to encourage their sounds and activities.

Sound artist and DJ Nick Luscombe will be contributing his research into the effects of sound on patients, developed as part of the Tokyo University Otocare Project⁵ in Japan, which involves piping in live sounds from islands, hillsides and coasts to a simple sound system placed by the individual beds so the patient can access them at will. (www.dropbox.com/s/w4uiktel1vpwyge/OTOCARE%204%20Hour%20Mix%20V2.mp3?dl=0)

4. Studies have found that prolonged exposure to elevated levels of noise can trigger stress, raise cortisol levels, increase anxiety, raise blood pressure and increase blood viscosity, increasing chances of cardiovascular disease due to its impact on hormone levels and the nervous system.

5. www.memuearthlab.jp/2021/03/05/otocare-discussion/



Outpatient waiting room leading to balcony, showing vibrant colour palette and natural light

Smell

'Smell is our number one sense. If we can interact with the olfactory part of our brains more and trigger emotions directly through this, we can alleviate many ailments and discomforts in our lives and restore happiness and pleasure.'

Lyn Harris, perfumer and founder of Miller Harris and Perfumer H

Pleasant ambient smells have been proven to decrease stress, support relaxation, and combat anxiety.⁶ Hospitals will always smell of disinfectant and that to the mind signals cleanliness. But we can create secondary smells to distract, these can be planted notes from essential oils or perfumes and fresh ingredients being cooked locally. (Olfactory interventions will be tailored to the needs of specific patients who may be experiencing a heightened sense of smell.)

6. The use of scent in 'various sectors of the healthcare industry has been widely recognised for its ability to improve how patients feel by having a positive effect on perceptions of service quality, cleanliness, and personal wellness.' (www.airscents.com/hospital-ambient-scenting-odor-control/)

7. A September 2019 study published in the *Journal of Parenteral and Enteral Nutrition* concludes that an increased risk of malnutrition in hospitals often leads to poorer outcomes for the patient and the healthcare system. Hospital malnutrition affects 30–50% of patients worldwide, according

Taste

'I hate going to hospital ... everything shuts at 5 o'clock and all you've got is an overpriced Boots sandwich and Sudoku.'

Grace, Hospital patient

Studies show that poor-quality hospital food increases the risk of malnutrition and negatively affects patient outcomes.⁷ The impact of food on staff health and wellbeing is a further reason why targeting hospital users' taste buds is so important.

More than just improving the taste, quality, and nutritional value of hospital food, the Living Systems Health Centre will actively participate in the 'food as medicine'⁸ movement by offering medically tailored meals to patients and educating the wider community through food and nutrition classes, following the examples of hospitals giving greater focus to the role of food in their patient's health.⁹

In this way, the Living Systems Health Centre will play an active role in encouraging healthy habits beyond its walls.

to a September 2019 study published in the *Journal of Parenteral and Enteral Nutrition*. The study recorded that often patients enter the hospital malnourished or at risk of malnutrition and experience nutrition decline during their stay, placing them at higher risk for adverse outcomes following hospital discharge. (www.huffingtonpost.co.uk/entry/bad-hospital-food-healthy_n_5e5d-3de2c5b63aaf8f5b0390)

8. 'In the face of the global epidemic of diet-related chronic disease, there is increased experimentation with the use of "food is medicine" interventions to prevent,

Touch

The building's interior design will harness the emotional and sensorial potential of materials while maintaining the highest standards in hygiene and performance. Where possible, materials will be highly tactile to help patients feel cared for; crisp cotton bedding, soft curtains made from organic fabric, smooth door handles in naturally antimicrobial wood, and handmade decorative objects in hospital rooms will provide a sense of domestic, familiar comfort. Natural and handcrafted elements which are made to last, will require a level of investment and maintenance, helping to foster a culture of care and commitment across the building.

manage and treat illness.' (www.bmj.com/content/369/bmj.m2482)

9. At Alder Hey Children's Hospital every ward of 36 children has its own chef, dedicated to educating children and their families about benefits of fresh, nourishing ingredients as well as cooking them healthy meals. There is an uplift in cost, but this can be offset against longer-term advancement in epidemics like childhood obesity that cost the NHS £6.1 billion a year. (www.alderhey.nhs.uk/parents-and-patients/while-youre-here/facilities-alder-hey#Food%20and%20Drink)

Community-Focused

'The hospital and the community are closely linked: one needs the other. They meet in the same building. A busy hospital stands at the centre of a community, just as the church once did in a village, marking our passage through life, all the way from birth to death.'

Dr Mando Watson, General Paediatric Consultant,
St Mary's Hospital

'The power of community to create health is greater than any physician, clinic or hospital.'

Dr Mark Hyman, Founder and Director of
the Ultra Wellness Centre

There is a symbiotic relationship between the Living Systems Health Centre and its communities, knit together through the life-defining milestones that take place within its walls. This roots the health centre in place, giving it the 'potential to become a backbone institution to better the health and long-term welfare of its communities.'¹²

Its power as an institution enables it to act as a catalyst for change and a tool for urban regeneration, making 'a significant difference beyond hospital walls, such as partnering with housing authorities to provide mental health services or with schools to help address asthma and improve school attendance.'¹³ or using its critical mass of demand and buying power to justify fresh food distribution into local neighbourhoods, acting as a conscious consumer within its locality.



Social gathering in the park outside

12. Victoria Jessen-Pike, Principal Projects Director, Publica.

13. 'Can Hospitals Heal America's Communities?' Norris and Howard, 2019.

Community-Focused: Neighborhood Life

The Living Systems Health Centre will reinvent its previous identity, transforming from a place of fear, pain and uncertainty into a positive resource, a community asset that enhances the public realm and improves peoples' lives.

To achieve this we have reimagined the street and first levels of the health centre as a burgeoning public space that not only welcomes traditional hospital users – patients, medical staff and visitors – but the general public as well.

In our vision, the first level of the health centre will include a public park and the ground level will be activated as a vibrant health centre including a fresh food market, facilities administering primary and social care and other therapies. By centralising hospital and some primary and social care it is hoped problems can be diagnosed – and treated – more efficiently and economically. By integrating the health centre with the wider community, it is no longer a silo to tend to the sick but a model of healthy living, playing an educational role that filters beyond the immediate hospital walls.



Gardening workshop in progress

Community-Focused: Collective Intelligence and Co-design

'Just give power to doctors and nurses, instead of to management. Then create constant, agile horizontal communication between the units, because they learn from one other, right?'

Mariana Mazzucato, Economist and Professor of Economics and Innovation, University College London

Informed by the collective intelligence of staff and patients, and co-designed with the local community to enable the resolution of specific departmental and societal problems, the health centre's interior has been designed to be easily reconfigured. This non-dogmatic approach to architecture conceives of the health centre building as an agile high-performance structure that can be adapted to constantly evolving hospital systems and procedures. Its responsive framework of modular parts will equip hospital staff and stakeholders with the tools to experiment and implement change as well as establishing the processes they know to work best.

It is vital that the health centre functions within a centralised network of shared information, through which lessons learned on the ground from this kind of experimentation can be communicated across its wider NHS Trust. Only through facilitating this sharing of information can the collective intelligence of the healthcare system as a whole begin to evolve.



Full spectrum of hospital staff – from consultants to janitors – socialising together in rooftop bar

Community-Focused: Social Access

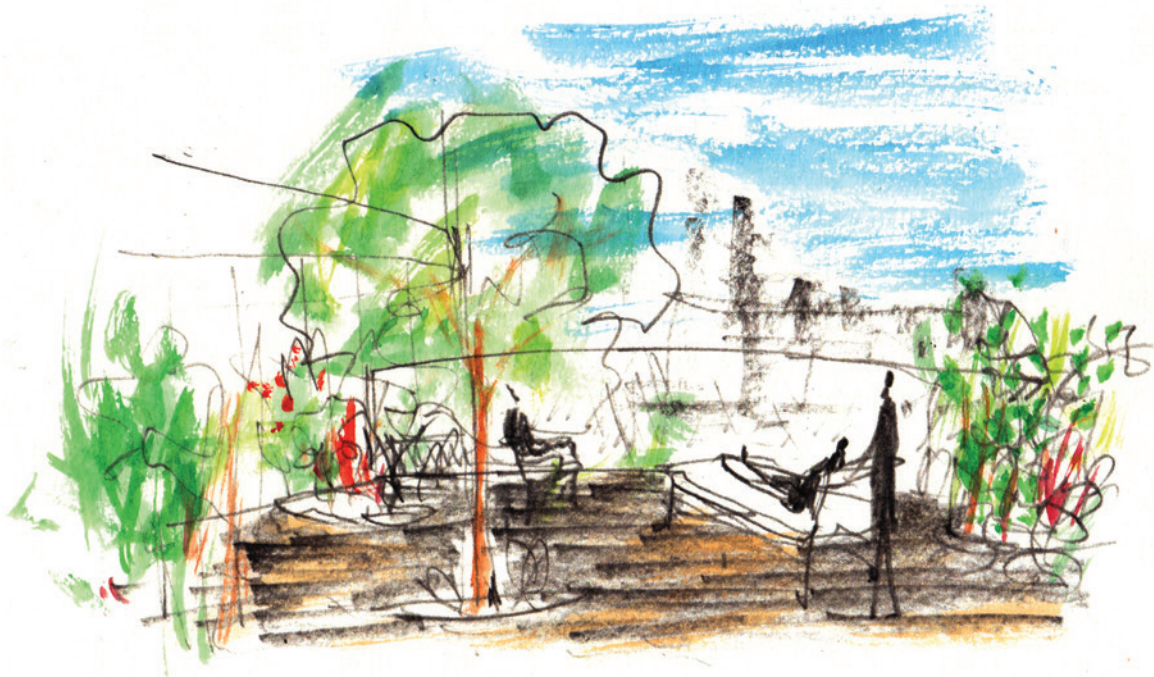
The health centre will counteract health inequalities for those who report encountering 'real or anticipated discrimination or challenges' within healthcare spaces, resulting in 'particular groups receiving less care relative to their needs.' Through welcoming communal areas on the ground floor and park level – featuring biophilic interventions and tactile materiality – the building will effectively communicate its accessibility to diverse and disadvantaged people, dissolving the perceived barriers it might otherwise present to the socially disenfranchised.¹⁴

The design principles of the ground floor of the podium; its naturally lit, open-plan spaces, will remain fixed from site to site but in each case its programme will be defined in collaboration with the health centre's local communities, reflecting their concerns and involving existing local resources.

This collaborative approach will address the question of the health centre's approachability, defining a holistic response to the needs of its communities, 'listening to their physical, mental, and social needs'¹⁵ via a programme of use that connects people with the social prescribing services; legal aid, community kitchens and housing services, that can improve physical and mental health and wellbeing. This will help empower less privileged citizens, helping them to negotiate the system and giving them tools for self care, easing the burden on the health centre.

'You need to give communities the tools to do things themselves. Sex workers, for example, were hard to reach when it came to the Covid vaccine, so some were given vaccines to distribute to other sex workers.'

Grace, Hospital Patient



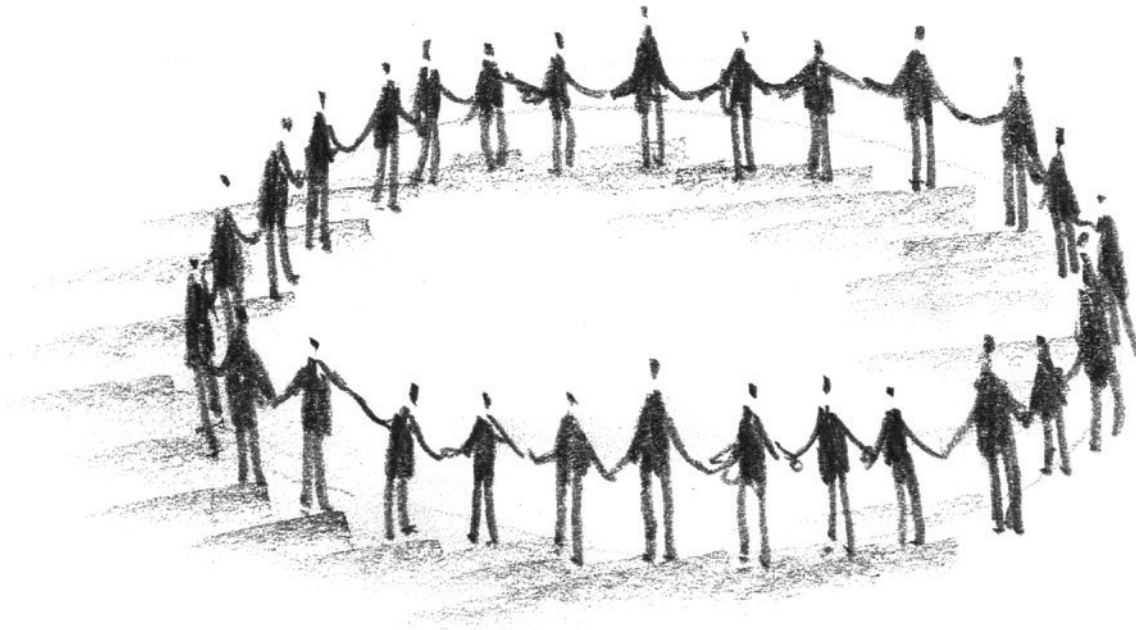
Pocket parks enjoyed by patients, with access to natural light and green spaces accelerating their recovery

14. Extracted from the Kings Fund enquiry 'What are health inequalities?' (www.kingsfund.org.uk/publications/what-are-health-inequalities)

15. 'Social Determinants of Health', World Health Organization.

Community-Focused: Volunteering

Volunteering programmes – targeting retired staff, patient's families and friends and locals (who may have been patients at one time) – will help bring people together in pursuit of a common goal, further cementing the bonds between the health centre and its communities.



Nature-Driven

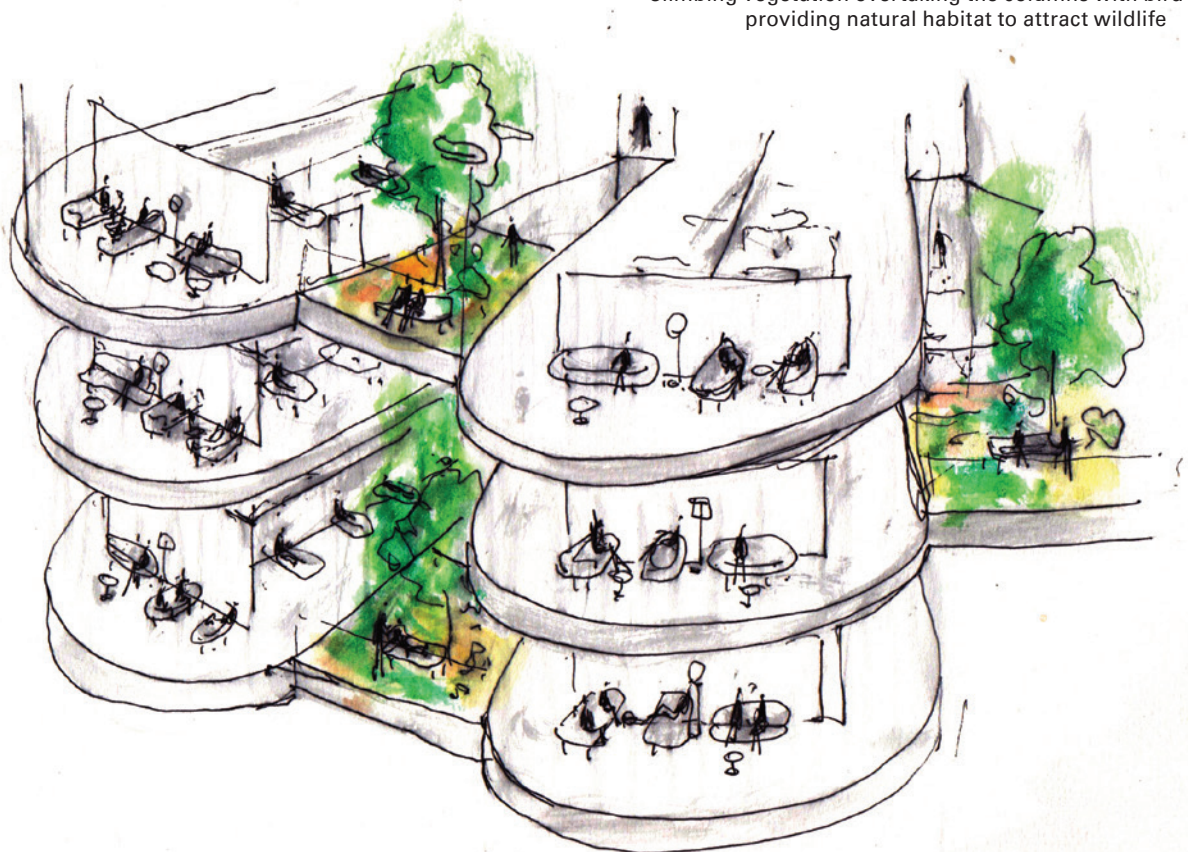
'The benefits that landscape and gardens offer us when we are healthy – beauty, contemplation, energy, connection, food, contact with natural and seasonal cycles and processes – are magnified a hundredfold when we are ill. We all know every home should have a garden. Therefore hospital design should make access to nature central to their conception so that they become not just somewhere we go to be sick, but places we are happy to call a home away from home.'

Dan Pearson, landscape designer and horticulturist

The Living Systems Health Centre fosters the human connection with nature, understanding its power as a unifying principle and as a means through which to improve the experience of patients, staff and visitors.



Climbing vegetation overtaking the columns with bird feeders providing natural habitat to attract wildlife



Pocket gardens and social spaces

Nature-Driven: Biophilia

Biophilia is defined as the innate human instinct to connect with nature and living beings. In hospital terms, it is well known that access and views to nature reduce staff and patient stress levels and speed recovery,¹⁶ aid relaxation¹⁷ and improve clinical outcomes.¹⁸ Through prioritising views out to nature, integrating planting in public areas and providing access to gardens, the Living Systems Health Centre will harness these benefits for its users. The building's biophilic design will also offer natural mitigation for many of the negative influences commonly associated with the hospital environment, including noise pollution, long exposure to fluorescent lighting, poor air quality, and a sense of isolation and disconnection from the outside world.

Integration of planting and gardens will reinvigorate the health centre's identity. Since thriving plants are a sign of a healthy environment, a product of careful attention and nurturing, it will help outwardly propagate a culture of care.

Letting the outside in will positively influence those in otherwise sterile environments helping nudge the body and mind into a healthier state via natural stimulus like the feeling of fresh air on the skin, the sound of birds singing, the sight of plants growing over time, enhancing their feeling of connection to the wider world.

Planting around the exterior of the building will filter light and provide natural shading. The health centre's planting scheme treats the building like a mountainside, locating warmth-loving plants on its southern

face and hardier shrubs on its northern face. This shift in mood as you move from one side to the other will establish a journey and facilitate orientation.

Access to 'pocket parks' situated in between wards will enable any patient – no matter their ambulatory abilities – to enjoy fresh air and nature, and provide them with a place to escape the confines of the health centre. The staff welfare facilities on the rooftop (including a bar, quiet workspace and social areas) are located among the greenery of the health centre's urban allotment, the natural landscape creating a retreat where hospital workers can relax when off-duty.

The building's orientation and its maximisation of natural light will help to connect patients and staff to the world outside, allowing natural cycles of light to permeate the health centre.

The health centre's interior spaces are programmed to optimise these cycles, with the wards situated in the south facade to give patients access to maximum sunlight and warmth, and the inpatient and staff spaces in the north, where light is softer and more filtered and therefore better for office and consulting work.

Maintaining this connection will help prevent disorientation and isolation as well as supporting healthy sleep patterns and combating depression.

16. Regarding physiological manifestations of stress recovery, laboratory and clinical investigations have found that viewing nature settings can produce significant restoration within less than five minutes as indicated by positive changes, for instance, in blood pressure, heart activity, muscle tension, and brain electrical activity (Ulrich, 1981; Ulrich et al., 1991)

17. Nakamura and Fujii have carried out two studies in Japan (1990, 1992) that measured brain wave activity as unstressed persons (non-patients) looked either at plants or human-made objects. In an intriguing first experiment, the researchers analysed

alpha rhythm activity as subjects viewed: two types of potted plants, each with and without flowers (Pelargonium and Begonia); the same pots without plants; or a cylinder similar to the pots (Nakamura and Fujii, 1990). Results suggested that persons were most wakefully relaxed when they observed plants with flowers, and least relaxed when they looked at pots without plants. In the second study, they recorded the electroencephalogram (EEG) while persons were seated in a real outdoor setting and viewed a hedge of greenery, a concrete fence with dimensions similar to the hedge, or a mixed condition consisting of part greenery and part concrete

(Nakamura and Fujii, 1992). The EEG data supported the conclusion that the greenery elicited relaxation, whereas the concrete had stressful influences.

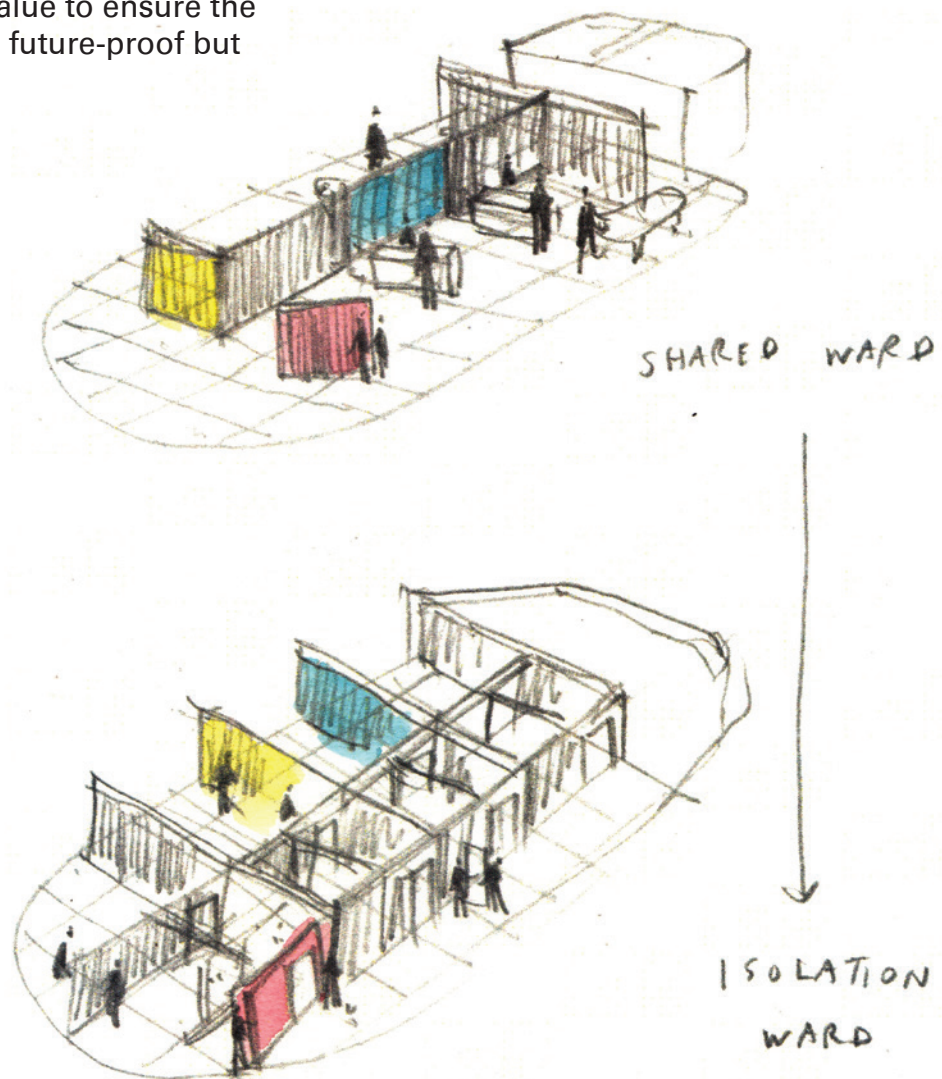
18. Well-designed hospital gardens not only provide calming and pleasant views of nature, but can also reduce stress and improve clinical outcomes through other mechanisms, for instance, fostering access to social support and privacy, and providing opportunities for escape from stressful clinical settings. (Ulrich, 1999; Cooper-Marcus and Barnes, 1995).

Flexible and Future-Proof

The Living Systems Health Centre is prefabricated, modular and adaptable, tailored to respond to the changing needs of its users.

Progress in healthcare represents the biggest challenge to healthcare design today. As healthcare services change, and with rapid advances in science and technology, a hospital or health centre designed as a rigid structure can easily become obsolete.

We have designed the Living Systems Health Centre to be flexible throughout: engineering in added value to ensure the health centre is not just future-proof but 'future enabled'.



Flexible CLT (cross laminated timber) partition system being reconfigured from six-bed shared ward to four isolation rooms

Flexible and Future-Proof: Structure

While the cores, heavy plant and the containing perimeter are fixed – the latter through the configuration of steels, columns and large timber beams – a flexible, integrated M&E system will run across the health centre's internal framework to maximise the fluidity of what lies inbetween, allowing for rapid change and transformation.

'The building should have a permanent spine and nervous system with regenerating limbs that can be "regrown" as necessary when change occurs.'

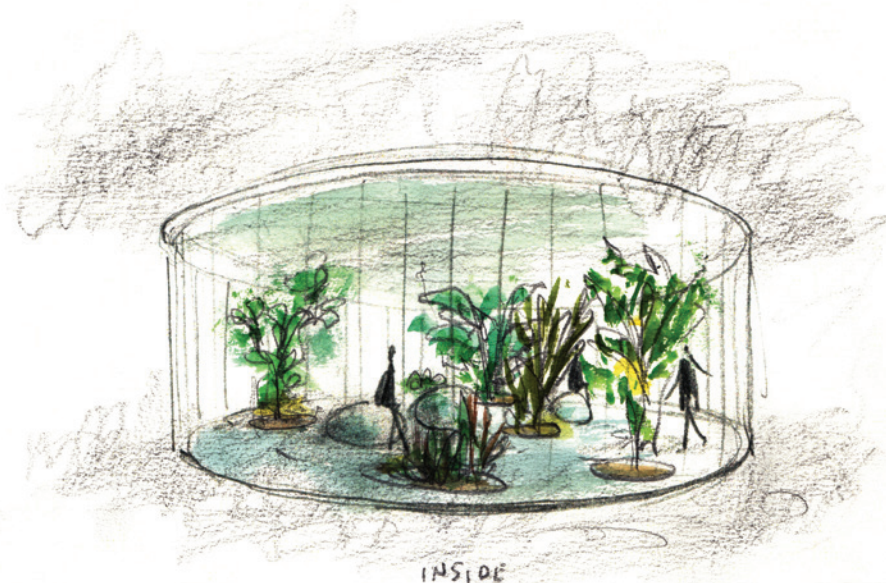
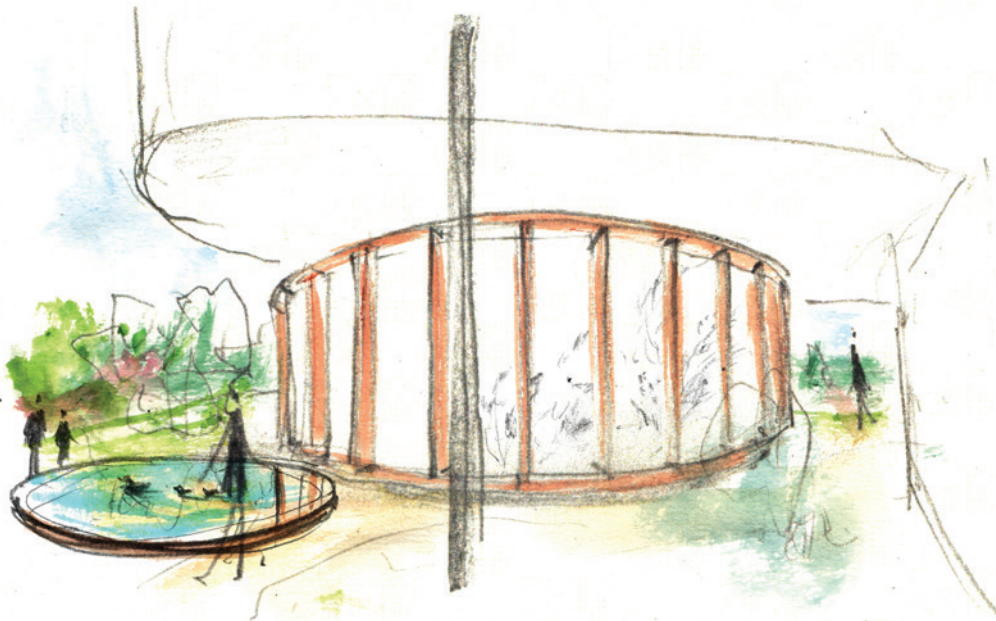
Phil Armitage, Senior Partner, Max Fordham

Future-proofing the health centre through integration of flexible components is the most efficient way to avoid waste and allow it to adapt, change and transform, extending its life span and avoiding obsolescence. This flexibility prevents long-term waste, including waste of materials in the demolition of fixed structures, waste of time in the disruption caused by retro-construction, and waste of energy in the application of non-modular solutions.

Internally, the building's compact design is composed of a dry-fix kit of parts that can be reconfigured in many ways while maintaining consistent acoustic and thermal separation between spaces. It also enables rooms to be reorganised through mechanical means (without knocking down walls, generating unnecessary waste or disrupting the running of the health centre). This way, an office could be turned into an operating theatre, or a six-bed communal ward could be transformed into a series of private rooms or isolation units.

Flexible and Future-Proof: Programme of Use

The health centre's design will support a programme of overlapping activities in its spaces, allowing for multiple uses at different times of day. Its facilities – the hydrotherapy pool, gym and yoga studios for example – will be available to the community outside working hours, and key spaces (like the doctor's sleep pods) will be available as extra office spaces when not in use. This is part of a general approach that seeks to maximise efficiency and minimise wasted space in the building, ensuring it works as hard around the clock as the people it serves.



Contemplation Space – outside and inside

Flexible and Future-Proof: Sustainability

‘Planet Earth, our home, is a system. For materials, the system is essentially closed, with elements being conserved in cycles of assembly and degradation. For energy, the system is predominantly open, powered mostly by incoming solar energy. A myriad of processes work in tension to produce an equilibrium which creates the narrow range of conditions needed to support life. Life uses energy to increase the level of organisation of components, from atoms to molecules, molecules to cells, cells to organisms and organisms to ecologies, seemingly cheating the second law of thermodynamics, if only briefly.

‘Through our collective vision of a hospital of the future, we bring this system-level thinking to help address some of the major challenges of our time – countering global warming by decarbonising the construction and use of buildings, using materials in more respectful ways and reversing the decline in biodiversity.

‘Our approach prioritises passive design, the extensive use of naturally produced organic materials and the therapeutic powers of natural light.

‘The aim of passive design is to create spaces which remain comfortable with the minimum use of active systems. The circular plan of the upper parts of the building has a low form factor creating a thermally efficient envelope with minimal quantities of insulation material.’

Phil Armitage, Senior Partner, Max Fordham

‘Our approach is a change of paradigm in the sense that it sees hospital health as a social investment, a long term one.’

Javier Botella, Economist at Tesco PLC



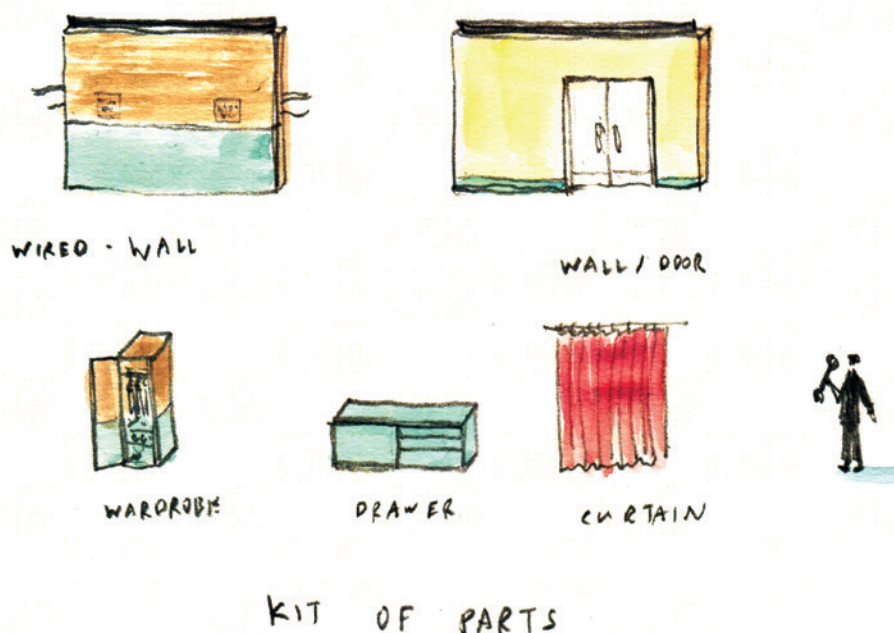
This approach relies on creating the most from the least, minimising waste and prolonging lifespan by investing in the present – in low carbon materials, reuse of existing materials and adoption of low energy solutions; appropriately scaled architecture, minimised spans and high level flexibility – to protect the future both financially and environmentally.

The design maximises natural resources provided by the site. The earth from the raised park will heat and cool the building, while green planting will create shade and offset solar radiation. We will use captured and stored rainwater to hydrate internal plants as well as the crops within the rooftop allotment.

The building will utilise prefabricated, industrial components. Standardisation of these components will allow us to create an efficient supply chain for the structure via a centralised factory and warehouse that will create and house prefabricated components (such as steel columns, wooden beams, curtain walling etc.) that will be sent to site for easy assembly. This approach will maximise economy of scale in production and maximise efficiency, speed and agility. Making use of local labour and skills will support local economy and further minimise waste in transportation of labour while capitalising on local investment in the area.

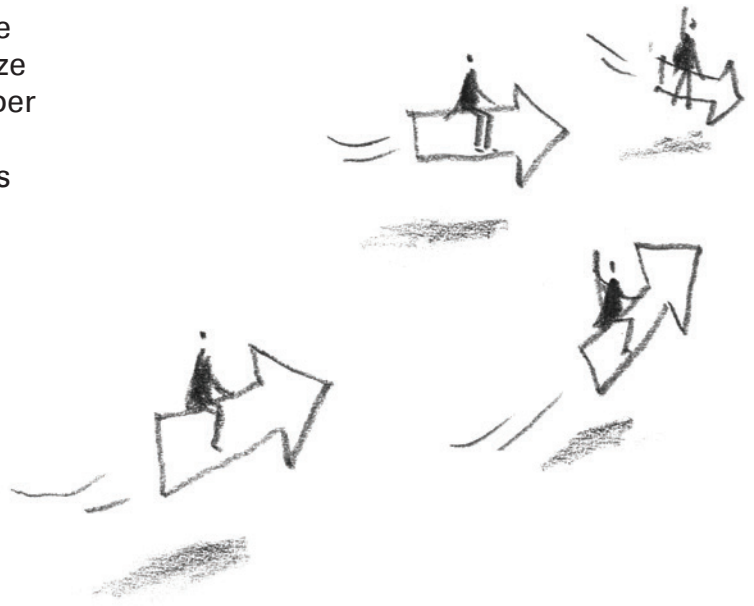
The Living Systems Health Centre is an advocate for localism at every level, utilising local kitchens and supply chains to minimise food miles. Inspired by Alder Hey Children's Hospital, where food is cooked on every floor, it will supply fresh food born out of the community that is designed around the patients' needs and tastes and can be tailored to the individual. What waste is generated will be composted on site for use within the building's gardens where possible.

The health centre will offer a limited car parking provision for emergency and accessible parking only. This stance supports our bid that the health centre be fully integrated into the local community, its inner-city location rendering it accessible to a wide-reaching sector of society by foot and public transport, the rest served by either dial-a-ride or local authority provided patient transport services. Limiting car use in the health centre's immediate vicinity will contribute to the creation of a more peaceful environment for healing and recuperation, as well as supporting the health centre's position as a source of education on healthy and sustainable living. In this way, the health centre can help its local area align with the widening list of cities experimenting with limiting car use or pledging to reduce private cars in their centres over the next decade.



Ideas Still to be Explored

In developing the initial ideas from our Stage One proposal for the Wolfson Economics Prize into our final submission, there were a number of areas we were unable to expand further within the timeframe of the competition. This section includes the proposals that we could not develop but believe would be of great value to future health centres and hospitals.



Ideas Still to be Explored: Communication

‘Apprehension, uncertainty, waiting, expectation, fear of surprise, do a patient more harm than any exertion. Remember he is face to face with his enemy all the time.’

Florence Nightingale

Creating actively caring environments involves the consideration of how and what those spaces communicate to the user. Visitors, who may already be anxious about their visit to hospital, can feel confused and disorientated when overwhelmed by multiple and often conflicting strands of information. This confusion compounds the general feeling of impotence and insignificance that can assail an individual when faced with the complex mechanics of a hospital.

Health centres and hospitals should be places of clarity and order, with spaces where you can pause to breathe, absorb information or prepare yourself for what is to come.

A rational, holistic and intuitive communication strategy that considers and empowers the individual can create a hospital that is welcoming and reassuring, making the user feel valued rather than disenfranchised.

Achieving this is as much about controlling methods of messaging as much the content. We recommend:

- eliminating visual noise, aggressive logos and competing advertisements to ensure that the visual communications people receive on every level – whether branding, art or uniforms – are calm, clear and human-centric.
- dressing staff should in uniforms scrubs that make their role clear. These should be designed to support their jobs, while being comfortable and presentable enough to make them feel proud of their role and appear approachable to visitors.

- providing patients with a human guide on arrival, who will support them through the health centre experience. Such guides should be trained to understand the patient’s health holistically, to offer psychological support on top of their medical specialisms, to read a patient’s state of mind and know how to communicate medical news with absolute clarity and empathy.
- systematising regulatory information to prioritise human-to-human contact. Pieces of tangible communication such as directional signs, information boards on walls, physical literature and forms that need to be filled, must be designed for the patient, so that it can be humane and intuitive.
- using light and sound to demarcate different areas of the health centre, signalling shifts in mood and flow of time, modulating functions and atmosphere and creating structure.

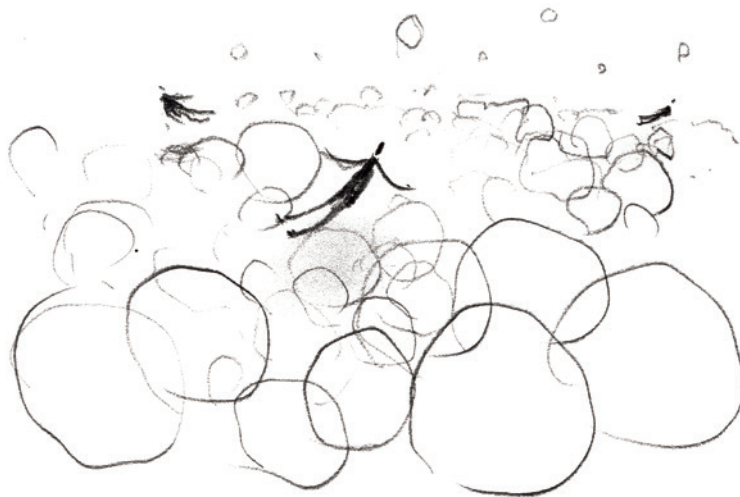
As health centres need to be accessible to all, it’s important that the visual and verbal language is inclusive and caters to diverse communities. Visual and verbal communication must be simple and clear to those not fluent in English or who have needs that make everyday tasks challenging.

Ideas Still to be Explored: Digital Technology

Digital technology has become a vital tool for allowing medicine to become more preventative, personalised and precise. It allows health centres and hospitals to extend and operate beyond their physical walls. New technologies are constantly emerging and will ultimately completely revolutionise the way all health care is delivered. But as patients and healthcare workers adapt to new digital solutions so must the healthcare space adapt to accommodate these innovations.

Some of these emerging technologies enabling this paradigm shift in healthcare are:

- **Telehealth**, the uptake of which in the two years since the onset of the pandemic¹⁹ is redefining the hospital as a hub. The hospital-as-hub supports satellites elsewhere in the city, such as primary and specialist social care centres and even patients' homes.
- **Virtual Reality**, which has the capacity to expand the architecture of the hospital. Its applications are continually emerging but it currently has proved very successful in offering pain relief to patients²⁰ and stress-relief and as well as providing a sense of escape via VR retreat spaces to staff.²¹
- **Patient-facing technologies**, like wearables, apps, online communities and patient portals and electronic health records that empower patients to manage their own healthcare and to engage directly with healthcare providers.
- **Data sharing**, that facilitates information flow between patients, the hospital, other healthcare providers and even patients' families and visitors, while ensuring a critical level of patient data privacy and security.



All of these innovations must be integrated into the physical design of the health centre. This requires an approach that ensures the design of physical spaces facilitate new technological approaches to treatment, care and doctor-nurse-patient communication.

Design can ensure these innovations are sensitively integrated, that they are as unthreatening and intuitive to use as possible and that they do not hinder the primacy of human relationships in the hospital setting.

Virtual Reality is an excellent approach to pain management. It captures the mind's attention and blocks pain signals from reaching the brain. It's almost like a form of active hypnosis. VR provides tactile and sensory feedback and allows the patient to rally the neurotransmitter mechanisms that decrease pain.

'If you tell a nurse that you're a 7 or 8 on that pain scale, you'll most likely get fentanyl or morphine, but if you say you're a 3 or 4, you'll receive Tylenol. Being able to lower the pain in a non-invasive, risk-free way can be instrumental in avoiding potential opioid addiction.'

Helen Starr, Cultural Activist, Curator & Producer

19. The Nuffield Trust Report documented a significant leap in the number of virtual GP appointments from 25% to 71% and an increase in 'registrations to use the NHS app by 111% from February to March 2020.

20. A randomised trial at Cedars-Sinai Hospital in 2017 reported an average

3-point reduction on a scale of 0 to 10 for pain definition when patients were treated with virtual reality. The effectiveness of VR arises from its ability to provide multi-sensorial engagement that can compete with pain signalling while also decreasing anxiety.

21. BehaVR is a VR company specialising in digital therapeutics for behavioural health. It worked alongside John Hopkins HealthCare Solutions to create a VR-based mindfulness and stress management.

Ideas Still to be Explored: Humanising Hospital Uniforms

'Uniforms should give you an identity you can be proud of, communicating who you are and what you do to the outside world. As a doctor or a nurse, you are in a position of trust, and an ill-fitting, unfit for purpose uniform undermines that position from the start and makes it harder to do your job. They must be comfortable but personable as well.'

Dr Laura Benjamin, Neurologist and Principal Clinical Research Fellow, University College London

Studies have long concluded that in order to retain staff and enhance job performance in the health sector it is vital to improve their self-image and the public's perception.²²

A research report study 'exploring how nursing uniforms influence self-image and professional identity' found that uniforms in which staff feel well represented and can take pride 'lead to enhanced confidence and, therefore, better performance in clinical practice.'²³

Participants in the study acknowledged that feeling professional was important to self-image and that uniform played a large part in this. One highlighted that their current uniform was poorly fitted and generic, stating 'I don't feel very professional', while another said 'It's about self-esteem – if you feel awkward because something doesn't fit properly then you're less likely to be assertive.'

Our approach to the design of uniforms for the health centre staff is to treat them as pieces of clothing that should be enjoyed by the wearer, presentable enough to make them feel proud of their role, as well as appearing approachable to visitors. This enjoyment will stem from the wearing of a garment that is fitted to their silhouette and feels comfortable, stylish and fit for purpose.

Working with sustainable techno fabrics, the uniforms can be customised through details like functional pockets and adjustable ties that can make wider legs narrow or turn tunics into fitted dresses. These pieces will feel individual to each person with personalised embroidery on pockets, designed to support their specific function within the health centre and to communicate that function clearly and positively to the patients they serve.



22. www.pubmed.ncbi.nlm.nih.gov/16441539/

23. www.nursingtimes.net/roles/nurse-educators/exploring-how-nursing-uniforms-influence-self-image-and-professional-identity-15-03-2010/

3. Collective Intelligence

Introduction

To envisage what the hospital of the future should look and feel like, it must be considered by a collection of diverse, multidisciplinary minds. Only through a co-design methodology can we create a truly holistic solution that engages the wider hospital community and responds equally to the needs of all users.

We have developed our vision of the Living Systems Health Centre by gathering knowledge from hospital staff, patients, visitors, and experts from diverse fields. This section includes roundtable discussions, expert opinions and a report that contributed to the development of our design.

This section begins with transcripts of three separate roundtable discussions that cover a number of different themes.

Next, we asked a collection of medical clinicians, academics, and consultants from various cultural fields to contribute short written reflections on the state of hospital design today. Their personal and professional opinions exposed key issues that influenced and informed the development of our design. Together, these pieces reveal many important facets of the hospital as an institution and its place in our lives.

Finally, we commissioned Publica, a London-based urban design and public realm practice, to prepare a report outlining three potential locations for the Living Systems Health Centre across the UK. Publica considered the health centre's potential to affect positive change in its local community and, if integrated into the right place in the right way, to act as a catalyst for urban regeneration.

Roundtable Discussion 1: The Mechanics of the Hospital

A range of experts from diverse fields – including medicine, cultural production, and urban design – discuss the power of localism, the relationship between the health centre and its communities, and the importance of building support networks for staff and patients.

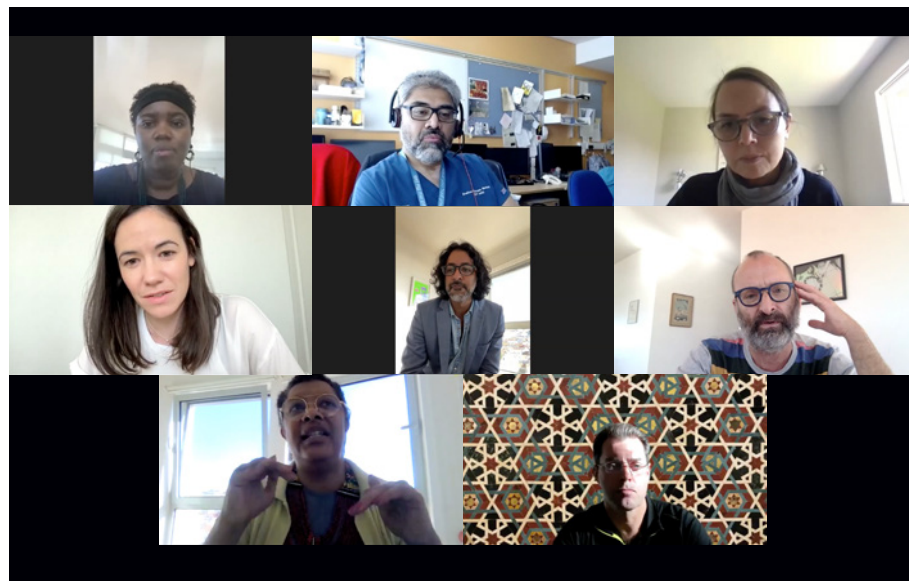
Participants: Toby Anstruther (habitat maker), Dr Laura Benjamin (Neurologist and Principal Clinical Research Fellow, University College London), Dr Ellie Cosgrave (Director of Community Interest Company & Research at Publica), Victoria Jessen-Pike (Principal Projects Director at Publica), Dr Hammad Khan (Consultant Neonatologist, St Thomas' Hospital), Dr Ash Ranpura (neuroscientist & clinical neurologist), Helen Starr (cultural activist, curator & producer), and Dr Mando Watson (General Paediatric Consultant, St Mary's Hospital).

Ab Rogers: Thank you for coming today. I'd like to begin the conversation by asking: How can we make this health centre as inviting as possible to the complex network of communities that surrounds it? We're thinking about social engagement as a tool to encourage people to enter the building. How can we break down barriers, so it's less institutional and intimidating?

Dr Ellie Cosgrave: It's important to think about the modes and mechanisms of engaging with existing community groups. How can you bring organisations and groups into the space so that people come with a trusted community they already belong to? You need to make groups feel that they belong in the space, and there needs to be a structured programme around that. One of the key things is to create a sense of familiarity using visual cues so that people think: 'I know what this space is, and I know what I can do in these spaces.'

Ab: One of the patients we spoke to said it was vital for her to be given tools to help herself rather than having to go to an institution. How can you extend that idea into something like the design of a health centre?

Ellie: Organisations can support that. For example, the organisation that I run provides healthcare services tailored to women who have experienced sexual



violence, and we are always thinking about how we can do self-testing for HPV. At the moment, you have to come in for some testing but are there ways that we can work with communities to bring those services out of the institution? You need an organisation that can create that access, which sits separately to – or in parallel with – the central organisation of the health centre; it's about partnership.

Ab: Can we have a medical perspective on this approach?

Dr Mando Watson: A balance is extremely important here. While you're trying to make the health centre more attractive, what you don't want to do is undermine external resources, whether they're from the voluntary sector, the local authority or primary care. One of the biggest challenges for the health system now is that people think their GPs are no good and that the hospital is full of expertise. So manifesting the hospital resource in a community-based, non-hospital setting is a great idea. It links back to the concept of the anchor institute, where the hospital is a trusted place for many, even if it's the enemy for some more marginalised users. We need to go in the direction of the health centre adding to its brand by putting its weight behind health initiatives that traditionally take place outside the hospital, such as early intervention and prevention.

Ab: We also need to ask how we can get primary care services to work more

in partnership with the health centre. At the moment, it feels like primary care could create a barrier to getting people into the health centre.

Mando: Yeah. But if you've got good resources out there, you don't want to bring them all into the health centre, creating a desert around it. You want to take the health centre and push it out.

Dr Hammad Khan: Looking at this current design, I can see a kind of moat around the health centre. There's a barrier. And that barrier is the road. As a cyclist and a pedestrian, I don't like it; it's intimidating. Any entrance to the hospital needs to be primarily accessible on foot, and if you're going to have space for cars, then that's got to be at a lower level. You need to create a safe space around the hospital that isn't so intimidating.

Additionally, the questions around air pollution and health and the impact of the urban environment on health really need to be considered.

Ab: We've removed the car park from the hospital specifically for those reasons.

Helen Starr: I was just thinking about the way they have pedestrianised the V&A – maybe we could make the hospital more accessible in a similar way? What you want to do is embed the hospital into the community and not have it look like a UFO that's just landed. Pedestrianising the road could achieve this.

Victoria Jessen-Pike: Yes, the public realm around hospitals is essential. At Publica, we've been doing work around the Royal London Hospital. Obviously, that whole area is huge and on a very different scale, but it's important that the spaces blend into the community. Even though there are green spaces inside buildings and everyone knows the value of nature, sometimes patients and visitors want to meet in a real-world space where other things are going on as a break from the hospital environment. The health centre could provide generous enough spaces so that community events and other things can happen there.

On the scale of a hospital, one can also balance vehicle-accessible entrances for people who need to come by car with other entrances for people coming on foot and by bike. The submission should find a way of showing something that's always going to be more complex than a building just sitting in a block. We can design variation around the building.

Dr Ash Ranpura: The scale of the space is a real issue. When we talk about this design, I think it's good to emphasise that we're looking at a large building on a human scale. It's important that people feel invited to do things in that space. The hospital's marketplace gives people a reason to come into the building.

In thinking about barriers more broadly, I had a patient who developed calciphylaxis in her limbs, which is an incredibly painful calcium deposition. She wouldn't take morphine. We sent in our ethics committee and religious leaders to talk to her. She refused morphine until finally, the dialysis nurse from the outside clinic who'd been treating her for 25 years came in and within five minutes, she agreed. Outside providers are often very, very trusted. You have to invite outside providers into the hospital. So often, in medicine, we create structural organisation barriers.

Ab: That's such an important consideration. To speak to your first point and to what Victoria was saying, we're very much trying to create a forum where other activities can happen. The idea of making people feel at home in the health centre leads to the question of scale. Many hospitals are giant cities in their own right – people get lost in them.

We are trying to create something on a more domestic scale. The question is: What is the correct scale? Making people feel less intimidated is key to getting them inside, so a domestic scale seems like a solution. But we're not doctors ...

Ellie: There is no right answer for a scale of healthcare; we need to think about an appropriate scale for any given activity or mode of care. We can make a case for this space suiting a certain type of wellbeing, rather than saying that all hospitals or health centres must be at this scale. We can say that there is a need to invest more in hospitals of this scale because we know that the size gives us certain qualities such as safety and community.

Small is not always better. To people affected by sexual violence, a domestic scale can be quite traumatic because people can feel more observed. Sometimes a larger space makes people feel more anonymous and therefore safer. In other instances, intimacy is required.

Ab: The idea of a smaller scale being more intimidating is really interesting. In our roundtable discussion with hospital users, we spoke to a homeless woman who asked, 'Where do I hide in a hospital like this?' An intimate scale could make someone like her feel too exposed.

Toby Anstruther: Coming back to the idea of community, I think we need to clarify whether we're talking about communities of interest or communities of place. People in communities of interest need to feel welcome in the hospital and like they're part of 'the club'. Similarly, in specialist hospitals that deal with particular issues – like the Royal Marsden or the Brompton & Harefield – we've also got communities of place, much like a traditional cottage hospital. This distinction is important for the design.

Ab: We need an integrated system. We need both cottage hospitals and super hospitals. An intertwined solution is vital.

One thing we're talking about in our plans for the health centre is the importance of different levels of stimulation. We've done a lot of work in our design around getting people moving. Last week, I spoke to a cancer patient who was talking about needing prompts

to get moving around again post-operation – something as simple as a change in environment or a conversation with a fellow patient can be a reason to get out of bed. So what can we do to get people moving? I suppose it's about designing nudges and cues.

Ash: Helen's virtual reality [at The Mechatronic Library] may really help. There's good evidence that the mental rehearsal of movement will help bedbound patients move in the end. And it will be great when we can do this as a real experiment to see if the mental rehearsal of movement can shorten the discharge requirements of patients. Another defining feature of this health centre is the access to gardens. A lot of the problems we're talking about are solved by gardens – they're a good way of encouraging people to move without really telling them to do anything. If you let patients go outside, and there are lovely things there, people will tend to move. If we can wheel beds outside, we can also provide consultations in the gardens.

Ab: I have a dear friend Lucy who is in hospital with leukaemia, and the most important thing for her to feel empowered rather than impotent is to treat her days as if they're normal, functioning days – to have work calls and make decisions and feel needed. How can we keep the hospital empowering us and not pulling us back?

Virtual reality is really interesting – especially for patients who are otherwise confined – because you can go somewhere else without leaving your bed.

Helen: There are many easy ways to use it. For example, when Ash was talking about the outside provider helping the patient who wouldn't take her medicine, they could actually have done that via virtual reality. It's more immersive and intimate than someone calling in on the phone or over video because you have what's called copresence, where you actually feel as if the person is physically in the same space as you.

Dr Laura Benjamin: We need to think about other kinds of movement: movement of mind, movement through sound, through touch – they're all stimulating. Sometimes they get approved dogs to come into the hospital, and people just stroke them. It's therapeutic.

A lot of people can't walk in hospital, but stimulating their mind or other parts of their body gets them ready and motivated. It's key to rehabilitation.

Ellie: Virtual reality has great potential for bringing all sorts of consultations to different types of spaces, although we have to acknowledge the kinds of experiences that you cannot have virtually. We've felt that through the pandemic.

We also need to expand human contact and connection – connection with animals, with nature – and to make sure we are being imaginative. We can't just replace traditional types of care with virtual reality. The tangible connection offered by physicality is really important.

From a personal perspective, I think about joy in movement. Wouldn't it be wonderful if we consulted dance artists to think about why we move and how we move? We can be imaginative about the type of knowledge that's out there about movement.

Ab: There's a great precedent in the Bristol Royal Hospital for Children, where they do a lot of performances with the kids in order to do exactly what you're saying.

Ellie: I would place that alongside a narrative around tech innovation and virtual reality, which can be linked to movement innovation and physical reality.

Ab: It's imperative that we have all these different components. We're certainly not prescribing a purely virtual world. Virtual reality becomes really interesting when you start looking at pain management or establishing a sense of escape. There could also potentially be benefits for staff. When you are in these very stressful, tense places, being able to jump in a swimming pool or be by the sea would be fantastic.

Toby: It's important we think about the health centre as both a physical place and a distributable service. This can lead us to think about how innovations like virtual reality might be distributed and accessed outside the health centre.

Ab: This idea of virtual reality leads me to the next question, which is really

about the senses. The idea of sensory stimulation through sound, smell and taste is something we talk about a lot. But I suppose, how far can you take it without the risk of alienating some users? For instance, some users might really respond to sounds being piped around the health centre, but there's a risk that others might find it monotonous. Smell, I guess, is even more controversial.

Ash: Smell becomes a bit tricky, as many hospitalised patients will struggle with nausea. For some patients who are transitioning to discharge, stimulating scents will be really nice, but nausea is a huge issue in bedbound patients.

Stimulation through light and circadian rhythms is also really important. Circadian rhythm disruption has been shown to be linked to psychotic episodes in hospitals and, conversely, maintaining circadian rhythms has been linked to speeding up discharge. So I think the health centre's garden spaces are important because they maintain a natural day and night cycle, and that can become part of the ward as well.

Hospitals are getting a lot better at night. I think now most major hospitals have no consultations before six in the morning and no loud noises after ten at night. So this cycle of light and dark is really important.

Ab: We've done a lot of work on the sense of time in the health centre and trying to create prompts throughout the day (like playing recorded sounds of birds singing in the morning and making things quiet in the afternoon). We've tried to coordinate the lighting so that even when the sun goes down, warm lighting provides a feeling of security.

Laura: I think of this in terms of different compartments. I think of the compartment of the patient in the hospital ward, where you want to try to stimulate healing. You probably want that compartment to be soft in sound and lighting. In the daytime, there should also be enough darkness for them to sleep. And then you have a communal area, which I suspect you'd want to be more uplifting and inviting, both for the community and for the people who are anxious and waiting for appointments. And there's a contrast between those two places.

Ash: I listened to Nick Luscombe's nature sounds, and I thought they would fit well in a hospital. The sounds weren't too overstimulating, aggressive, or new-agey; they were really natural. They seemed like the kind of sounds you would hear outside. I was surprised because I wasn't expecting it to be as peaceful and pleasant as it was.

Ab: Nick Luscombe composes soundscapes for specific spaces. He's currently working in a hospital in Tokyo, creating soundscapes to stimulate healing. The next evolution of his work there is trying to pipe in sound directly from the countryside. He's planting microphones in fields of cows. You press a button, and suddenly, you have all these cows mooing in your space. I spoke about this to my friend Amanda, who's recently spent some time in hospital, and although she wasn't keen on the thought of mooing in her room, she liked the idea of putting a microphone in the middle of the earth and hearing the earth breathing. These things are so personal. You need to have control.

Ellie: It is a very playful idea. And the idea that you could choose is really important. Maybe if I had options to choose from, I would feel I had control over the sounds I was listening to and that I was part of something – that I was connecting with different parts of the world. The idea is more compelling if it has that playful element and involves patients establishing some sense of agency.

Victoria: A hospital is such an artificial environment. Everything is controlled: every bit of air, every bit of sound. And I think those opportunities to get into the outside world are important, providing the patients with the opportunity – not just on the ground floor but throughout the building – to get back out into the real world and be outside. I don't know what others might think about people's need for that from a clinical point of view.

Helen: I would second Ash's comment that what's pivotal about this design is the gardens, which would be really good for your sense of agency. In hospitals, you get that feeling that you are sort of trapped in this stuffy, overheated place. So the idea that you can safely step out into a different environment and have

a breath of fresh air, even if it's for 15 or 20 minutes before you go back inside, is so important.

One thing I would add about virtual reality is that they've found that the positive impact of virtual reality is as effective if it's 15 minutes long or two or three hours long. So, for example, if you have a virtual reality experience that's very relaxing – like if you're by the sea looking at waves – 15 minutes of that is enough to calm you right down. And that effect lasts for 24 hours. So, again, I think what these gardens provide is a moment of respite, and that would bring a lot of agency and purpose to a patient.

Ab: Toby, you must have thoughts on sensory stimulation?

Toby: I completely endorse what other people have said about the need for some sense of agency. We're probably also moving to a point in healthcare where instead of trying to get rid of all microbes and germs, we're looking at how we use them or what the balance is between them. I suspect that sort of environment and integrating nature is very important. Smell is such a cue, isn't it?

Ellie: For me, hospitals already have a strong, unpleasant smell. And I think we need to think about a smell a bit more subtly. Is there a way we can neutralise some of the hospital smells? Are we aiming for no smell? If so, what would that be like, and what would the challenges be around that?

Ab: It's all these disinfectants fighting with each other, isn't it? I think what you're saying is absolutely right. We've been talking to Lyn Harris, the perfumer, about creating therapeutic smells and the idea of masking hospital smells.

In Alder Hey Children's Hospital just outside Liverpool, every ward has its own cook. (It's also worth mentioning that Liverpool has one of the highest rates of obesity, malnutrition, and eating disorders in the country.) It costs a little bit more in the short term, but long term, starting to educate families and children about fresh food will pay for itself.

Of course, properly prepared foods on the ward must really change the smell. In my fantasy for this hospital, you'd have these beautiful smells of tomatoes and garlic cooking, but I'm sure,

as those smells drift through the wards, they're probably going to make some people sick.

Ash: I think it's important for us as a design group to remember that a lot of problems with hospital smells are because of caustic irritation. It's not really the smell of the disinfectant; it's that it causes a little bit of a burn of the nasal epithelium. So we can't really cover that up. Even if you layer a smell on top of it and you're unaware of the smell of the disinfectant, it still causes nasal irritation. But I agree with Toby's point that eventually, we'll move away from this idea that we can disinfect every surface. I don't think we need to disinfect as aggressively as we do in hospitals.

Laura: I hear what you're saying. There's also that reassuring feeling of the smell of disinfectant. When you go to hospital, it's reassuring to know that things are clean. So we can't take that for granted. But the smell of cooking is definitely a cue for knowing you're going to eat. And that's actually quite exciting sometimes, no matter how bad the food is.

Ash: We could create a very subtle cycle of smells in the health centre, so the smells become meaningful. Because you're absolutely right, we typically use smells as cues. So there could be a smell that cues you for the morning, a smell that cues you for lunchtime and a smell that cues you for nighttime. Anything we can do to demarcate the day is really helpful.

Laura: Exactly, it encourages mental agility and activity. Cueing can be really helpful in the rehabilitation process.

Ab: Which then brings us to taste. I talked to our friend Lucy about her palette, and she only wants to eat really bland things. Putting a chef on every ward can only be a positive thing, but how we can cater for the many palettes and the mouth ulcers and all these horrendous things that go with the hospital experience?

Laura: Taste and smell go hand in hand. I wonder whether the garden could stimulate smell. We see a lot of it now with Covid-19, where people lose their sense of taste and smell,

and they're having to retrain their senses using pungent smells like mint. The building could contribute in that sense. And we may not be able to mitigate taste, but we can work on smell; it's more accessible.

Toby: One of the problems with existing hospitals is that they work at scale. They aim for maximum output for minimum diversity to get economies of scale. What you've designed expressly pushes against that.

These ideas play back into smell, into taste, but also perhaps into the design of the food, something that is much easier to customise by yourself rather than being given a whole dish. And we may not have a chef in every ward, but perhaps we can have some choice in how we constitute our meals.

One thing I was slightly worried about when looking at your design is that it's naturally grown, and seasonality plays out. I wondered what your images would look like in the middle of February. I wondered whether a vertical farm with LED lights might be a way to cover some of that gap and also use the darker spaces of the building. And this could allow us to change the flavour of vegetables and herbs, depending on what light they're given, as different coloured lights will change the flavour of what you grow. And so we'd be able to play around with taste through the lighting of those vertical farms.

Ab: It's a brilliant idea. And I love this idea of tuning the flavours through light.

Victoria: The garden and growing things are also part of the therapy, aren't they? I mean, that's part of the idea.

Ab: Completely. But I think Toby's worry is when it's winter and we just have cabbages.

That probably leads us to my final question, which is about how one can improve the supply chain (because the concept is to try to keep everything as local as possible). Obviously, we're building a health centre out of timber, and the timber's not coming from Hackney. But beyond that, I want to think about how we can create a very local market to avoid sourcing materials that need to travel miles from everywhere. Who wants to talk about locality?

Toby: I think locality is something that makes us feel good, but it creates practical limitations on what you can do, particularly if you're in an urban context. However, I think that the social capital around locality is really important. And particularly coming back to the ideas expressed at the beginning of this conversation around community and engagement – a sense of tying in local suppliers is a really good thing. So even if it's not about growing coffee beans in Hackney, it might be about where they're roasted. I think that a map of the supply chain is really key.

Victoria: And this is not necessarily just about how materials are localised, but also human resources, and the ability to make a positive contribution in terms of employment through construction and all those stages. I mean, that's what everyone is trying to do in development terms.

Toby: If you look at the Sagrada Familia, it has a school onsite because construction has been going on for a hundred years. There are kids who went to school there who are now working on it. Now, this health centre won't take a hundred years to build, but that school properly knits the building into its community.

Ab: We hope this health centre will be very, very speedy to build. And I think we very much see it as a tool for urban regeneration and as a hub for employment. And in order to do that, we want to try and make things as local as possible – so locality is really a key part of the picture.

Victoria: I'm not sure how relevant this is, but I went to a talk by Gary Elliott of Elliott Wood, a structural and civil engineering practice, and he was describing what a quiet process it is to construct with timber, as you don't have the noise of hammering and drilling to the same extent as you do with a concrete or steel building. Perhaps using materials that aren't noisy should be an important part of the building process if we're considering the impact of noise on construction workers and the local neighbourhood. I think that's all part of the environmental agenda of the building. And beyond this, the acoustic qualities of certain materials also contribute to the sensory experience of the finished building.

Ab: I've never thought about the quiet building. That's really interesting. The hospital's interior has no plasterboard; it's all made out of TLC partitions that can be moved around and rebolted. And the resonance of acoustics in that situation is so much more pleasant than with hard surfaces.

Ellie: Just to add an anecdotal experience – at UCL, we've built a new lab called Pearl. And part of the purpose of that building is to create any type of environment. It's a massive airport hangar size building, but they've managed to get the acoustics to feel like you're in a bedroom or living room. I visited when it was still a building site, but it felt like there was no echo – it was an extraordinary place to be. And the sense of courtesy and peacefulness on that building site was palpable. My sense is that it was to do with the lack of aggression in the sounds of the atmosphere and environment. Of course, that's anecdotal and just my personal experience, but it felt very profound to me.

Ab: It's a proper nudge to have that level of calm.

Ellie: But also, I don't want to live in an entirely courteous and gentle atmosphere all the time; we also want to go to raves where that tension is appropriate and exciting. It's about what is appropriate where.

Ab: Completely. I don't think you necessarily want to have a rave in the hospital (unless it's in Toby's illuminated basements).

Ellie: A garden rave. Perfect.

Roundtable Discussion 2: The Patient Experience

A group of frequent hospital users from a range of demographics discuss the nuances of accessibility and how the health centre's design could help balance users' needs for personal privacy, safety, and social interaction.

Participants: Hospital users Bug, Grace, Joan, Katie, Luca, Monica, Rachel, Stan, Tony, Tracy, and Dean Walker (design director).

The session begins with a presentation from Ab Rogers Design on their vision for the Living Systems Health Centre and how they would realise it.

Ab Rogers: I'd love to get your thoughts on the idea of the health centre opening its doors to the community. Instead of it being an off-putting, hostile environment, why not make it a place you can come for a massage or acupuncture, or to go to the GP, or the gym, or to buy fruit and vegetables?

Grace: I really like that idea. It reminds me of when I was at Great Ormond Street. In the middle of Great Ormond Street, there is a massive area where they put all the trees and activity equipment and benches. Because let's face it, when you're in hospital, all you can do is get out for a fag on the park bench outside.

And in regards to the centre opening its doors to the community – you need to give the tools to the actual communities. So, for example, let's take sex workers and vaccines. They are a hard-to-reach group, so they were trained to administer vaccines within their community during the pandemic because hospitals just didn't bloody know how to. Something like this empowers the community to deliver health interventions themselves. Why don't you just give us the tools, and we can do it?

Ab: Giving tools to the community is essential. We also have to adapt to the local community.

Rachel: It's a brilliant idea. The hospital can be a very lonely place, so it would be very good for people's mental health and wellbeing.

Ab: We're going to take you through the design for the hospital shortly. We're really interested in your thoughts on the market sitting directly underneath the



hospital rather than as a standalone place.

Bug: Having something like that downstairs is going to be ideal. Because when you're a patient in a hospital, and the hospital feels not very nice, to be able to get fresh food from downstairs is a really, really good idea. And also having green spaces – if you were in a hospital bed for weeks or months on end, having somewhere nice you can go and sit does help.

Joan: What about the patient who just wants a nice quiet place to get well and recuperate? Won't this market bring in a lot of hustle and bustle?

Ab: Yes. But we have direct cores that can take you straight into the hospital, avoiding the market if need be, and, of course, the accident and emergency side of the building, which doesn't interact with the market at all. But it's more the idea of having a kind of 'town' to come into rather than a car park. We're trying to create an environment that becomes part of the community so that people will be less scared of it.

Also, we're all sitting in London, which is full of hustle and bustle, but in many of Britain's cities, with the recent plight of retail, the city centres are feeling quite empty. So we want to bring some bustle back to them. In this way, we can see the health centre as a way of activating the local community.

Tony: But shouldn't we be wasting less money building hospitals and spending more money improving the hospitals we already have?

Ab: That is a very good point, but we have a lot of problems with how existing hospitals perform. There aren't currently enough hospitals, and often it is more expensive to refit existing hospitals, so we need to build new ones. Although, part of our work at ARD is to look at how we can refit existing hospitals and improve how they perform and feel.

Grace: I fucking hate going to hospital. I find it boring, soulless – you're in bloody bed all day. But if the doctor was like, oh, there's a better hospital where you can at least relax and sit somewhere nice outside, I'd be like, maybe it's not that bad. There's nothing worse than just laying there, and all you've got is an overpriced Boots sandwich and a Sudoku book, and everything's shut after five o'clock. It's just soulless.

Ab: There's something quite wrong about having these profiteering companies like Boots selling second-rate sandwiches in hospitals. There must be a way that we can find local vendors who are interested in providing a proper service to patients.

Luca: When I was in hospital, I was treated really badly. They need to look into making hospital cafeterias more hygienic because some of them aren't hygienic enough.

Tracy: It's a good idea to have the market underneath. My partner was in hospital for seven months – he was so bored, and they didn't look after him very good. So to have things to distract you and keep you entertained and things like that would be a great idea.

Katie: Being in hospital can be really boring, and it would be great to have somewhere you can go just to feel a bit of normality, even if you have to go down in a wheelchair with your oxygen or whatever.

Monica: My nan was in hospital for nearly six months, sadly, before she passed away. But the way she was treated in hospital was diabolical. Only one family member was allowed in at a time to see her, and she would always be phoning one of us to complain that she was bored or that she'd only had a sandwich or some soup to eat. So I think the market would be a good idea.

Ab: Now that we've begun to discuss the relationship between the health centre and the community, we should focus more on what you think of the patient experience that our design proposes.

Rachel: Okay, so two things. Firstly, in the park, would there be gym facilities? And also, what safety measures would be put at the top of the building where you're growing vegetables? As some people do get lonely and very isolated in hospital, and things happen.

Ab: Two really good points, Rachel. In the park, we have these pavilions that contain gymnasiums, but maybe you're right, and we should be thinking about having outdoor equipment in the park as well. And I think, of course, one of the risks of having all these high-level external spaces is, as you say, that people get desperate ...

Rachel: A hundred per cent.

Ab: So, we do have partitions, but we need to look more at that level of security. We're not so naïve as to believe that if we make the space beautiful, no one will want to jump.

Rachel: I think there should be a check before someone goes up to the garden,

so you know exactly who's going up there and if they're vulnerable.

Ab: In our thinking, it's by invitation only at the moment. But also, we're hoping to make the place more accessible and open to volunteers and other people who might be interested in using it, like when your partner who likes gardening comes to visit and then becomes a volunteer for the garden.

Grace: Smacking the bereavement centre next to the kitchen and the daycare centre, particularly if they've had a child pass away, might be a bit difficult.

Ab: What we're trying to do is get the bereavement centre out of the back of the building because so often, it's found in the depths of the hospital. And we think it's very important that death becomes part of the conversation.

Grace: Absolutely, it needs to be open, but next to the kitchen might be a bit loud, with people shouting and stuff.

Ab: We need to relook at that, but the adjacencies are really complicated. The bereavement centre is the place we've spent the most time moving around.

Dean Walker: So, at the moment, you have a very public side of the park where the restaurant is, and you come round to a much quieter park, and the bereavement centre is located next to the library on the north side. But you're right; we'd have to make sure there was enough acoustic separation.

Grace: Also, if you've eliminated parking, what about parking for staff?

Ab: The health centre will be based in the inner city, where it's often really hard to use a car, and there are many other modes of transport. If we're building new hospitals, they need to be about getting people better rather than parking cars. So much space is consumed by car parking in hospitals at present.

Bug: What about patients who are hard to work with because of stigma about homelessness or something like that? They won't want to mix with other people in the ward because they might feel they're going to be talked down to

or people will be funny. Would you consider a quiet little area where people who don't want to be around a load of other people can just go on their own?

Ab: It's very important to have quiet space. I think we have private rooms, and we have public rooms, but it's hard to start hiding people from one other. We need to be a more inclusive society, and we hope that by treating people with respect, they can forge more relationships. But maybe that's being naïve ...

Bug: What I'm saying is that for someone who's homeless, if they get treated badly, they'll clam up, and they won't want to be around anybody else; they'll be unsocial and hard to work with. And that's not fair on them or other people. I know what it's like – if you're homeless and you're an addict, the only thing you care about is your habit. You don't care what you look like. And people will walk around hospital in the same clothes for four or five days and refuse to clean themselves up, and all the other patients will be moaning. So it's hard. That's why I'm saying if there was a place where people could just go to be on their own, wouldn't that be better?

Ab: I fear there is a risk of then confining that anti-social person to their bed. But maybe there could be a room – like a little glass cubicle – where someone could go and be by themselves and read a book or something.

Joan: Yes. The individual needs somewhere to go to be alone, so it's not just a choice of being with people or in bed. The majority of people would like to be part of a group and to share. But even on the best of days, everyone needs a bit of headspace.

Ab: It's true. Everything in the current design is very open. We need something like a little reading room.

Katie: Is this hospital just for medical needs? What provision is there for mental health patients?

Ab: The health centre is designed around care, and the specifics can be adjusted depending upon the wards that are there. We are very interested in creating an environment for mental health issues as well as physical health; for us, it's

about improving health overall. We are working to break the mundaneness of the hospital experience so it doesn't feel like you're in this monotonous environment – you're in a much smaller, more caring space.

Tracy: If patients were in hospital for a long time and getting better, would they be able to do gardening on the roof?

Ab: Absolutely. That's very much what the garden is for.

Monica: I was just reading about the homeless being discharged back to the streets after being classed as 'bed blockers'. One of my clients was basically chucked out within 20 minutes of us arriving at the hospital because they didn't want to give her a bed. So she headed back to the streets and then sadly passed away two days later.

Ab: That's shocking.

Monica: It was absolutely devastating. She was in so much pain. Yet they didn't want to give her a bed because the homeless are classed as second-class citizens, and they don't give a damn about the homeless in hospitals. If she'd been in the hospital and had the right treatment in the first place, it wouldn't have happened.

Stan: I think it doesn't really matter what the hospital looks like; what matters is the treatment you get. I think that, as always, the government are pitching the ball in the wrong park. We should be looking at urban and suburban regeneration, which includes community health hubs at a primary level and not just a secondary level. If you think about it, people go to GP surgeries to live and hospitals to die. And the reason they do that is that hospitals are very much the end of secondary care. And when you end up in hospital, the chances of surviving are lower than if you end up in primary care. Your ideas about regeneration and a health system that's part of a community hub are fantastic. If you combine that with good-quality housing, education, and transport infrastructure, we'll end up reducing the need for secondary healthcare until people are much older. And transforming some hospitals is far simpler than transforming the whole of societal thinking.

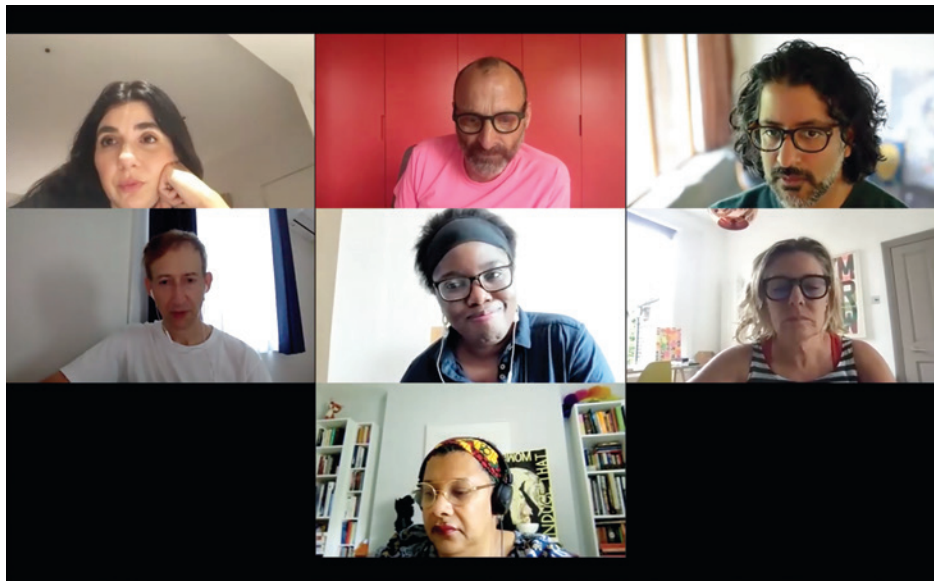
We should be creating much more council housing. We should be creating much more of a community spirit. That's going to take a lot longer to change.

Ab: I couldn't agree more. We're trying to use the hospital as a tool for urban regeneration, but it's only one part of a much more complex story. At the moment, primary care acts as a protector of the hospital when it needs to be working with the hospital. There needs to be much more connectivity. Our hospitals need improving, and we also need to improve how we treat both the hospital staff and users. What we want is to create a more holistic system. I cannot thank you all enough for your time this morning. It's been really insightful, we've learned a lot, and we will use your ideas and feedback to help create a better solution.

Roundtable Discussion 3: The Community

A multidisciplinary panel – including doctors and curatorial, communication, sound and design practitioners – discuss the health centre’s mechanics, considering how it functions and feels.

Participants: Dr Laura Benjamin (Neurologist and Principle Clinical Research Fellow, University College London), Stuart Gough (Associate Partner, Pentagram), Nick Luscombe (broadcaster, radio producer & sound collector), Dr Ash Ranpura (neuro-scientist & clinical neurologist), Helen Starr (cultural activist, curator & producer), and Marina Willer (Partner, Pentagram).



On Camaraderie

Ab Rogers: Laura, as a neurologist, how do you think hospitals could be more supportive of healthcare professionals?

Dr Laura Benjamin: I think what we’ve lost from hospitals [over] the last 15 or 20 years is a sense of camaraderie, which is crucial to wellbeing. We’ve lost that sense of working as a team so that, as a staff member, it’s no longer an issue that you’re spending a lot of time in a hospital because you’ve got a second family [there]. We’ve effectively lost camaraderie completely. Renewing that in some way will help staff well-being and make it much more exciting to go into a hospital space and do your daily work. So how can a hospital support that?

Ab: Why has that camaraderie been lost?

Laura: Because in trying only to improve efficiency and save costs, you lose any sense of teamwork. You try to remove redundancy, [so] you have shift-work patterns where people overlap by shorter periods. And then you have people rotating quite quickly to cover other areas to support training. It has eroded a really important component of delivering good care. Not having happy healthcare professionals has a knock-on effect on the patient’s experience as well.

Ab: Is the singular focus on efficiency a false economy?

Laura: I think so. There are creative solutions that give staff the time to get to know one another, [like] if they have

spaces to interact in or time outside of work when they can build that camaraderie. The hospital needs to be more than just a place you come to work and then leave at five o’clock.

Dr Ash Ranpura: I think Laura’s absolutely right. The physical layout of [The National Hospital for Neurology and Neurosurgery] in Queen Square is very different from Yale New Haven Hospital. At Queen Square, a lot of socialising happens in the garden and the public square and the pub on the corner because there are no spaces inside the buildings to work or hang out in. The trouble with socialising in the park or the pub when you’re a clinician is that it’s not private. It’s very hard to discuss patients in those settings. For example, in neurology, there are a lot of collaborations between neurology, neurosurgery, and neuroradiology (these are three very different departments in very different parts of the hospital doing very different things but often sharing patients). And what worked at Yale was that we had rooms where we had all of our computers. We did all of our electronic medical records in certain rooms, and we could freely walk into the rooms of the neuroradiologists and the neurosurgeons – those spaces provided the opportunity for collaboration. These are the kinds of spaces where we look at MRIs together or review a case together – the spaces generate the teamwork. It’s much harder at Queen’s because we don’t have those rooms.

Space is at more of a premium at Queen Square. There are private offices but no communal workspaces.

Laura: In most NHS hospitals, space is at a premium. If they need to expand on any health services, they compromise on the type of spaces you are talking about.

Ash: It’s really critical, and it impacts patient outcomes. The fact that neurosurgeons, neuroradiologists, and neurologists can sit together improves patient outcomes, particularly when you can do that casually. It’s during the casual chitchat around the computer when people are typing up their notes when, in my experience, really good things happen in terms of building a team, exchanging knowledge, and improving outcomes.

Marina Willer: You have to have this casual togetherness and sharing of knowledge [and] collective sense of doing things together. It’s about being able to have these casual encounters as a group, which is the antidote to the over-systematisation of the NHS. Also, I heard that singing together played an important role in helping nurses cope with overwork in the pandemic; it was one of the ways they dealt with having to nurse dying people. At the end of each day, someone would always bring out a guitar.

On Sound

Nick Luscombe: I've been working with the University of Tokyo and a music therapist, and we've been experimenting with recording nature sounds and playing them in hospital wards, care units, and communal areas. We've also been commissioning music in response to those field recordings to play in high-stress hospital environments. There's definitely a huge interest here from clinics and hospitals. We're finding that the sounds are also bringing hospital workers together – they've become a point of discussion.

Ash: There are a lot of noises in the hospital that are for staff only, like when IVs run out or medication needs to be refilled. Sometimes patient call buttons and other noises tend to be alarming; they alert everyone – patients and staff. It's possible that staff could be trained to recognise certain nature sounds and say, okay, that just means somebody needs an IV or wants to talk to a nurse. There are a lot of sounds that could be coded for staff only.

Stuart Gough: In my past life as a lifeguard, the SOS alarm to indicate a lifeguard had entered the water was the sound of Tarzan beating his chest. The public didn't have a clue what was going on; it was only the staff members who were alerted to it.

Marina: I had premature babies in intensive care for months, and as their parents, we spent a lot of time there. I remember the trauma acutely. Being aware of babies dying next to you is really traumatic. There are smells and sounds of that hospital that are forever with me. They transport me immediately back to that place. So all these things that seem little are really important; they stay in your brain forever.

Laura: Nick, have you had any surprising feedback?

Nick: We've discovered that there's no universal sound of nature that appeals to everybody, but then there are certain crickets at night, for example, that kind of lovely summer sound that people generally really like; it sends them to sleep and calms them.

Ab: Also, there's so much sound pollution, and the sounds you're talking about are more about inspiration than about masking. They're about creating a more soulful and calming environment.

Nick: Definitely. You can absorb a soundscape, and it can direct you into feeling and seeing certain things. I think the combination of music and natural sound environments mixed properly can be a wonderful thing. I wouldn't go as far as to say they are healing, but they are certainly nurturing.

Ab: Laura, as a neurologist, what do you think about piping sounds through the hospital?

Laura: It's a nice idea, but I think you need different sounds in different zones and at different times of the day. Something I tried to advocate for is having more protected time in hospital wards – usually about two hours, often after lunch – when there are no visitors and when doctors are not allowed to interact with the patients or go on their ward rounds. It's just quiet time. And they usually dim the lights. You can imagine nice music playing then. The light and sound can make it possible for a room to exude calmness and peace.

Ash: What Laura is describing is exactly how these things can subtly modify people's behaviour. So, if the lights are dim, you know not to enter the room, and if there's very soft sound, people naturally lower their voices. There are ways to control how people behave in a space with these subtle cues. I'm all in favour of that.

Ab: When we were first observing a paediatrics unit for a project we worked on, the biggest problem was that there was no sense of day or night. Time became flat and continuous, and this complete lack of variation really seemed to be detrimental to everyone.

Ash: The circadian rhythm is a cue for how people should behave.

On Technology

Ab: I think many of us are probably aware that virtual reality can be very useful for pain relief in patients, but can you see it having a role in helping staff?

Helen Starr: Absolutely. I'm actually building and designing a virtual world at the moment, which we'll hopefully be trialling in a hospital soon. We're thinking of it as a sphere that breathes – if you go into this world (which you can do via your laptop or phone), you can breathe in time with the sphere and it will help you relax. Sound is a part of it, but sounds that are relaxing for some people are a trigger for others so we're trying to design it so that people can choose the sound. It might be wind, it might be water – but I think responsive choice is where the future of technological application is going, and that's going to be quite a wonderful thing.

[To answer your] question about virtual reality – I mean, absolutely it's going to become a really huge thing. And I was speaking to Laura's friend Izzy the other day who runs the physiotherapy department at ... Is it Queen Margaret's?

So I'm basically going in because she's actually just tried to buy a whole load of VR experiences and can't afford them. But I've just commissioned and built 14 VR experiences that she can actually have for free. So I'm going in to sort of have a conversation with her about what would she like and what would she need, because when I commission, I can put these requests in. But one of the things that she was saying with regards to physiotherapy is that 90% of the problem is you have a bored, depressed person who doesn't want to do it. So any way of making that exciting just becomes a huge tool.

So even with my breathing app, I'm thinking, as people are waiting to come to Izzy, they can get into that mindful space because you can access it on the phone. But then even with a VR headset, a lot of it's as if you're in a strange world that doesn't match the actual world that you are in. It's quite exciting, but you also really have to coordinate your balance and movement. So even just something as simple as that becomes a really easy and useful tool.

So I'm going into investigate why these companies are trying to charge so much.

Nick: For me, that's the thing across the hospital, it's this endless profiteering. And it just seems to be counter-intuitive – I find it really objectionable.

Helen: I absolutely agree.

Nick: Whether it's just getting shitty food or ...

Helen: Yeah. Or even the dance mat that she wanted to have, which I'm actually building, and it's the same problem. You're dealing with a public building so the danger for sensor-triggered mats on the floors is about you have public coming in and you've got these dangers of tripping. So you have huge insurance and all of this stuff. But in the public arts sector, we're putting in the same thing. It's exactly the same thing that Izzy was talking about, and I think they wanted to charge her something like £2,500. But I know because I'm literally doing exactly the same thing now, and I think we're paying maybe £25 for it.

And she was saying they were saying to her that it's because of software development. But if you're in the technology world you know most software at this point is open source. So it's literally just an excuse to harvest money. So, that's definitely something ... And Dave, since we spoke, I messaged my board about the price and I sent the document I wrote for you. And they immediately, 'Right. We're setting you up with Darby Hospital. We work with them. Let's get this trialled and sorted in September.'

Nick: Fantastic. That's really good.

Ab: Helen, do you find that hospitals are open to working with new technology? What's the attitude that you've encountered?

Helen: One of the things that we are seeing in technology is that a lot of the conceptual understanding of applications moves at a particular pace. But what Covid has done in the tech sector is that we're now where we thought we would be in 2040. The impact of Covid has launched the entire world into the

future. If, two years ago, I were to go into a hospital and talk about screen fatigue, no one would have known what I was talking about. But now, if I insist that a virtual reality experience shouldn't be longer than 15 minutes, hospital staff immediately understand why.

For many of us in the technology field, the last 12 months have been an incredible time to see what people have been able to do. I believe we're really at a tipping point of digital understanding.

Marina: Laura, with Covid, obviously there are now many areas of the hospital people can't even enter. Do you foresee that the hospital of the future will need to have many more mechanisms to deal with viruses, so much so that they will become an obstacle to a more nurturing, humane environment?

Laura: It's hard to tell. I just don't see things going back to normal, because this threat will always be there in different forms or variations. Whether there will be new variants for the foreseeable future or even new viruses causing havoc, I think there has been a seismic shift. And even though things are calmer now, we still haven't reverted to allowing patients' families back into the hospital, and their presence is an important element of healing and recovery. Using technology to try and bridge that distance is a possibility.

And just in response to your question, Ab, I think there's an enthusiasm for technology. I think the tension with that is, obviously, intellectual property, but these open software spaces are great in that sense. And then, of course, there's confidentiality and storage of data, things like that. But I think there's generally an enthusiasm for digital work. As long as you can demonstrate [its effectiveness] (you usually have to go through some kind of hospital red tape to show that there is some evidence that it's working), I think [the attitude is] definitely changing.

Ab: Particularly without having visitors, this idea of patients being able to put on a headset and escape (so suddenly you can be swimming with whales or floating in outer space) is appealing.

Laura: I do remote doctoring. We do it in the emergency setting, like for

stroke services. I use an iPad, and the ambulance gives another iPad to the patient at home who is unwell and triaging. Then the doctor in the hospital can decide whether they should come to A&E and receive rapid care or go to their local hospital or go to the GP.

Ab: And where do you physically do that from?

Laura: When we were piloting it, I was doing it from home. But as it's evolved, we have realised that we actually need a dedicated space because there are so many things that come with telehealth; for instance, you need to medically and legally document the conversation in case things go wrong.

Ab: You need acoustic properties. You want somewhere, presumably, like a broadcasting space.

Laura: The visual background is important as well, as that will impact how they feel and their potential anxiety level. So the background [is an important element], and you have to have the right audio so they can hear you properly, and nothing is misunderstood. But that's how we evolved: from initially being in our homes to moving to a dedicated space with appropriate technology and infrastructure to help us deliver the optimal service.

Expert Opinion: 'On Sleep in the Hospital' by Dr Ugo Faraguna

Hospitals are not places known to be conducive to sleep. Yet sleep is a core function. A large body of evidence suggests sleep is necessary to boost proper immunological responses and healthy recovery, and that medical and surgical treatment only partly contribute to recovery. The mood of the patient, his/her motivation, and other modifiable environmental parameters are significant factors. Sleep is central to the homeostasis of both mood and motivation. Environmental parameters of the hospital should therefore be designed to promote this.

But hospital environments seem currently designed specifically to disrupt sleep. Several studies describe equipment, noisy personnel, unpleasant lighting, uncomfortable bedding, inadequate room temperature and the timing of procedures as the primary causes.

Some of these disruptions are easy to overcome. For instance, light exposure as well as unnecessary noise are environmental parameters we can control to achieve the conditions conducive to the physiological rhythm of recovery.

Hospital lights are hallmarks of sterile, cold environments. They are often kept on 24/7. Where continuous visual monitoring is required, this is justified in some medical environments. It is completely unnecessary in many others. Lights can be controlled to minimize sleep disruption and circadian misalignment. Melatonin – the hormone of sleep and darkness – is inhibited during the day by a specific blue light wavelength (460–500 nm). When light is necessary at night, blue light should be filtered out so as not to interfere with melatonin secretion.

Environmental noise can also be controlled. A well-conducted study carefully investigated the sources of noise disrupting patients' sleep. The most common were staff conversation (65%), roommates (54%), alarms (42%), intercoms (39%) and pagers (38%).

Alongside our awareness of sleep's importance in the recovery process, miniature, sustainable environmental sensors could provide invaluable information on how to improve the hospital on a daily basis – to make it a place of care conducive to sleep and health.

Relevant Bibliography

www.sciencedirect.com/science/article/pii/S1389945718303149

www.jamanetwork.com/journals/jamainternalmedicine/article-abstract/1108610

www.sciencedirect.com/science/article/pii/S1087079221000162

www.ncbi.nlm.nih.gov/pmc/articles/PMC7030790/

Ugo Faraguna is an Associate Professor of Human Physiology at the University of Pisa Medical School; he is also President and Cofounder of sleepActa srl, a spinoff company operating in the field of sleep medicine. His main research interest focuses on the homeostatic regulation of the sleep-wake cycle and its impact on daily performance.

Expert Opinion: 'The Hospital of My Dreams' by Dr Luna Gargani

The hospital I envision is open and friendly. It is friendly to the patients, it is friendly to the families, it is friendly to the healthcare personnel.

Patients and their caregivers fear hospitals because they feel rejected in a place which usually enhance, instead of supporting, their vulnerability and frailty.

We can make the difference at any level: from structural design to the colours of the walls; from the disposition of the rooms, to the cut of the uniforms; from the environmental sound to the green spaces; from the meals to the light outside and inside.

Why cannot we listen to our favourite music, read inspiring books, watch funny movies while we are spending some of our time in a hospital?

We become the place we work in. We are humans, and our attitude varies according to the context we are living: a kind, comfortable, peaceful atmosphere will make us warmer, more empathic and caring. This is not an esthetical pose; this is part of the treatment, it is part of the cure, which is the results of the effects of a drug or therapy, together with all the rituals, gestures, words, feelings, environmental awesomeness.

The Hospital is a community, a living organism, a complex system, where different people with different needs gather, and where the same person can experience very different emotional situations. It is a place of birth and death, of hope and despair, of fatigue and friendship, of conflict and love.

A successful community is able to fulfil all these circumstances, supporting the human being who live there and need a sympathetic habitat to give their best, from both sides of the bed.

The light, the colours, the space, the nature, the sound, the smell, the touch, the words, the feeling will heal or will assist to endure the disease and the pain.

The hospital I envision is open and communicative. Communication is the ground, the foundation of the relationship between patients, doctors, nurses, families. What we hear and feel in a hospital will likely live in our memories forever, and will influence our way of reacting to a new situation, to a disease, to the hope of recovery. There cannot be too much care in the way information are communicated in a hospital, from basic signboards helping you to find that ambulatory office or the cafeteria, to the heartfelt words of

another human who has to tell you that that drug hasn't worked as expected.

Effective communication between healthcare providers may mean life or death, may cause serious complications of synergize the cure.

This is the place where we want to be born, where we want to die, where we want to keep the hand of our closest relatives in pain, where we want to work, grow and help others.

Luna Gargani is a Cardiologist and Senior Researcher at the Institute of Clinical Physiology for the National Research Council in Pisa, Italy. She is a recognized expert and pioneer in lung ultrasound.

Expert Opinion: 'Bereavement and Remembrance in Hospital' by Dr Hammad Khan

Death is painful to deal with in any circumstances. In a hospital death can be drawn out, unexpected, even caused by medical failure. When death occurs in a hospital, the hospital becomes a liminal space, separated from home and from the everyday reality of life. In a hospital, the immediate aftermath of death involves tears and paperwork in equal measure. This can make the bereavement process challenging for both clinical staff and families. Just as the hospital must institute better processes to facilitate recovery so must it provide space and time for acknowledging the reality of death.

When a child dies in hospital the impact on families and staff is particularly acute. Parents have to deal with the tragedy of a life cut short. Staff must manage the combination of clinical detachment and empathy necessary to do their jobs well. Often the brevity of a life culminates in efforts to capture it in some way. It is not uncommon for parents to ask for photographs, or even tiny footprints, of their child, to be taken.

The act of remembering at these times is particularly important. In some newborn intensive care units babies who have died are remembered with a 'tree of life', a mural of a tree on which each leaf represents a child who has passed through caring hands and onwards. Other units memorialise the stories of children through collages. I have had the privilege of attending the annual multi-denominational remembrance service The Evelina Children's hospital holds for children who have died there. Held in a hall packed with parents, grandparents, siblings, friends, doctors, nurses, pastors and imams, the service includes readings and prayers, songs and stories, tears and joy. It's an opportunity to celebrate being touched by these short lives and ultimately to remember what a hospital is for.

Whether through, space, colour, time or stories, these acts of remembering need to be elevated in the hospital. Even as the hospital continues to function around those who must come to terms with the end of a life, we must still make room for grief in the running of the contemporary hospital.

Dr Hammad Khan is a Consultant Neonatologist at St Thomas' Hospital. He is passionate about providing excellent neonatal care at one the UK's busiest neonatal units. He is an advocate for family-centred and family integrated care in neonatal units and has strived to provide compassionate healthcare for families through good design in both the physical and digital space. He volunteers for the charity Humanity First and works to improve health infrastructure in the developing world, including in Pakistan and The Gambia.

Expert Opinion: 'Reflections on Healthcare Space Design' by Dr Hammad Khan

Twenty years ago, I remember, as a newly qualified junior doctor, the first time I had to give bad news to the relative of a patient. I sat with them in a side room. When I faced a woman in her late 70s, who could have been my grandmother, I had been trained to ensure I had given my pager to someone else so I wouldn't be interrupted. I explained we had been concerned about some of her husband's symptoms and had performed some tests on fluid taken from his lungs. The results of those tests had come back and sadly they showed he had lung cancer. I remember the silence and the tears. At the end of the conversation, she thanked me and I sat a little stunned myself. She said 'You did that so nicely. It was like someone came up behind me and very gently hit me on the back of the head with a hammer.'

I have thought on those words many times since. I couldn't take away that hammer blow but the way I delivered it mattered.

I think often about how that conversation could have been better. I think of the grey walls of the room, the support she lacked from other family members, the absence of a box of tissues. Nothing in patients' and families' healthcare experiences happens in isolation. Every encounter, every conversation, every space is significant.

As a consultant neonatologist (doctor of newborn care), I have the privilege of caring for some of the most vulnerable and smallest patients in the hospital. Half of my job is caring for their parents. These parents find themselves in their worst nightmare. Their child is sick and they feel helpless. My job is to guide them through everything that happens to their child, be it a long journey or a short one, whether the outcome is joyous or heartbreaking. They experience a spectrum of emotions spanning from loss to grief, through anger and hopelessness. Thankfully I work with an amazing healthcare team that supports families throughout their stay.

The conversations we have with parents require enormous sensitivity, careful explanation, empathy and patience. They need support from the entire healthcare team to take through this emotional journey to a resolution that leaves them able to parent in a new and unknown world.

As they work their way through this journey, for the most part their children go on a journey of their own, a journey of growth through to wellness and independence from medical support. Our aim as a team is that at the end of the journey, the babies are well and strong enough to go home and their parents are well and mentally equipped to care for them on their own.

Every family is unique and their journeys are unique and rarely smooth. There are often many ups and downs along the way. Occasionally, the outcome of this journey is not happy. Some of our patients don't make it home. The neonatal unit becomes the only home they will have ever known. Helping parents through that situation is one of the most difficult and heartbreaking parts of our job. It requires enormous empathy from the whole team: every word and every touch becomes significant. The space in which all of this happens also has a lasting impression on our families.

How do we do all this well? How do we ensure that the patient and family experience of healthcare is one that is sympathetic and conducive to growth and wellbeing?

For healthcare staff having a culture that reinforces our attitudes and an environment that supports this expanded sense of wellbeing is key. The story we tell ourselves about the work that we do needs to be positive and that culture and narrative needs to be reflected in the space in which we work.

The entrance to the ward should be welcoming and reassuring, the stories on the walls should speak to a journey of progress, wellbeing and hope. The space in which difficult words are spoken needs to give the same gentle support and empathy that we aim to provide through our words and actions.

The sounds, smells and sights in a room in which a family is looked after during the last hours of their child's life needs to be sympathetic to their situation. It needs to echo the conversations that staff are having with those parents. It needs to provide comfort and reassurance.

Decisions about the design of healthcare spaces are often made without a vision of the experience we want patients and families to have. If we can achieve that we can build hospitals, wards and clinics that promote health

and wellbeing and that are above all synchronous with the kind of care we want to provide.

Expert Opinion: 'Lighting Hospitals' by Paul Nulty

So often we see functionality at the forefront of hospitality lighting design. Of course, this is important and a crucial factor in the way a hospital and its staff need to operate, but the emotion can get left behind. We have to remember why hospitals exist. We need hospitals to make people feel better, to keep patients safe and to envelop them in warmth and security while they go through something frightening. We all want hospitals to make people feel comfortable and sterile design and lighting does quite the opposite. Lighting in hospitals is key and plays an important part in cultivating a safe and collaborative environment for both staff and patients.

Through the use of layers of light, varying levels of illumination can provide both functional and aesthetically pleasing qualities of light.

The quality of light used in a hospital is really important. Different ages have different requirements for light and if you're over 60, on average, you will need three times the amount of light as you do if you're in your 20s. It's a big difference and one that lighting designers need to be aware of when implementing a lighting scheme in a hospital. For example, the location of a light source is important in reducing glare to which many elderly patients are sensitive.

Directional light is also really important. These days we talk about 'a melanopic lux', which is basically the amount of light delivered from a certain angle. You have rods and cones in your eye, which are the two receptors: one sees in colour and is for daylight, while the other sees in black and white. Anything below 1 lux and you tend to see in grey. So this means that with different levels of light you have different abilities to see and process that light. Research done a while ago found we have a third receptor in the eye, which reacts specifically to blue light and regulates hormone production in the body, such as of melatonin, serotonin and cortisol. If you have too little or too much of this then one can experience a seasonal affective disorder and the body won't function properly. This shows that in a space like a hospital, where doctors need to be able to operate, patients need to be able to feel rested and all the people in the space need to be taken care of, a balance of different layers of light can be very important.

Although there are many ways we can light a hospital, it's imperative to remember the role daylight plays in health. Not only can daylight and vitamin D prevent illnesses such as scurvy and rickets, but natural daylight is also a great way of creating a calm and comfortable atmosphere. It provides a welcome break from artificial light, especially for patients who are spending a long stint on a ward. This is also important for the staff who work extensive hours in the hospital. They too need various types of light for the benefit of their eyes, productivity and mental health.

Hospitals are illuminated the way they are in order to be always prepared for emergencies. Whether you're in a hospital ward, emergency room, or even the hospital corridor; the overall layer of illumination needs to be practical so that the doctors and nurses can do their jobs effectively. But this doesn't mean there has to be just one layer of functional lighting. There could also be more personalised or localised light that changes colour temperature throughout the day to give a sense of time passing from day to night. You could also implement small gobo projectors in downlights to create dappled light on the floors of the hospital, to mimic moving trees or plants, or to recreate moonlight. If there are interesting objects in the hospital space, these could be illuminated properly to create focal points. It's great from a functional perspective to have uniform panels of light in the ceiling but these can be quite dull and mean that the eye doesn't have anything to look away from. Instead bouncing light off walls or allowing it to change and be dynamic in the space, encourages different emotional responses to each area of the hospital. This will achieve a warm, rather than a clinical and sterile, environment.

It seems strange to think about feeling at home in a hospital, but for staff and patients, creating an environment that feels as close to home as possible helps morale. Lighting could again play a huge part in making this conception of a hospital come to life. Bedside lamps could be placed next to each hospital bed to create a sense of being in a bedroom rather than a ward. Pendant lights, shades and localised lighting solutions above

beds can make a space feel more domestic when combined with more functional overhead lighting but, it would make the patient feel more comfortable in the space that they're in.

Expert Opinion: 'Meaning in the Blossom of a Magnolia' by Dan Pearson

When I created my first hospital garden in 1996 at Worthing and Southlands Hospital the idea that a garden could offer respite or aid healing was still on the fringes of healthcare thinking. The commission came from a visionary public art consultant, whose experience with siting art and sculpture in hospital environments had made the value of gardens clear to her. Within days of completion it was found to breathe new life into the hospital and quickly became a welcome place for contemplation and respite.

In 2004 my practice created a roof garden for the new Evelina Children's Hospital at St Thomas' Hospital. Commissioned by the Director of Art and Heritage, the garden was still considered an add-on rather than an intrinsic part of a hospital's design, and as a still-new idea, issues of weightloading, value engineering and maintenance meant that the space could never realise its full potential. Even so, to know that children on dialysis would be taken out into the fresh air and feel the sun on their faces made it all worthwhile.

That same year I was approached by the Maggie's Centres to design a landscape setting and internal gardens for the first centre at Hammersmith Hospital in West London. Although the building had been conceptualised we were brought in early enough to be able to develop a meaningful dialogue with the architects and Maggie Keswick's dream of a home set within a garden, where visitors would feel comfortable, relaxed and protected, became a reality.

While working there I was introduced to Cath Knox, who had been living with cancer for 12 years and getting to know her made the project very real for me. 'When you are told you have cancer, every moment counts,' she told me. 'To have those moments captured in the blossom of a magnolia that you may not see the following year, to stumble across perfume caught on the breeze or the scent of mint crushed between your fingers becomes incredibly meaningful.'

The ability for centre users to engage physically with the gardens has also been central to the designs of all the Maggie's centres. At the Manchester centre there is a greenhouse designed into the building that has encouraged more men, in particular, to feel comfortable in this supportive and caring environment.

I have always intuitively known that intimacy, sensuality and sanctuary in a garden are key to creating a sense of wellbeing, but at Maggie's it has been made so much more vivid seeing it through the eyes of someone who is seizing life with a new intensity. That intense connection with nature is something from which we can all benefit.

The Maggie's approach has been a game changer in current thinking about hospitals, and it is heartening to see the influence of their philosophy and thinking on places like Horatio's Garden, the charity supporting those with spinal injuries, and on new ICU units at King's and at Chelsea and Westminster Hospitals, all of which put gardens at the centre of the patient experience.

The benefits that landscape and gardens offer us when we are healthy – beauty, contemplation, energy, connection, food, contact with natural and seasonal cycles and processes – are magnified a hundredfold when we are ill. We all know every home should have a garden. Therefore hospital design should make access to nature central to their conception so that they become not just somewhere we go to be sick, but places we are happy to call a home away from home.

Dan Pearson is a landscape designer, horticulturist, gardener, journalist, and television presenter. Known for his painterly, naturalistic perennial planting, Pearson, and his London-based studio, work globally. Key projects include the Tokachi Millennium Forest, a 240-hectare public park in Hokkaido, Japan, the courtyard gardens at photographer Juergen Teller's studio and the Garden Museum, also in London.

Expert Opinion:

'The Hospital from a Nurse's Perspective' by Natasha Prime

The traditional model of a hospital environment continues to evolve. It was once a corridor of distinctly clinical and minimalist white walls but technological advances and our increasing knowledge of the connection between our environment and wellbeing continues to shape its role.

A hospital remains an integral part of society and a source that binds us together in fear, joy, relief and grief. Designing a space to deal with processing these significant stages in life can contribute to a positive patient outcome. Breaking bad news or providing end of life care to patients deserves time and empathy of the clinician. A bereavement suite that is placed right opposite the resuscitation room with critically ill patients will elicit feelings of pain and trauma for the patient's family as well as anxiety for the clinician waiting for the call that takes them away without closure.

The functionality of space in the emergency department is often prioritized over experience. Patient flow is given precedence at every stage with speed and efficiency in clinical outcomes leaving patient experience trailing behind. This unilateral approach excludes patients, families and friends that need that support throughout the journey. Comfort and space for sensitive encounters, food and drinks accessible within the department, relaxing music and art to distract. All these can contribute to a calming and healing environment. Walking into a hospital that doesn't provide any sign of being loved can illicit the same human response.

Designing a space where clinical staff can have a continual interaction with patients is key to providing a nurturing and reassuring environment. Lack of information, honesty and transparency can provide cracks in the confidence of clinical services. Using technology to stream live data on waiting times and triage keeps patients up to date on their journey and provides some control amid the chaos. Increasing clinical efficiency by tracking medical equipment and using patient wearable sensors will increase how much time clinicians can spend on direct patient care and allow clinicians to deliver effective patient-prioritised care.

We must also realise that the well being of the patient community is intrinsically linked to the capability and efficiency of the healthcare staff.

Lack of time, accessibility to ill-placed staff rooms and far away canteens means vital self-care for clinicians is lost. By providing a space for clinicians to optimise their break and rest time in a quiet environment allows them to return rested and ready to deliver excellent patient care.

Often emergency departments are on the ground floor but the windows are small, the air stifling and the room artificially lighted. Sometimes there is no distinction between day and night. By incorporating biophilic design may be key to improving the overall wellbeing of the hospital community of patients, their families and staff alike. Overlooking green spaces, incorporating nature in art, sunlight and fresh air will help us all feel part of the same ecosystem and with common goals of aiding healing and wellbeing.

Natasha Prime is an emergency department charge nurse with over 10 years of hospital experience working in a central London hospital. She has volunteered in nursing across the world and worked in Malawi setting up the first public emergency department. She is living and nursing in Switzerland and completing an MSc in Public Health.

Expert Opinion: 'Design for Dementia' by Dr Ash Ranpura

There isn't a lot of empirical research on how design features in clinical spaces affect patients with dementia and other forms of cognitive impairment. Likely this is because first, it would be difficult to conduct randomized controlled experiments on architectural features, and second, because patients vary widely in their capabilities and their cultural expectations surrounding design. In the absence of empirical evidence, the research literature offers expert opinion. The best work on this topic surveys a range of clinical specialists including doctors, nurses, occupational therapists and care workers to produce something like a professional consensus view on how design can be used to help patients.

There are a few clear themes that emerge in this consensus view. First and foremost, familiar domesticity really helps patients navigate other-wise threatening clinical spaces. This means that those health and safety measures which are institutional rather than domestic tend to cause confusion. Torrington 2006 makes this explicit, writing that 'quality of life was shown to be poorer in buildings that prioritise safety and health; buildings that support activity positively by providing good assistive devices, giving people control of their environment and affording good links with the community have a positive association with wellbeing.' (Torrington, Judith, 'What has architecture got to do with dementia care? Explorations of the relationship between quality of life and building design in two EQUAL projects,' *Quality in Ageing and Older Adults*, March 2006). Safety is maximized when clinical environments evoke domestic spaces.

Another theme emerging from the literature is the importance of light, colour and contrast. There is a conflict in the expert views here, because while patients with limited visual acuity need brighter lights and higher colour contrasts, those who are unwell or confused need restful visual environments which don't clamour for their attention. The reliable conclusion is that unnecessary visual clutter, and in particular institutional visual clutter like staff notices and equipment storage, should be minimized, and that wherever possible natural light should be maximised. Again, safety emerges from familiarity and comfort rather than as an explicit design goal.

It is striking that many of the papers in this field discuss the importance of gardens. From the perspective of low-level vision alone, a garden might be a chaotic and unpredictable space. However every paper which discusses gardens and green spaces concludes that patients navigate these spaces confidently and comfortably, and that the inclusion of significant green spaces improves the quality of life for patients with cognitive or sensory impairments, over and above nearly any other design feature of a building.

Ultimately, though, clinical experts are not necessarily experts in architecture and design. Clinicians see their patients interact with health care facilities as they exist today, but they may not have the training required to re-imagine these spaces in the future.

Furthermore, concepts like familiarity and domesticity are dependent on culture and social class. The role of clinicians and of clinical research should be to articulate problems that then require architects and designers with the training to create inclusive and flexible solutions. We shouldn't be looking for prescriptive solutions in the research. Instead, our design should be led first and foremost by compassion and humanity. The challenge is to meet institutional design needs while absolutely prioritising human design preferences.

Dr Ash Ranpura is a neuroscientist and clinical neurologist who has been active in brain research for over 25 years. He received his bachelor's degree from Yale University, his MD from the Medical College of Ohio, carried out PhD research at the Institute of Cognitive Neuroscience in Queen Square, London, and completed his residency in clinical neurology at the Yale-New Haven Hospital. He has recently co-authored a book on mindfulness and neuroscience with Ruby Wax and Gelong Thubten entitled 'How To Be Human: The Manual'.

Expert Opinion: 'On Placebo' by Dr Ash Ranpura

Clinical spaces always imply an understanding of medicine. In the simplest sense, the proportions and the accessibility of the spaces require assumptions about how the bodies of the sick function, how mobile they are or whether gurneys or wheelchairs are required. The space always incorporates some intuition about the needs of the body. Our physical intuitions about this are usually sound.

But the design of the clinical space also depends on whether we think a medical encounter is a product (a patient comes into the hospital to get healthy like a consumer goes into a shop to get a toaster) or a process (the patient comes into the hospital for an experience that facilitates recovery). Our intuitions about this have been distorted by centuries espousing a mechanical view of the brain and body. We imagine that health care is something that can be provided, rather than something which is achieved.

It's easy to see why a product-driven approach to health care is dominant. In an era of evidence-based practice, there is a justified emphasis on measurement and quantification. Prescription medications can be counted, surgical procedures can be documented. Patient experiences are much more difficult to analyse – crude survey-based scores fail miserably – so structurally the patient experience has been sidelined in favour of quantifiable health care products.

However, the patient experience is the most reliable predictor of clinical outcomes. In nearly every clinical trial, the control arm – typically a placebo group – does far better than average patients. Why does the simple fact of enrolling in a clinical trial produce such positive outcomes? Because although the healthcare 'product' in a clinical trial is standardised to typical practice, the patient experience is far from typical. Clinical trials offer top quality patient experiences. This is why they have such good health outcomes.

Instead of creating hospitals that deliver services, we should create hospitals that facilitate a therapeutic encounter between healers and the sick. The therapeutic encounter is a cultural product composed of rituals and artefacts, and these are the aspects of clinical care that should inform the building's design.

Spaces which are designed around the therapeutic encounter should

maximise the value of the rituals and artefacts surrounding the practice of medicine. Hospitals could be conceived as cathedrals rather than spas, spaces where the design of the building directly communicates the philosophical outlook of the people who use that building.

If we believe that food and plants are at the centre of the design of this building, then those elements should also be central to the philosophy of healthcare practiced in the building. Diet, nutrition and plant growth should be part of the treatment regimens that the hospital employs during a patient's stay, and certainly at the time of hospital discharge the patient should be given a meal plan and a packet of seeds. This ties the design of the building to the way medicine is practiced in it.

If we believe that light and greenery and nature are core concepts in the design of the building, then we should also incorporate those elements into the function of the hospital. Artificial lighting systems should vary seasonally, so that summer days have bright interior lighting and winter days utilise dim interior lights and focused spot lighting. The colour of the lights and the interior spaces might vary in response to the seasons. Sunrise and sunset could be represented within the hospital routines for opening and closing curtains, meal times, etc. The rhythm of the natural world, and variations in that rhythm, should be reflected in the working practices of the hospital.

This functional connection to the design goals of the hospital – an active adoption of a design – will help patients to feel more connected to the outside world and to their internal body rhythms. Hospitalisation creates a tremendous risk for disorientation and depersonalisation, even in the young and healthy but especially in the elderly and the sick. Disorientation occurs when the environment is uniform and unchanging, and in many cases this leads to some level of delirium. In extreme cases this requires treatment with antipsychotic medications, but even in mild cases it prolongs hospital stays and leads to poor overall outcomes. Hospital-acquired delirium is easily reduced with improvements in the built environment.

So I'm really advocating for integrating the design of the clinical space with its functional philosophy. I think that kind of integration can

dramatically improve both patient outcomes and staff experiences.

Expert Opinion: 'The Role of Design in Clinical Spaces' by Dr Ash Ranpura

Our conception of disease has always shaped our clinical approach. When we thought that disease was a formless evil, we turned to witch doctors and priests to exorcise it. When it was an imbalance of humours, we drank coloured fluids. When we thought it might be malodourous vapours we took in the sea breeze and the mountain air. In the industrial age we imagined jammed-up gears and misconnected wires and we developed surgical techniques to cut out and rebuild. In the chemical age we imagined a complex interplay between molecules and receptors and popped pharmaceuticals to raise or lower their levels.

Clinical buildings reflect this cultural understanding of disease. They have ranged from dark and secretive apothecaries to bright, metallic temples of hygiene. The architecture of these spaces suggests social hierarchies within the world of health care. Is the healer a ruler or a servant of the sick? Are the ill supplicants or customers?

Today our most articulate conception of disease is the biopsychosocial model. In this framework, illness is the combined effect of a biological vulnerability with a psychological state within a social context. For example, a person who works varying night shifts may be extremely tired with a weakened immune response due to disrupted circadian cycles. When exposed to a cold virus, this person is likely to develop a respiratory infection. If they are then unable to take time off work, their disease may progress. If they are eventually hospitalized with pneumonia, we would miss nearly all of the causative factors predicting disease if we were to focus only on the viral pathogen. In order to treat and prevent disease, we have to see the entire picture.

Clinical buildings today still reflect the monumental scale and gleaming efficiencies of the industrial and chemical eras. Now that we've arrived at the biopsychosocial model of disease, we need a new type of clinical building to support it. This building must function on a personal scale, offering privacy but also community. It must facilitate health interventions that are biomedical as well as those based on diet, exercise and social needs. The building must reflect a change in the way we deliver health care from an intervention at a point in time (a surgery, a prescription) to an ongoing interaction between

an individual and a comprehensive care system.

In this sense we can think of the building itself as a third carer, after a patient's family and their medical team. The building will facilitate nurturing interactions and anticipate the needs of its occupants. When the building functions in this way, as an active part of the healing process rather than as a passive stage on which the theatre of medicine is performed, patients will naturally come to associate the building itself with improved health. Just as temples and cathedrals can create a sense of spiritual calm, even without their attendant rituals, so too can this new type of hospital create a sense of wellbeing independent from and in parallel to the practice of health care.

This conditioned response to a designed environment is one of the most powerful tools available to the health care architect. The cultural associations we make with these environments are deep-rooted, and they have a tremendous transformative power both in the literal sense, in that they can alter disease states through placebo-like conditioning, and in the imaginative sense, in that they enable us to envision being well again. We must stop making monuments to those who fund and build hospitals, and return to a time when we built places to heal the sick.

Expert Opinion:

'The Merits of Virtual Reality in Healthcare' by Helen Starr

Concept

To provide a trauma informed digital layer to aid and support hospital care. In the form of interactive new media experiences such as VR (Virtual Reality), AR (Augmented Reality) and online multiplayer experiences.

- Pain relief (eg during painful procedures)
- Distraction therapy (eg during chemotherapy sessions)
- Boredom relief for bed-bound patients

Virtual reality therapy (VRT), is also known as virtual reality immersion therapy (VRIT), simulation for therapy (SFT), virtual reality exposure therapy (VRET), and computerized CBT (CCBT).

Virtual reality technology is increasingly being used for psychological or occupational therapy and in affecting virtual rehabilitation. Patients receiving virtual reality therapy navigate through digitally created environments and complete specially designed tasks often tailored to treat a specific ailment.

Virtual Reality is designed to isolate the user from their surrounding sensory inputs and give the illusion of immersion inside a computer-generated, interactive virtual environment. This technology has a demonstrated clinical benefit especially as an adjunctive analgesic during burn wound dressing and other painful medical procedures. (see Rebecca Allen) It is widely used as an alternative form of exposure therapy, in which patients interact with harmless virtual representations of traumatic stimuli in order to reduce fear responses. It has proven to be especially effective at treating PTSD, and shows considerable promise in treating a variety of neurological and physical conditions. Virtual reality therapy has also been used to help stroke patients regain muscle control, to treat other disorders such as body dysmorphia, and to improve social skills in those diagnosed with autism

Mechanism

Virtual Reality is an excellent approach to pain management. It captures the mind's attention and blocks pain signals from reaching the brain. It's almost like a form of active hypnosis. VR provides tactile and sensory feedback and allows

the patient to rally the neurotransmitter mechanisms that decrease pain.' If you tell a nurse that you're a 7 or 8 on that pain scale, you'll most likely get fentanyl or morphine, but if you say you're a 3 or 4, you'll receive Tylenol,' Dr Robert Louis, neurosurgeon and Director at Neurosciences Institute at Hoag Hospital, Louis explains. Being able to lower the pain in a non-invasive, risk-free way can be instrumental in avoiding potential opioid addiction.

In a VR study, published in 2017 by JMIR Mental Health, fifty patients received virtual reality therapy consisting of wearing VR goggles to watch calming video content such as helicopter rides over scenic portions of Iceland, or imagery of swimming in the ocean with whales. Those patients reported a 24 percent drop in pain scores after using the virtual reality goggles.

'Results indicate virtual reality may be an effective tool along with traditional pain management protocols,' said Brennan Spiegel, MD, director of Cedars-Sinai Health Services Research. 'This gives doctors and patients more options than medication alone.'

While it remains unknown exactly how VR works to reduce pain, Spiegel attributes the benefit to what he calls 'immersive distraction.' In other words, when the mind is deeply engaged in an immersive experience, it becomes difficult, if not impossible, to perceive other stimuli, including pain.

'We believe virtual reality hijacks the senses, but in a good way,' Spiegel said. 'It creates an immersive distraction that stops the mind from processing pain, offering a drug-free supplement to traditional pain management.' Participants in various settings who were immersed in VR experienced reduced levels of pain, general distress/unpleasantness, and reported a desire to use VR again during painful medical procedures.

Engaging the support of National Portfolio Organisations

To provide the immersive distraction necessary to deeply engage the mind in an immersive experience will require top quality content makers – there is a specific artistry involved around immersion technique. A key concern will be making sure these experiences are accessible and affordable for all.

National Portfolio Organisations are leaders in the UK field of artistic production with a collective responsibility to protect and develop our national arts and cultural ecology. Two NPOs leading on the intersection of Art and Technology are FACT (Foundation for Art and Creative Technology) in Liverpool and QUAD, Derby. FACT and QUAD are international centres for engagement in contemporary art and film, focusing on the creative use of emergent digital technologies such as Virtual Reality.

In the museum world ethics are seen as a set of guiding principles of good practice adopted by museum professionals in their various activities. Public investment brings public accountability for the Arts Organisations that Arts Council England invests in. The funding remit for ACE is to reach communities that currently have little cultural provision. Within this remit is the desire to ensure that every person can enjoy a relationship with art and culture. This is reflected in ACE's expectations.

In recent years there has been a growing concern in addressing ethical issues in museums as cultural workers have developed greater sensitivity and social responsiveness. Most codes of ethics urge museums to give appropriate consideration to represented groups or beliefs. In light of this, it has been recognised that exhibition of sensitive material, for example, must be done with great tact and respect for the feelings of religious, ethnic or other groups represented.

Helen Starr is a Afro-Carib cultural activist, curator and producer. She founded The Mechatronic Library in 2010, to enable artists and museums to create artworks using new media technologies, such as Virtual Reality (VR), Augmented Reality (AR), Game Engines and 3D Printing. She has funded projects at the South London Gallery and the Digital Manufacturing Unit of the Bartlett School of Architecture (UCL) in London, and curated for FACT (Foundation of Art and Creative Technology), in Liverpool.

Expert Opinion: 'Why Build a Beautiful Hospital?' by Dr Mando Watson

The hospital and the community are closely linked: one needs the other. They meet in the same building.

A busy hospital stands at the centre of a community, just as the church once did in a village, marking our passage through life, all the way from birth to death.

In the centre of the community, this building – the hospital – allows and fosters all the connections and communications that surround our life events. Everyone, no matter who we are, passes through it at some stage.

This building holds a space where amazing things take place: some events are scary, some thrilling; some are tragic, or joyful, or heroic, or ordinary – many are just the everyday events that make us human.

For some, the hospital is a place of healing; for others, it's where we go to work, where we meet our colleagues and join together in teams.

A hospital is a place built to be occupied and used as efficiently as possible, often under testing circumstances. A patient may arrive at A&E, need to be assessed, then be moved swiftly to theatre for an operation, and after that into intensive care for recovery. At every stage, the hospital building itself enables a unique support network where all can do their best.

Patients are not the only ones who need support: staff do too. And patients have families who need looking after, to be comforted, consoled or reassured. They want to feel that their loved ones are in an environment that lets them know: 'you're in a good place.'

Design matters. Transparency helps everyone. Some architects thought they were being kind to keep the entrance to A&E separate and hidden from patients seated in the waiting area, not wanting to disturb them with the constant coming and going; but they underestimated how frustrating it can be, having to wait for hours in a big room, with no sense of what's going on. But when you see hospital staff actively dealing with emergencies, where the space is clearly laid out, everyone can understand why some patients require higher priority, and then there are far fewer complaints.

The most rewarding spaces are those where patients and hospital staff collaborate, working in a joint endeavour: everyone shares a common purpose, understanding that nearly

all healthcare challenges are better faced together.

Hospitals link up with other parts of the community, such as schools. In one project, children regularly visited geriatric wards, both old and young discovering an uplifting two-way exchange. Sensitive hospital design makes it possible for different generations, from the very old to the very young, to find the best in each other.

Just as churches were once designed to cater to the eye as well as the soul, sensitivity to beauty in a hospital, whether through a view of the sky or the colour of a wall, means that the building itself can foster recovery. Good building design creates an environment where patients and staff can thrive, whether they need calm, respite, recovery, re-energising or relaunching back into life.

Dr Mando Watson is a General Paediatric Consultant, working clinically at St Mary's Hospital, Paddington (Imperial College Healthcare) and working as Clinical Director at Central London Community Healthcare. Through the Connecting Care for Children programme in North West London she has developed holistic care and increased emphasis on prevention and the patient perspective.

Expert Opinion: 'The Healing Power of Water' by Jane Withers

Recently I met a friend at the V&A, and we found ourselves gravitating towards a temporary pavilion erected over the pool in the museum's garden. Sitting on a small bench we lost ourselves companionably in the liquid reflections playing around us. Although we were in a public space with kids paddling and people milling nearby, the presence of water helped create a sense of calm and seclusion, easing the door to intimate conversation. It was a powerful reminder of the soothing and connective powers of water.

This is one example of the many ways that water could be woven both imaginatively and practically into the design of hospital environments and made an active protagonist in supporting healthcare and human and environmental wellbeing. Others might include bathing and water therapies, celebrating drinking water and hygiene rituals, or reimagining the role of blue infrastructure in sustainable design.

Water therapies are an obvious example. Historically the healing power of water was widely recognised and it is only comparatively recently that water and wellbeing have been estranged in the public sector. Rome was famous for its fountains, aqueducts and monumental baths which were as much about rejuvenation as cleansing – a space for balancing mind and body ('mens sana in corpore sano' – a healthy mind in a healthy body) where water was a purifying, healing and integrating force. Other examples include the Nordic sauna and the hammam or Turkish bath, as well as ancient communal bathing cultures in Japan and Korea that still flourish today. Although not strictly accurate, the word Spa is often said to derive from the Latin 'salus per aqua' (healing through water), and spa towns flourished across Europe in the 18th and 19th centuries as resorts for health and relaxation. In all of these traditions we find elaborate bathing rituals supported by intricately designed facilities and water technologies, as well as restorative routines that usually combine exercise and massage. Many however declined in the 20th century with the waning interest of the medical establishment in water cures. But today resurgent interest in communal bathing is supported by recent research into the therapeutic benefits of water and bathing in reducing stress and the risk

of cardiovascular and neurodegenerative disease, developing better immune responses and improved sleep. With the shift in hospital design to balance clinical care with wellbeing, spaces designed around communal water therapies could help define a new healing environment for patients and staff as well as visitors and the wider community.

Another area undergoing reinvention is blue infrastructure. Arguably by piping water invisibly into our lives modern technology has weakened water's cultural and social role, turning it into what Ivan Illich memorably describes in *H2O and the Waters of Forgetfulness* as an 'industrial cleaning fluid' that we take for granted. In the context of the climate emergency, it's clear that many of the ways we use and abuse water no longer make sense and reimagining blue infrastructure can make water an active protagonist in sustainable design: harvesting rain to feed gardens and grow food, supply water for bathing and pools which as well as offering a space for respite and for contemplation help cool the environment. Designers are also looking to ancient technologies for passive cooling using water to reduce our reliance on energy intensive air conditioning. Future hospitals might be inspired by the Islamic garden or Roman cities to foreground water infrastructure as part of a holistic approach to sustainable design and wellbeing.

Another example is rituals for hydration and hygiene. The resurgence of interest in drinking water fountains is supported by health advocates, environmentalists and city planners globally. At the same time the pandemic has initiated new behaviours for handwashing and we need to devise new typologies to support hygiene in the public realm. Surely there could be a reinvention of the fountain in a hospital foyer or garden offering water for drinking and hand washing, a rejuvenating health ritual for both hygiene and hydration. I recently set this as a brief for master students at ECAL, Switzerland's leading university of art and design, and keenly anticipate their first concepts at the end of the year.

Clearly, the benefits that water can offer and the roles it can play in healthcare are multidimensional and, as with food and plants, there is scope to bring this elemental resource into the heart of the 21st century hospital

and health care environment in ways that benefit both people and the environment.

Jane Withers is a leading design curator, consultant and writer. Her London-based studio works with public and private organisations to shape strategies that bring innovative design thinking to address social, cultural and commercial challenges. Jane has long been interested in water and the role design can play in shaping a more sustainable future. She has initiated a series of projects exploring the role of design in addressing the global water crisis including '1% Water and Our Future' at Z33, Belgium, and the 'Water Futures' research programme at A/D/O New York.

Expert Report:

'Building and Designing our Cities for Health' by Publica

In creating our proposal for the hospital of the future, we asked Publica, a London-based urban design and public realm practice, to consult on location. They have come up with three potential sites across the UK.

There are many complex ways in which various aspects of city life interact to shape health and wellbeing. Hospitals play an essential part, not only in providing healthcare and managing illness within hospital walls but in their potential to promote health and transform the neighbourhoods they are anchored in into healthy communities.

1. The hospital as an anchor – social and economic vibrancy

The *community focused hospital* is rooted in place, and has the potential to become a backbone institution to better the health and long-term welfare of the community in which it is anchored in. Hospitals potentially have the resources to make a significant difference beyond hospital walls such as partnering with housing authorities to provide mental health services or with schools to help address asthma and improve school attendance. Furthermore, if hospitals focused activities to benefit the local community, for example through localised purchasing, hiring, investment and incubating new community enterprises hospitals as anchor institutions could have a transformative effect on the lives of people, the health of the community and driving local economic growth.

The *community focused hospital* could be strategically situated amidst other key facilities like places to socialise, libraries and clinics, establishing a set of services within the urban environment. Blurring the boundaries of where health is generated and delivered creates an opportunity to reach more people and influence their health and recovery far beyond hospital walls. The *community focused hospital* is no longer isolated from the community it serves, instead it encourages a mixed-use neighbourhood anchored by health services. In this way, the neighbourhood becomes part of the experience – rather than being confronted with an isolated institutional environment. The *community focused hospital* will become part of a thriving neighbourhood, opening its services

and campus, where there is no divide between 'citizen' and 'patient'.

2. The hospital as a healthy neighbourhood – placemaking and the built environment

Planning and designing our cities for health does not only mean building hospitals. While hospitals are incredibly important, health is holistic – the whole person needs to be cared for, listening to physical, mental, and social needs. Our health is therefore not the sole responsibility of doctors and health care professionals. There are a wider set of forces and systems shaping the conditions of daily life that drive health outcomes. For example, the design and layout of our built environment is a significant determinant of human health through its influence on socioeconomic and environmental factors. The *community focused hospital* is encouraged to look outside its walls to consider the social and environmental factors that affect health, which include air quality, noise pollution, green infrastructure, and safety. Good urban planning can not only mitigate the impact health hazards but can also become a tool for generating and promoting health. The design and planning of the places we live, work and socialise is therefore an opportunity for the *community focused hospital* to join to reach beyond its walls and engage in placemaking and street transformation. The *community focused hospital* can create an attractive and welcoming urban environment by ensuring that adjacent streets and public spaces are accessible, safe and support a range of activities including playing, sitting and socialising.

Public space and public life are more important than ever now, as we continue to navigate what mark the Covid-19 pandemic will have on urban planning and our urban spaces. We know that throughout history public health issues have shaped cities and have led to both significant infrastructure and generous moments of civic design and innovation. For example, London's cholera pandemic (1846–60) led to a modern sewerage system and Victoria Embankment – an iconic public space in the city. The significance of community and sense of citizenship has been a lesson learnt from the Covid-19 pandemic. The pandemic has also created a new emphasis on local growth, resiliency

and sustainability, which creates an opportunity for future hospitals to be more engaged institutions in the life of their communities.

3. Methods for engagement

Caring for and engaging with the community is an essential component of a lasting, sustainable health service. The *community-focused hospital* will listen to its communities, gain their trust, identify what the key health problems are and articulate a strategy to address them. This approach will help develop an increased sense of ownership over health and wellbeing in the community. By investing in and working with others locally, the *community focused hospital* can have a greater impact on the wider factors that make cities healthy.

An evidence-based methodology – studying urban neighbourhoods forensically to document their land use, character, social infrastructure and complex identities – is a crucial starting point for decision-making about urban change and growth. From these social, cultural and spatial investigations we can create visually accessible area portraits, which provide base-line intelligence about an area's assets, social networks and character. We can use this intelligence to understand key opportunities and challenges affecting an area, ask strategic questions, address social and economic needs and develop community engagement plans.

4. Study Sites / Mapping exercise

It is essential to understand the social infrastructure surrounding any area a *community focused hospital* could be anchored in. The *community focused hospital* will not operate in isolation, but will be designed in response to what is around it with a programme bespoke to the community it will support. We have mapped the social infrastructure across three sites in the UK – Queen's Park (London), Burnley (East Lancashire) and Finnieston (Glasgow) – to begin to understand the potential role of a future community focused hospital.

i. Queen's Park (London)

Queen's Park is one of Westminster's most demographically diverse areas. It is in the north-west of the borough,

at the border with Brent and Kensington and Chelsea. Queen's Park is a largely residential area with less than 1000 people working within the ward with very little public space. The area faces a number of challenges, the greatest are associated with the loss of retail on the Harrow Road and Kilburn Lane but also on smaller residential streets. There is considerable street drinking and antisocial behaviour still evident in the area, especially on Harrow Road.

Queen's Park has a number of Victorian civic buildings that were built as part of the Avenues Estate such as the Library and St Jude's Community Hall. For the past 30 years, there has been a legacy of good social infrastructure provision in the area to address the disadvantages that many of the residential population face including sports centres, libraries, health centres, and schools.

There are a few community gardening and food growing projects including the Friends of Queen's Park Gardens and the Paddington Development Trust. The Queen's Park Community Council host several public events including the Summer Festival and Winter Fair. These events are well attended and valued occasions for local residents.

Potential engagement opportunities:

The hospital as an anchor

- Support the local community through building relationships and partnering with existing and well-established social services and networks including community councils, health centres and schools to support shared approaches locally. These could include the Half Penny Health Centre, Queen's Park Children's Centre and the Dart Street Community Centre.

The hospital as a healthy neighbourhood

- Create a temporary programme of engagement events and/or public classes in empty shop units on the high street (Harrow Road) to help residents tackle health issues in their day-to-day life. Consider hosting an event in Queen's Park Gardens with the Queen's Park Community Council, who host a number of public events including the Summer Festival and Winter Fair. These events are well attended and valued occasions for local residents.

ii. Burnley (East Lancashire)

Burnley is a town in East Lancashire, England at the confluence of the River Calder and River Brun. During the Industrial Revolution, it became one of Lancashire's most prominent mill towns and one of the world's largest producers of cotton cloth and a major centre of engineering. Over the last few years, there have been many pledges to help to 'level up' Burnley; however, with little attention being paid to public health, benefits, housing, and schools.

In October 2020, Burnley registered the highest rate of Covid-19 infections in England, something partly traced to its high levels of poverty and overcrowded housing. The area has therefore suffered disproportionately during the pandemic and its economy is predicted to be among the ten most heavily impacted in the UK.

During the pandemic, social infrastructure has been an important underpinning of community resilience. A network of community-based groups sprang up across the UK to provide support to many who felt isolated and vulnerable. An example of this in Burnley is Church on the Street in the town centre, which helps and supports people affected by homelessness and addiction. Predominantly the church has been working on food distribution, pastoral support, and collecting and distributing medication during the Covid-19 lockdown.

Partners across the public, private and voluntary sectors have also set up a community hub, Burnley Together, to co-ordinate help and support for residents across the borough during the pandemic. To date services include mental health support, dog walking, collecting prescriptions and meals on wheels amongst others.

Potential engagement opportunities:

The hospital as an anchor

- Co-locate, coordinate, and integrate healthcare and wellness services with housing and other social services such as Church on the Street Ministries, Burnley Jobcentre and Lancashire Women.

The hospital as a healthy neighbourhood

- Many of the residential streets in the area are quiet and calm. Some of the streets in residential estates are parking access-only, which

could make a good environment for temporary street play schemes. The introduction of traffic controls would help improve air quality and reduce congestion, prioritising walking and cycling and making safer streets for residents.

iii. Finnieston (Glasgow)

Finnieston is an area in Glasgow, Scotland, situated on the north bank of the River Clyde, between the city's West End and the city centre. The area borders the neighbourhoods of Anderston, Kelvingrove, Kelvinhaugh, Overnewton and Sandyford. It was once a thriving area of heavy industry on the north bank of the River Clyde, but in the 21st century the wider area has become a popular tourist destination and leisure hub, mirroring Shoreditch in London. The area has a diverse mix of residents, from long-standing residents to young students (five leading academic institutions are within commuting distance).

Following a recent increase in visitors to the area and number of local businesses, the local Community Council, Yorkhill & Kelvingrove, have put forward a vision for improved cycling and pedestrian infrastructure.

In 2020, a temporary emergency critical care hospital and vaccination centre was set up within an exhibition and conference centre to support Scotland's response to the Covid-19 pandemic. Valuable community groups in the area include the Mel-Milaap Centre, a community resource and safe environment for the promotion and furtherance of multiculturalism and the My Body Back Project, a volunteer-run organisation providing sexual and reproductive health services for people with sexual abuse history.

Potential engagement opportunities:

The hospital as an anchor

- Working with the local community council, set up a governance structure such as advisory council made up of people who live or work in the area to integrate community feedback into planned or proposed initiatives.

The hospital as a healthy neighbourhood

- Provide opportunities for further play spaces, tree planting or small allotment sites along the edges of existing housing developments and

streets, or some of the pavements in the area to increase access to open, green space. Create partnerships with existing community gardening and food growing projects such as the Woodland Development Trust and Kelvingrove Square.

4. Making it Real

Urban Context and Environment

The Living Systems Health Centre is designed to be adaptable to its urban context and environment.

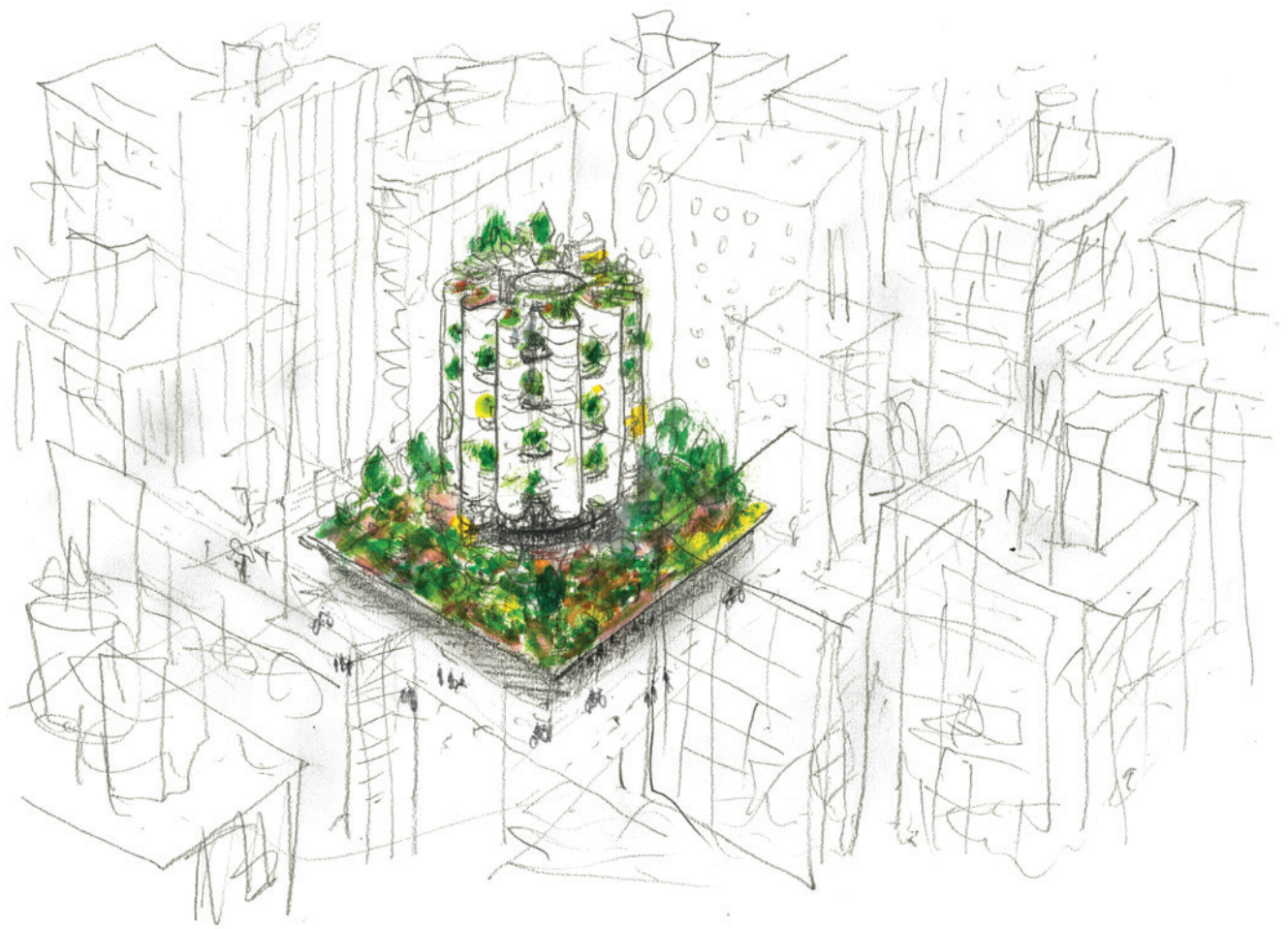
Building a new health centre is an opportunity for urban regeneration. While the principles of the building's design will remain constant, its programme will be not only be defined by its areas of specialty but by the social, political, geographical, environmental and architectural needs of the communities it serves, engendering focused interconnectivity with its users.

'The social capital around the health centre's location is really important; tying in local suppliers in some way is definitely a good thing.'

Toby Anstruther, Habitat Maker

The health centre's location is key to establishing it as a vital civic hub. It must be close to its local communities while still providing a safe, protected environment. The site must have minimal sound pollution; it should be a safe distance from motorways, flight paths and train lines yet close to good transport links.

The health centre's design will respond to its local landscape, taking into consideration parks and green spaces, transport connections, roads, and rivers.



Urban Context and Environment: 'Building and Designing our Cities for Health' by Publica

'Public space and public life are now more important than ever as we continue to navigate the impact that Covid-19 will have on our urban spaces. Hospitals play an essential part [in contributing to public life], not only in providing healthcare and managing illnesses but in their potential to promote health and transform their neighbourhoods.'

'Hospitals are ideally placed to build [local] partnerships, such as with housing authorities or schools. They can also support local strategies for reducing noise pollution and improving air quality, green infrastructure, and safety. The community-focused hospital works with its communities, gains their trust, identifies key health problems, and articulates strategies to address them.'

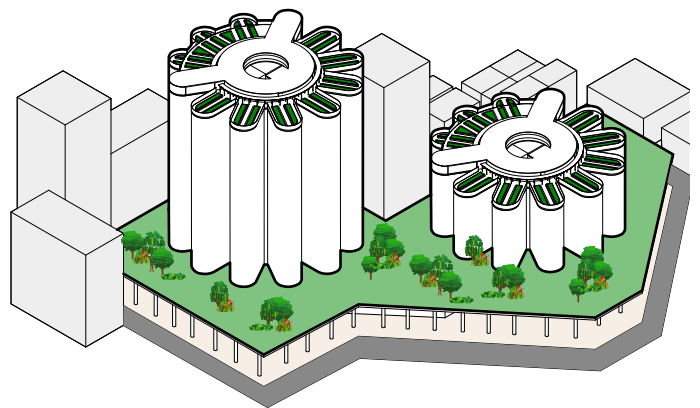
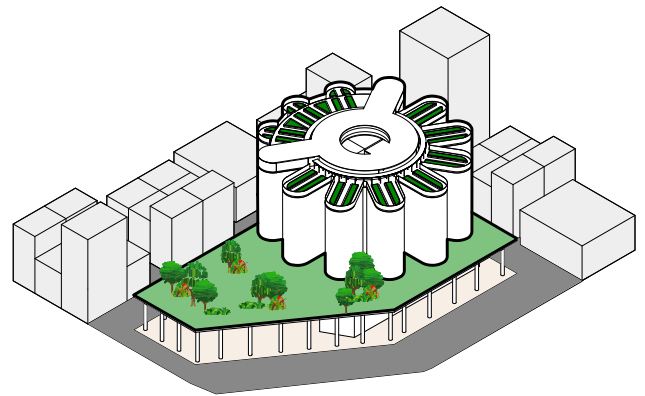
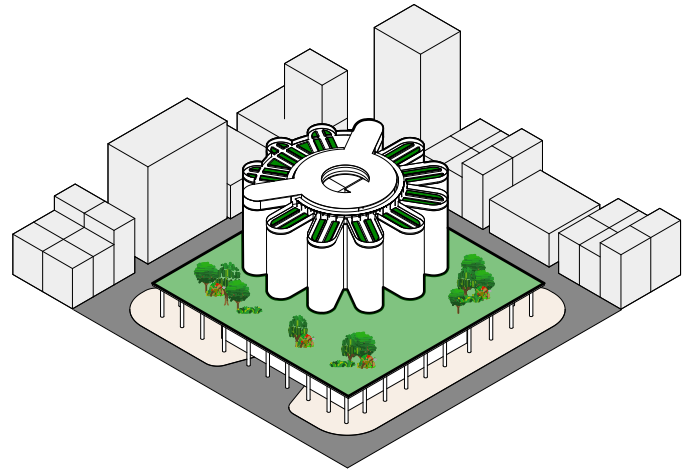
See Publica's full report on page 62

Urban Context and Environment: Site Adaptation

The key to standardising the architecture of the Living Systems Health Centre is for the podium, park and tower to be designed to integrate with the site so that it can reach out to the local community.

The podium contains a flexible programme which can adapt to different sites; working with existing community groups to break down barriers and welcome the community in.

Below are a series of diagrams exploring how the podium, park and tower can adapt to different sites and contexts, with multiple towers on larger sites.



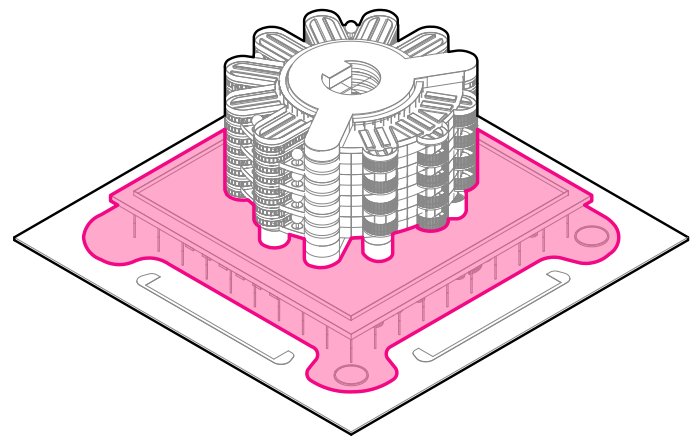
Adaptability of podium to suit varying socio-economic and geographic briefs

The Architecture

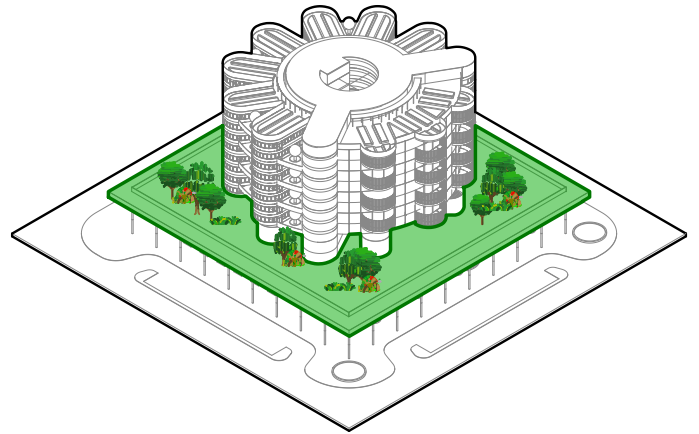
The building's architecture is designed to be efficient, legible, practical, and sustainable, prioritising flexibility and humility over heroism. Through consideration of the internal demands and complexities of a health centre, we have designed the Living Systems Health Centre from the inside out. This has led to a prototype consisting of a largely open sided podium with a public park on top. These support a tower harnessing a floorplan shaped by a concentric circle of petals.

Responding to the sun's path, the architecture will maximise natural light, drawing on its power to heat, heal and balance those inside. An abundance of natural light will conserve energy and minimise carbon consumption and waste.

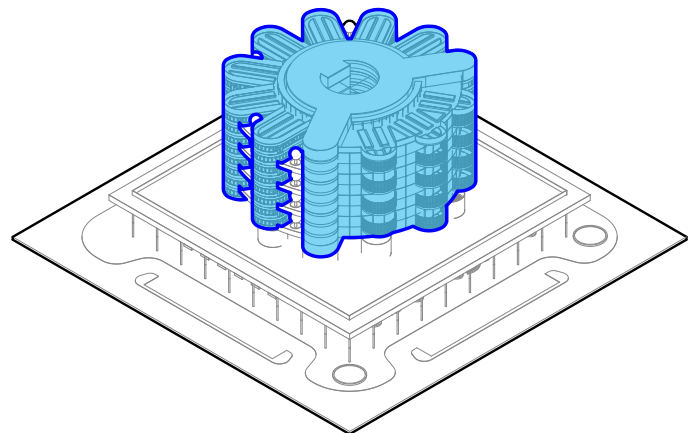
The health centre's structural principles consist of a network of responsive and adaptable enclosures that follow a plug-and-play system. These support the interior's changing programme, working like self-generating cells that can be bolted together and easily dismantled via a series of integrated fixings in the slab and ceiling. These components will be able to form walls, doorways, and fixed structures around service voids so that everything from M&E to rooms will be reconfigurable.



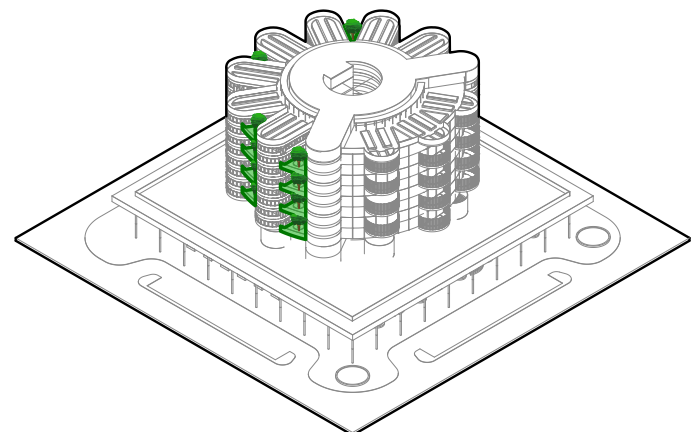
Podium



Park



Tower



Pocket Park

The Architecture: Façade and Cladding

The health centre's exterior is punctuated by pocket parks, planted balconies and trailing greenery, creating a lively façade that enhances its surroundings and supplies them with biophilic energy.

The building's façade is transparent at podium level, revealing its inner workings to the world. It is open along two sides of the ground floor to allow a continuous flow of visitors.

In the tower (to ameliorate the issues of solar and heat gain), the full division of the petals is maintained only on the south side. Here, the sun's warmth will help passively heat the building and natural light will flood the wards. On the north side, the petals will be linked by a curved, glazed façade, with the tips left as open balconies. This will create softer, more filtered light, appropriate for the office and consultation work being conducted on this side of each floor.

The façade will be cleaned via a building maintenance unit (BMU) or cranes positioned on the roof as necessary.

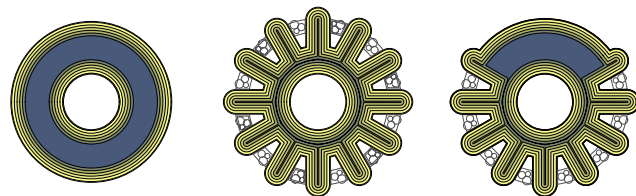


Diagram showing efficiency of natural light penetration through architectural form

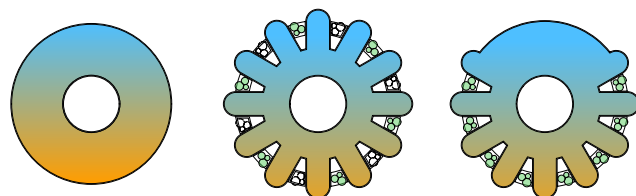


Diagram showing how floorplate has been shaped to optimise ratio between heat gain and facade to floor area



Park meets restaurant-café and refreshment kiosk

The Architecture: Material Palette

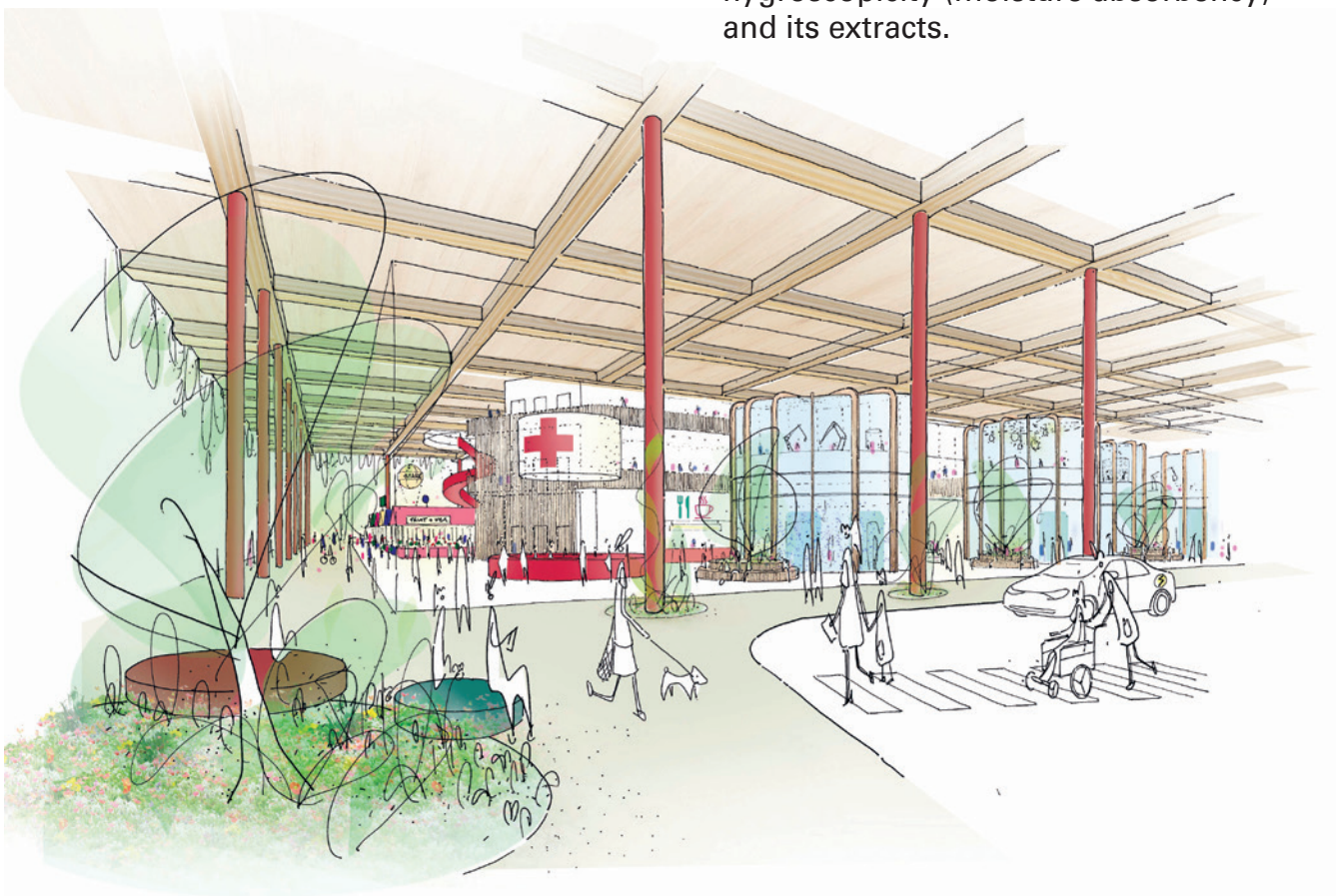
The Living Systems Health Centre will adopt a non-dogmatic approach to material specification. Materials will be chosen for what is most fit for purpose. We propose terracotta, glass, steel and timber for their resilience, efficiency of construction and sustainability credentials.

The interior will be comprised of cross-laminated timber (CLT), constructed via a kit of prefabricated, modular, dry-fix panelled components with neoprene seals. These panels have the benefits of reduced embodied carbon, biophilia and increased flexibility (they can be easily removed for the addition of new risers, for example).

Our biophilic approach will inform the choice of materials, particularly in the public spaces where natural and organic surfaces and fabrics will help create welcome spaces that feel warm and welcoming rather than clinical.

We are committed to specifying materials with naturally antibacterial qualities where possible, including:

- **Ceramics** glazed with antibacterial additives that protect against microbial reproduction and growth.
- **Wool**, which is naturally water- and soil-resistant, with a surface layer that is repellent to microbes as well as properties that inhibit the growth of some microorganisms including mould, mildew, bacteria, and viruses.
- **Copper** and its alloys, such as brass and bronze, which have the innate capacity to efficiently kill a range of harmful microbes.
- **Wood**, the extracts of which have been found to have antibacterial properties (such as the lignin that binds the fibres together). In addition, the quick-drying nature of wood puts bacteria at a disadvantage. Oak is particularly hygienic, with antibacterial properties due to a combination of its hygroscopicity (moisture absorbency) and its extracts.



Ground-floor entrance, showing reception, marketplace and community support centres

The Architecture: Cores and Circulation

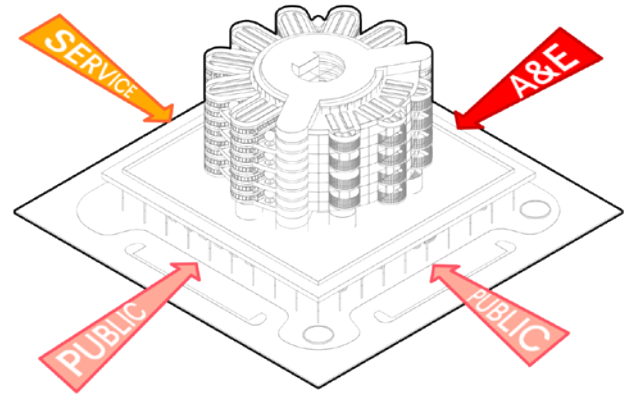
Three vertical cores serve the health centre's podium and tower:

- **Core 1** for staff and patients admitted from A&E
- **Core 2** for visiting public and outpatients
- **Core 3** for food/laundry delivery and waste removal plus general servicing

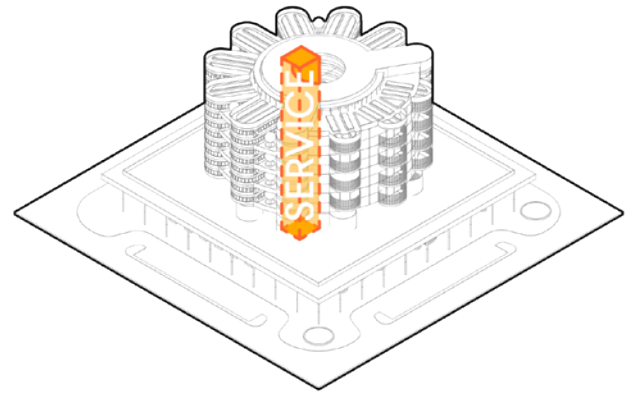
The two main circulation cores (1 and 2) each contain 3 lift cars that always open towards the facade so that when people exit, they get the benefit of the park view and exposure to natural light on arrival at the wards. A further bed lift exits directly into the wards.

The different orientation of these lifts creates privacy and separation between patients arriving on beds and visitors arriving on foot.

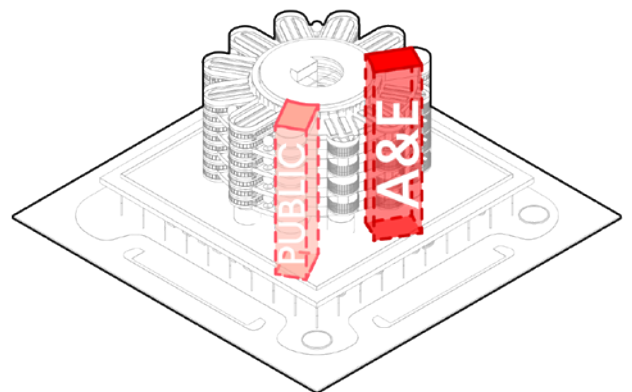
A feature spiral staircase will bring the public from the ground floor up to the park level, creating a dramatic public realm connection between the main spaces open to all. This staircase will also open at the first floor – Innovation Centre – level, giving access to the public pharmacy and an open route past the glazed laboratory spaces to the main lift core. This staircase will be supported by a glazed lift for further public access.



Main points of access, combining services, A&E and public drop-offs



Defining main service core throughout the building



Defining the public and A&E lift cores throughout the building

5. Zoning

Podium

'We should be looking at urban and suburban regeneration, which includes community health hubs at a primary level, not just secondary.'

Stan, Hospital Patient

'You need to embed the health centre in the community and not have it look like a UFO that has just landed.'

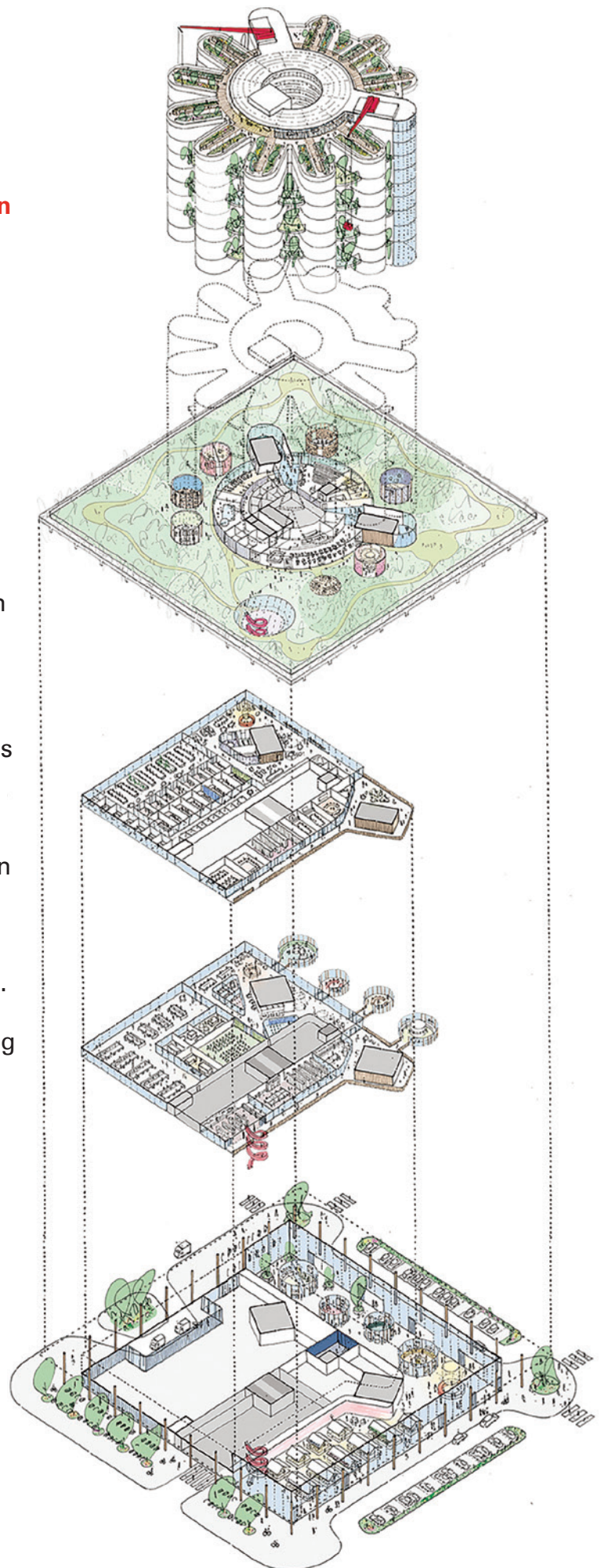
Helen Starr, Cultural Activist, Curator & Producer

Open to the general public, the building's podium is key to the health centre's mission to embrace the local community and function as a living system. It will bring the sick and the well together to foster a culture of care.

Based around the idea of an open marketplace, the health centre will strengthen the local economy, giving local businesses access to a wider range of customers and raising awareness about the range of community support services available.

While this marketplace strategy will remain constant, the detail of the programme can be tailored to the needs of the particular community the health centre serves, aiding urban regeneration in the best ways possible.

As the public nerve centre of the health centre, the podium is a prime site for ensuring that the maximum number of people benefit from the building's biophilic interventions. Scented plants can be used in entrance and exit areas, unscented plants can be used elsewhere for their tactile and oxygenating qualities while hypoallergenic plants can be incorporated at closer contact points.



Exploded isometric drawing analysing the components of the podium



Section of the Living Systems Health Centre, revealing the full functionality through the marketplace, innovation centre, hospital support, park and hospital tower



Podium: Ground Floor

Entrance & Reception

At the building's northeast corner, the highly visible main entrance and reception area will serve everyone, guiding the general public up to the park and staff, visitors and patients into the main body of the health centre via the lift cores.

Access is via a patient drop off area on the north side of the ground floor, with another public drop off area on the east side.

Marketplace

Housed in a triple-height void on the north and east sides of the ground floor, the marketplace will be a hive of activity at the heart of the building, featuring stalls selling fresh local produce and dry goods and crafts. A series of standalone pavilions will contain social prescribing and community welfare services including a community kitchen. As the area where community and health centre meet, the marketplace must be safe; it must be well lit, well policed with open sightlines and no concealed corners.

A&E

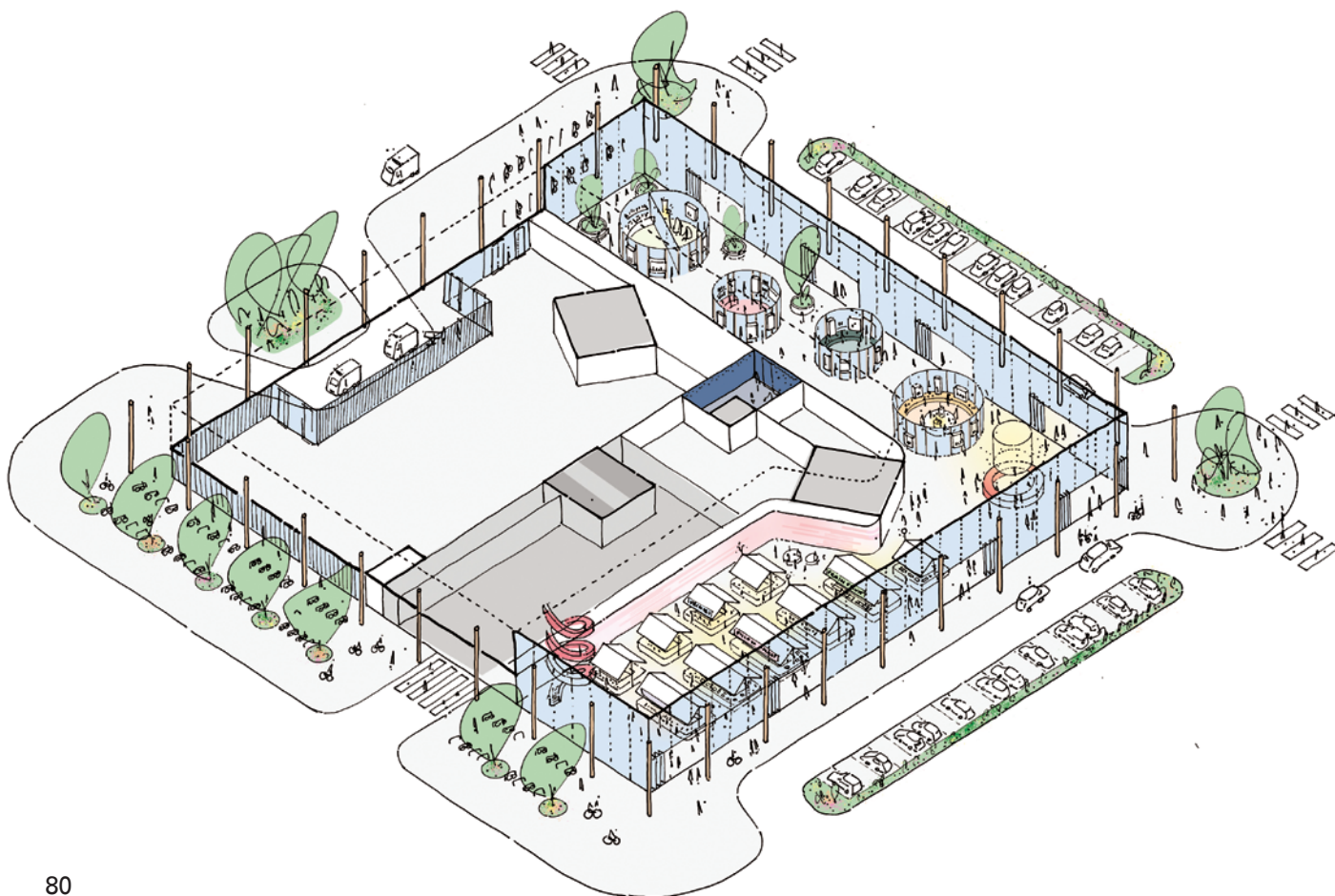
Separation between A&E and the public facing marketplace is achieved through back of house zones including the loading bay and service core. The A&E department is served by its own lift core which takes visitors and patients directly into the health centre.

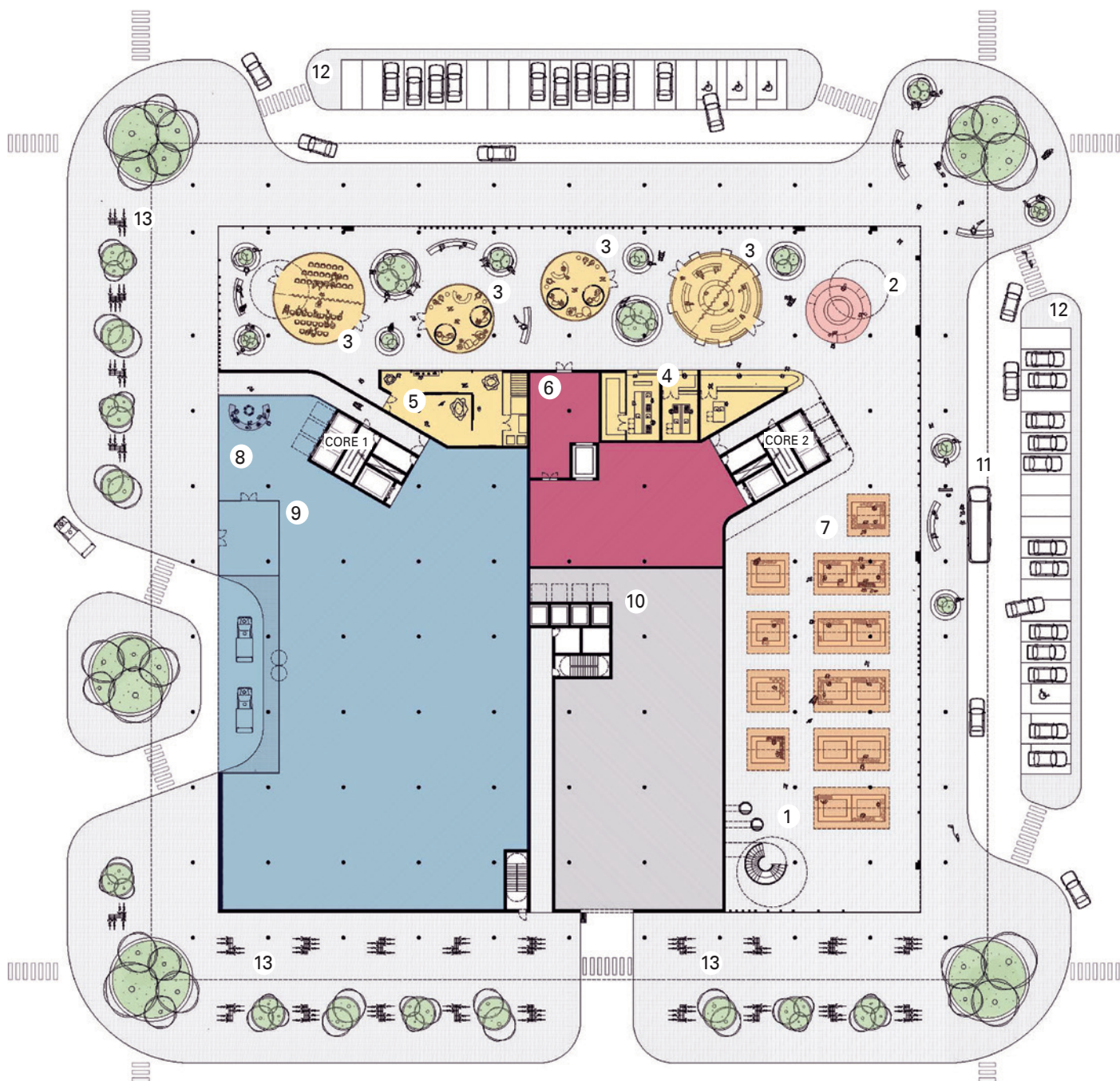
Access to the A&E department and ambulance drop off is to the west of the ground floor.

On the north side of the central space is the entrance to the Mortuary which provides visitor access via a dedicated lift that also carries them directly up to the Bereavement Centre at park level.

Primary & Social Care

The programme of social care housed in the spaces along the north perimeter, will include a doctor's surgery containing a consulting/ exam room, waiting area and nurses office, as well as a community kitchen, counselling and consultation rooms for family and community welfare services such as housing support, debt relief and legal advice.





- | | |
|------------------------------------------------|----------------------------------|
| 1. Public Stair & Lift Access | 7. Community Market |
| 2. Main Entrance Reception & Information Point | 8. A&E Reception & Waiting Room |
| 3. Community Support Centres | 9. A&E |
| 4. Community Kitchens | 10. Loading Bay & Service Access |
| 5. Community Exhibition space | 11. Bus stop |
| 6. Bereavement & Mortuary Entrance | 12. Car parking |
| | 13. Cycle parking |

Podium: First Floor

Innovation Centre

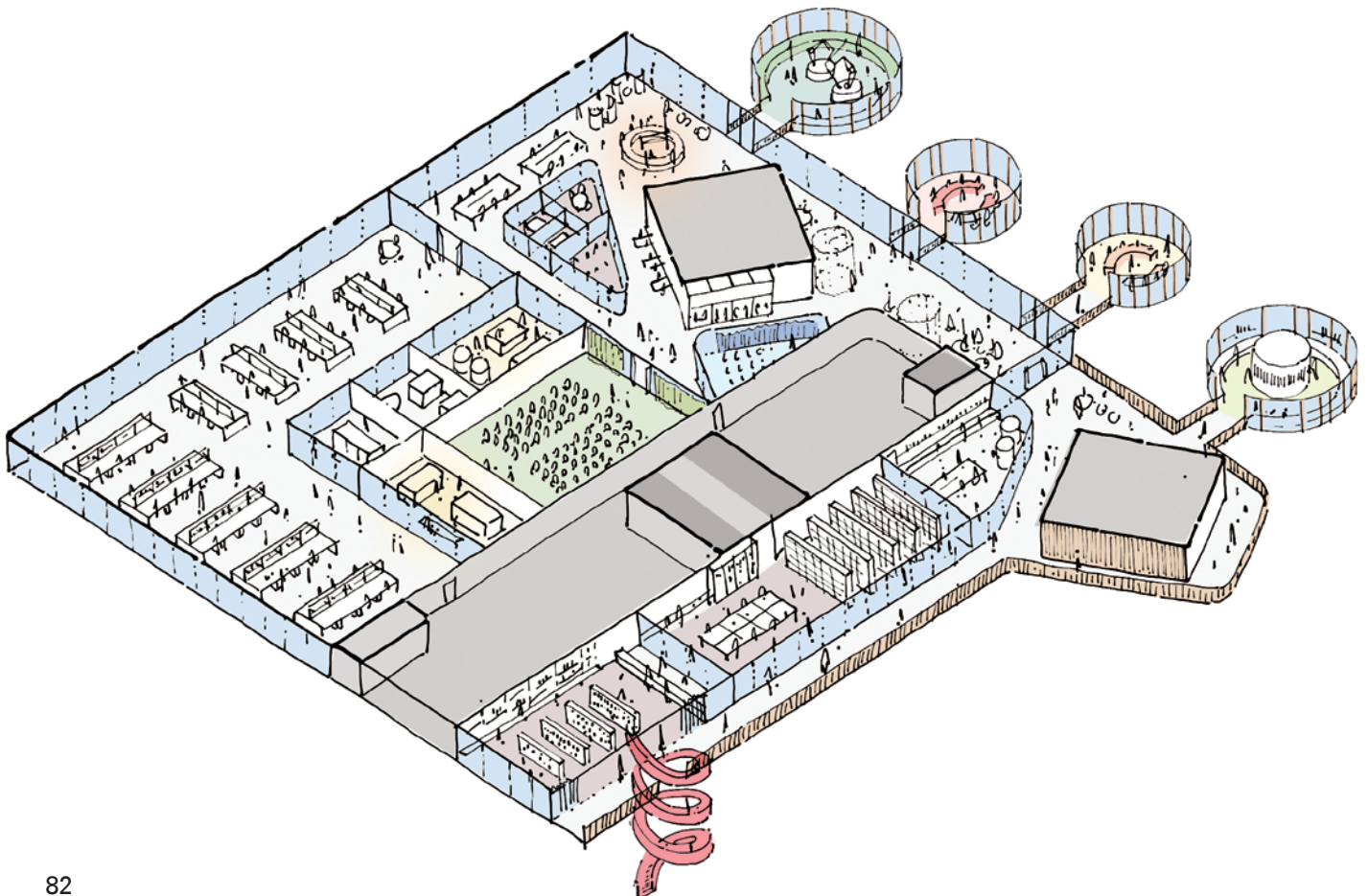
The first floor of the podium occupies a mezzanine level containing the health centre Innovation Centre's laboratories, teaching and research workspaces as well as two pharmacies that will serve the general public and the health centre respectively. Maintaining the visibility of these spaces is essential to demystifying research processes and keeping people connected to medical advances that affect their health. The view of the Innovation Centre as a burgeoning hub will foster a culture of transparency and promote inquiry, discipline, learning and innovation at the core of the health centre's activities.

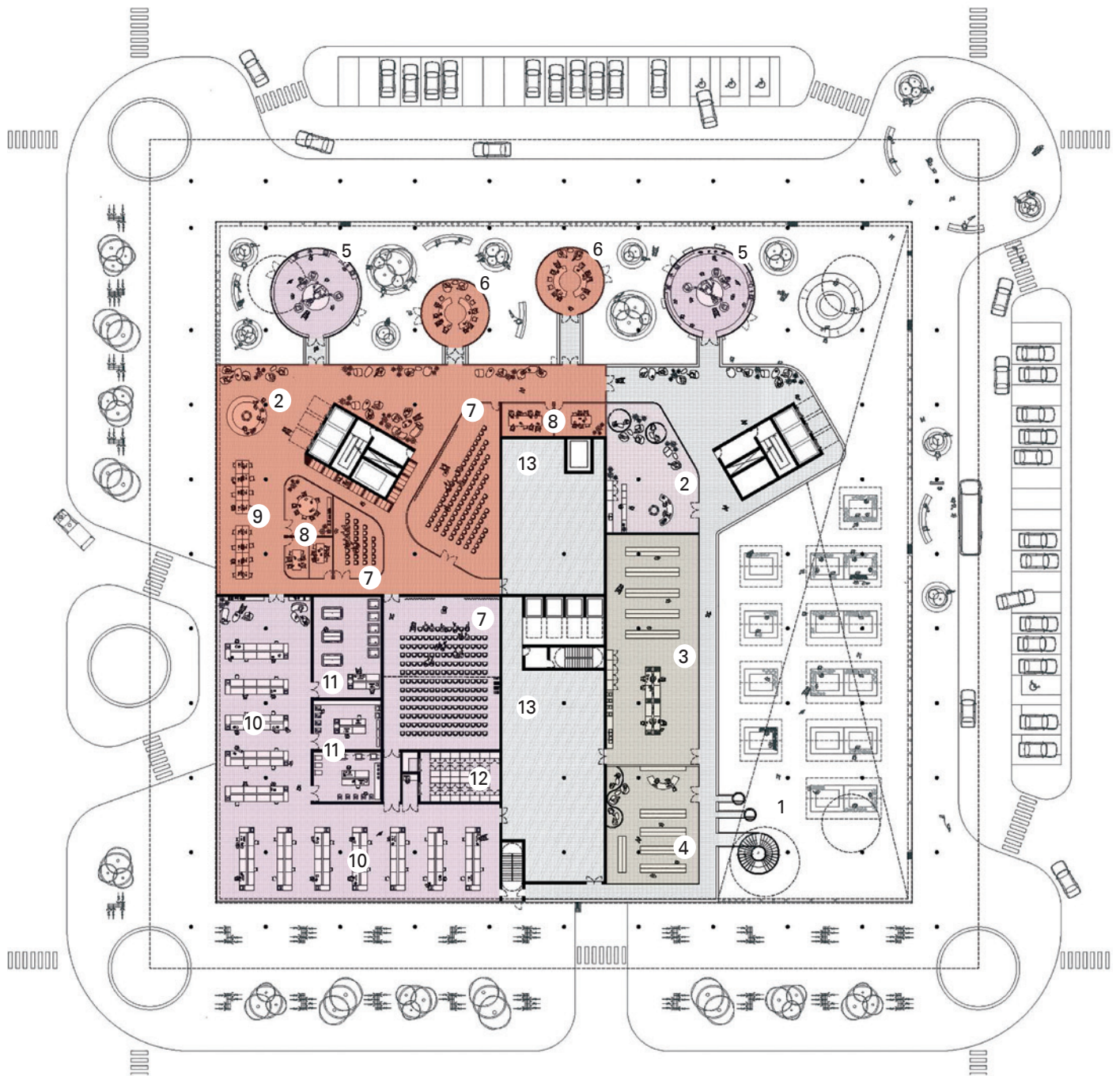
The façade and internal walls of the Innovation Centre will be fully glazed to let in natural light and reveal the laboratories' inner workings. The floor offers a range of workspaces with varying levels of privacy; from formal and informal meeting rooms and soundproofed phone booths to flexible, open-plan co-working and teaching spaces.

More private spaces (lecture theatres, seminar rooms and spaces for isolated lab work) are located in the centre of the floor plate, while breakout workspaces for staff and students are situated on circular glazed platforms, suspended above the public-facing retail units below. These enclosed platforms are designed to showcase the activities inside.

Pharmacies

Back of house areas and the service core separate the two pharmacies from the research and teaching area. Unlike the Innovation Centre, the pharmacies can be reached via the main public lift core, or alternatively via the spiral staircase from ground level. The health centre pharmacy is directly connected to the hospital above via the service core creating a potential route for robot-distributed medication.





1. Public Stair & Lift Access
2. Laboratory
3. Hospital Pharmacy
4. Public Pharmacy
5. Innovation Space
6. Seminar rooms
7. Lecture Rooms

8. Meeting Rooms
9. Study Area
10. Laboratory
11. Laboratory Testing Rooms
12. Laboratory Cool Room
13. Back of House

Podium: Second and Third Floors

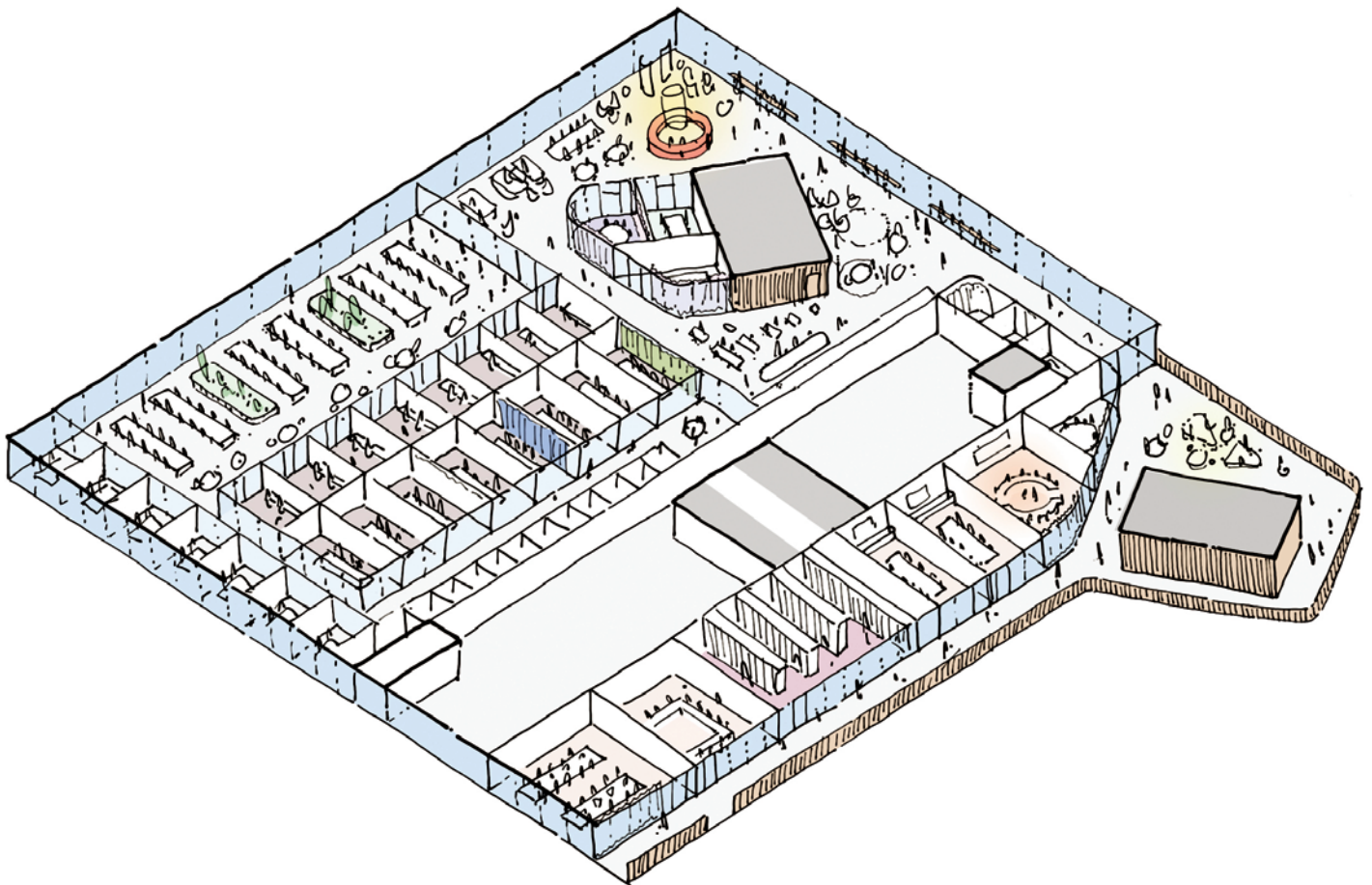
Hospital Support

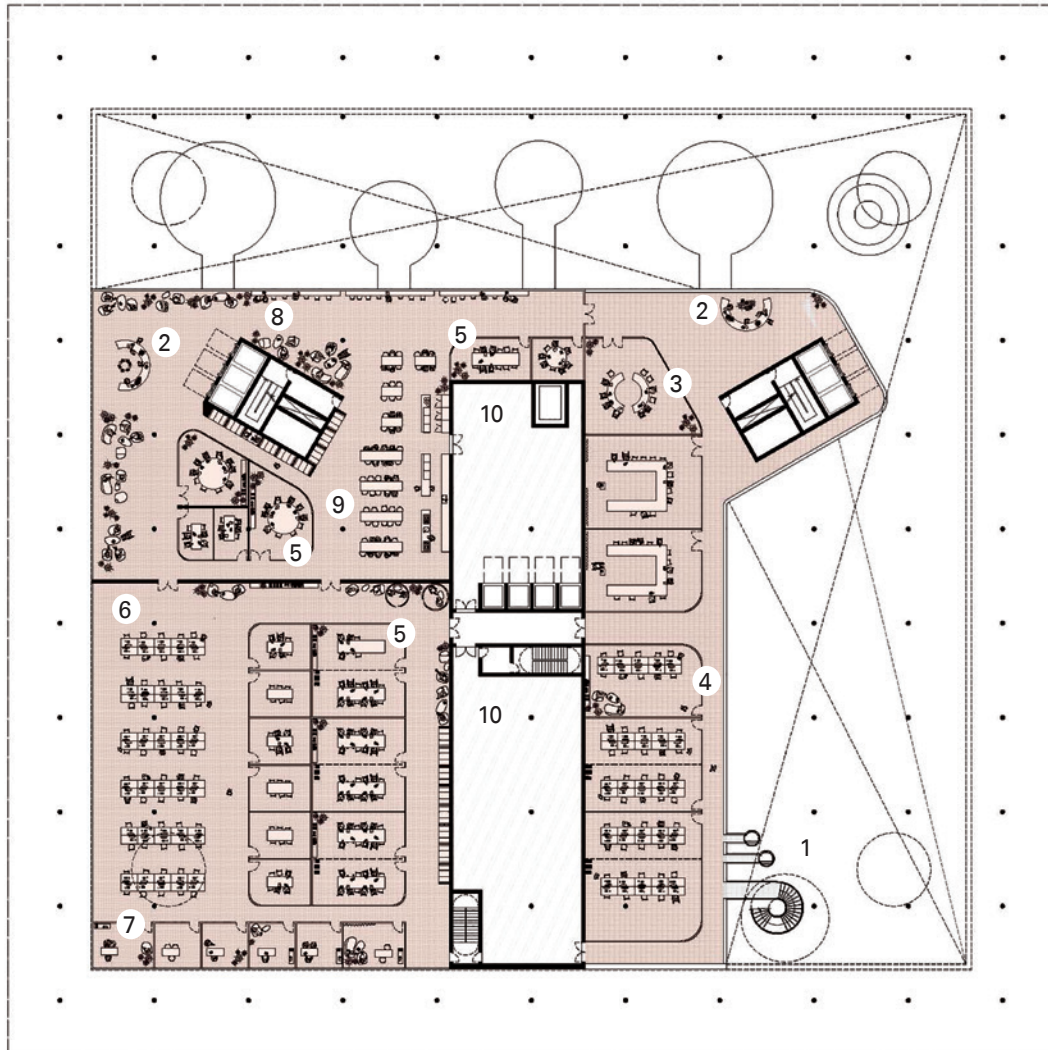
Accessible via Core One, this floor contains hospital support spaces including extra administrative, meeting or staff spaces and storage for additional equipment. Its large, open floor area utilises a flexible grid structure that enables service elements such as lighting or heating to be plugged in or removed and walls or partitions to be easily moved in anticipation of the changing needs of the hospital.

Instead of dedicating the roof space to plant machinery, we have located M&E on the third floor of the hospital. Sitting between two most highly serviced spaces (Podium and Tower) it can be reconfigured to suit changes in either without affecting significant parts of the remainder of the building.

This location will enable centralised distribution of power and water via a simple three-core system that allows for flexible movement of people, food, and waste.

Its ventilation will be configured to intake and exhaust from the perimeter of the floor, avoiding the need for large risers throughout the upper floors.





1. Public Stair & Lift Access
2. Reception
3. Conference Rooms
4. Flexible Office Space
5. Meeting Rooms
6. Open-Plan Office
7. Private Office Spaces

8. Co-Work Area
9. Canteen
10. Back of House

Park Level

The Park and Pavilions

Open to all, the public park is a city retreat that will give the local community a place to meet, exercise and interact with nature. Containing a series of interlocking gardens, it will offer a contrast to the health centre's clinical functions while supporting shared health goals through interventions like markers on pathways to highlight progress and give a sense of achievement.

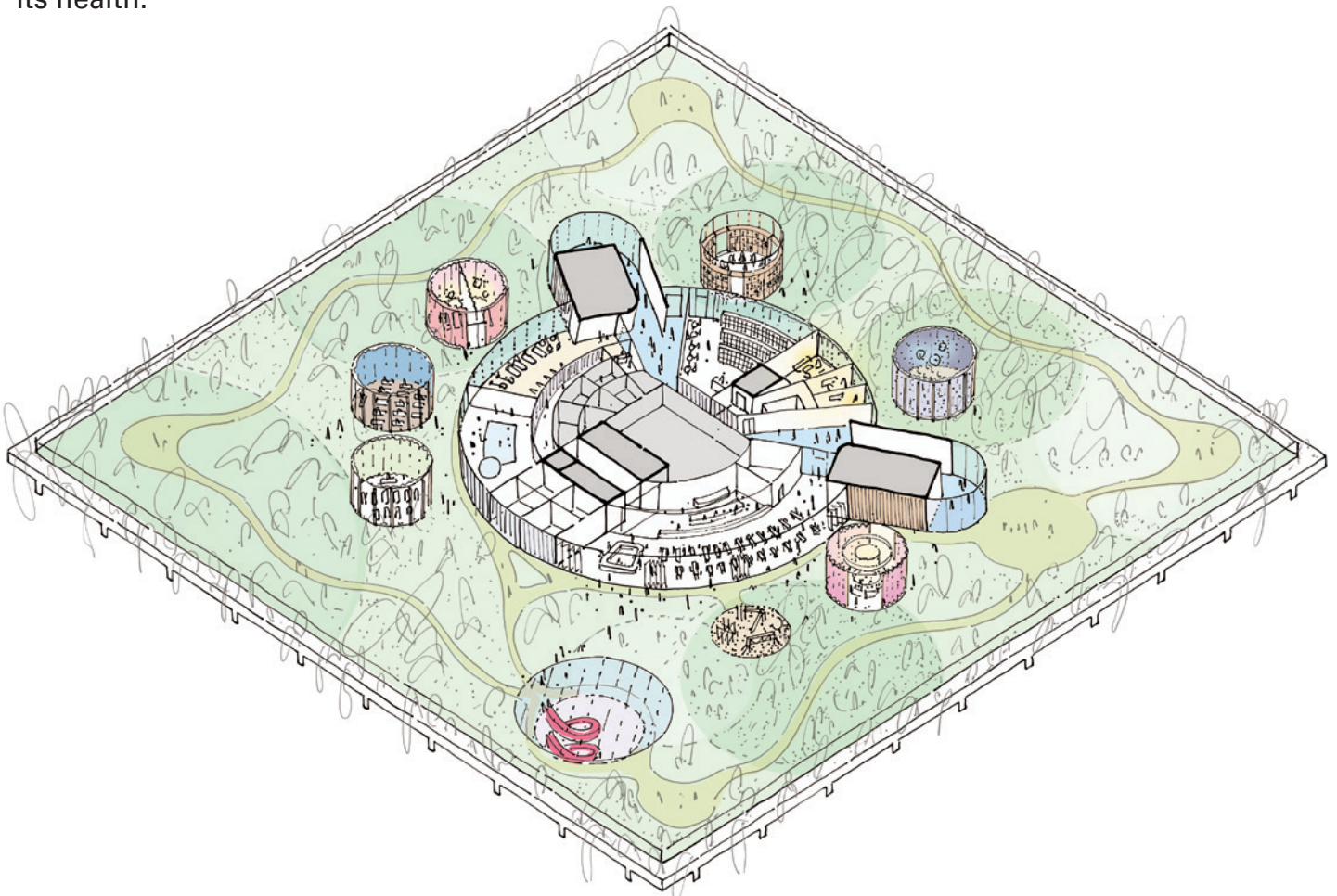
The park's landscape will be designed to deliver a colourful, engaging environment of exploration, encouraging biodiversity and showcasing tangible seasonal changes – 'Blossoming cherries for moments of seasonal celebration, English Oak to instil a sense of longevity, Rowan for brilliance of autumn colour and fruits' (Dan Pearson, landscape designer and horticulturist).

Nature-focused interventions like bird and bat boxes will animate the park and fuel its health.

The park is accessed via a spiral staircase and lift at the southeast corner which leads to the day care centre and café and restaurant space, and via a lift in Core Two, accessed from the main entrance.

Separate from the main building, the park also contains a cluster of stand-alone pavilions that offer specific services – such as acupuncture, osteopathy and counselling – as well as a kiosk for takeaway food and drink and studio spaces for art classes and therapy groups.

Removed from the clinical space of the health centre, pavilions will offer a space in nature for peace and reflection.



‘Even as the hospital continues to function around those who must come to terms with the end of life, we must still make room for grief in the running of the contemporary hospital.’

Hammad Khan, Consultant Neonatologist,
St Thomas’ Hospital

As part of the health centre’s Bereavement Centre, one of the park’s pavilions will contain a non-denominational chapel for all hospital users. This Contemplation Room will be a place where people can go in difficult or happy times to reflect, pray, remember, grieve or give thanks no matter their religion or beliefs.

Each pavilion is shaded by the overhang of the petal-shaped wards above. Their flexible nature means they can be easily repurposed, whether as private consultation rooms, or play spaces for children. Their services will be available to patients as well as to the general public through a programme of out-of-hours sessions and classes. These services will support continuity of care for patients post-discharge. The design of each pavilion can be informed by its function, the degree of openness to the landscape dependant on the level of privacy required by its function.

Café and Restaurant

Serving delicious, healthy food and offering views out onto the park, the Living Systems Health Centre’s café and restaurant will be cultivated as one of the local area’s desirable health food destinations. Food will come via the service core from a central kitchen that also serves food to hospital patients. In stark contrast to the traditional hospital canteen, the café and restaurant will offer dishes made with fresh, seasonal produce, some of which will be grown in the rooftop garden allotment or provided by local suppliers in the health centre’s marketplace.

‘Somewhere to go, just to feel a bit of normality, even if you’ve got to go downstairs in a wheelchair with your oxygen for a fresh cup of coffee, would be nice.’

Katie, Hospital Patient

Gym and Physio

The gym will house exercise spaces, fitness studios with specialised rehabilitation equipment, physiotherapy treatment spaces and changing rooms. Primarily for use by patients, its facilities will be available to the public outside peak hospital hours.

Library

Located on the same level as the park, the public library will cater to both patients and the wider community. It will offer patients a space to frequent other than their rooms, providing a valuable source of stimulation and promoting an active approach to recovery. A mobile offshoot will bring books to those who are bedridden. The library will house a separate reading area and rooms for writing workshops, storytelling sessions and poetry recitals.

Day Care

The health centre’s day care centre will give parents a safe place to leave their children while they wait for test results or visit an ill family member or friend.

Bereavement Centre

The Bereavement Centre will offer both practical and emotional support for grieving families. Small rooms will provide privacy while larger ones will allow families to come together or make administrative arrangements.

‘In a hospital, the immediate aftermath of death involves tears and paperwork in equal measure.’

Dr Hammad Khan, Consultant Neonatologist,
St Thomas’ Hospital

Flower-Shaped Tower

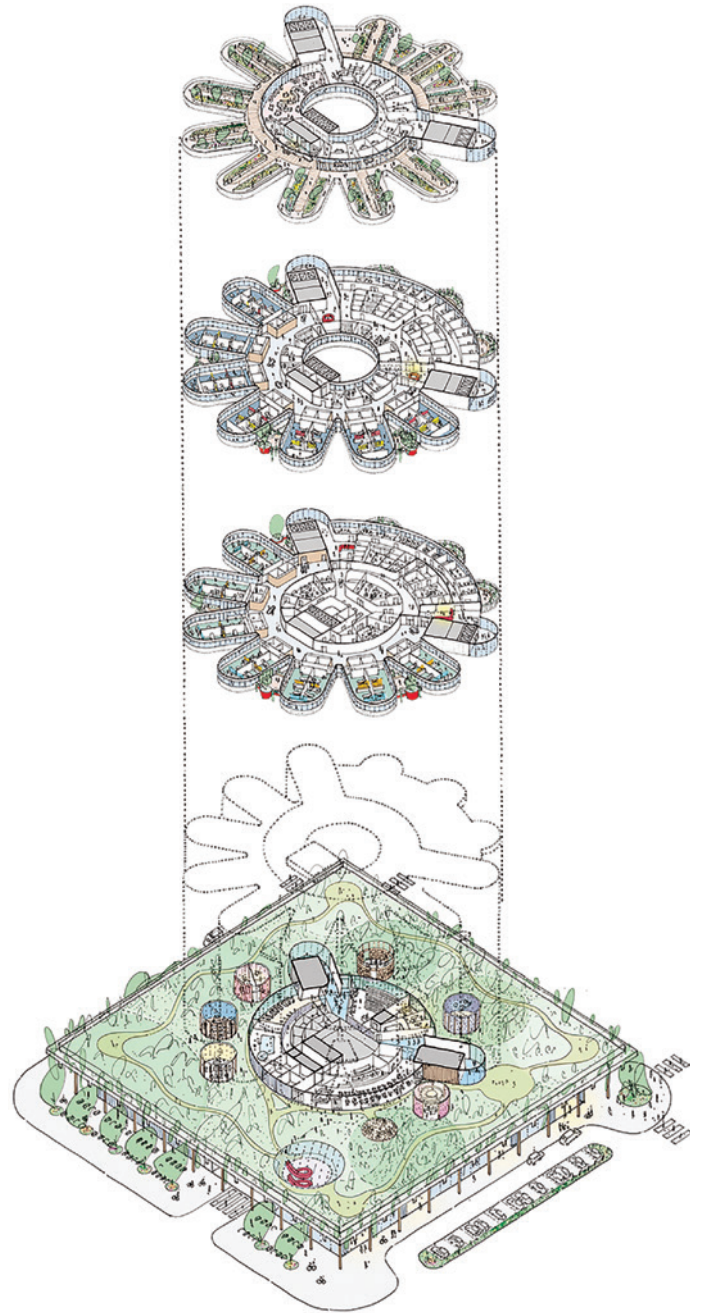
‘Designing a space where clinical staff can have continuous interaction with patients is key to providing a nurturing environment.’

Natasha Prime, Emergency Department Charge Nurse

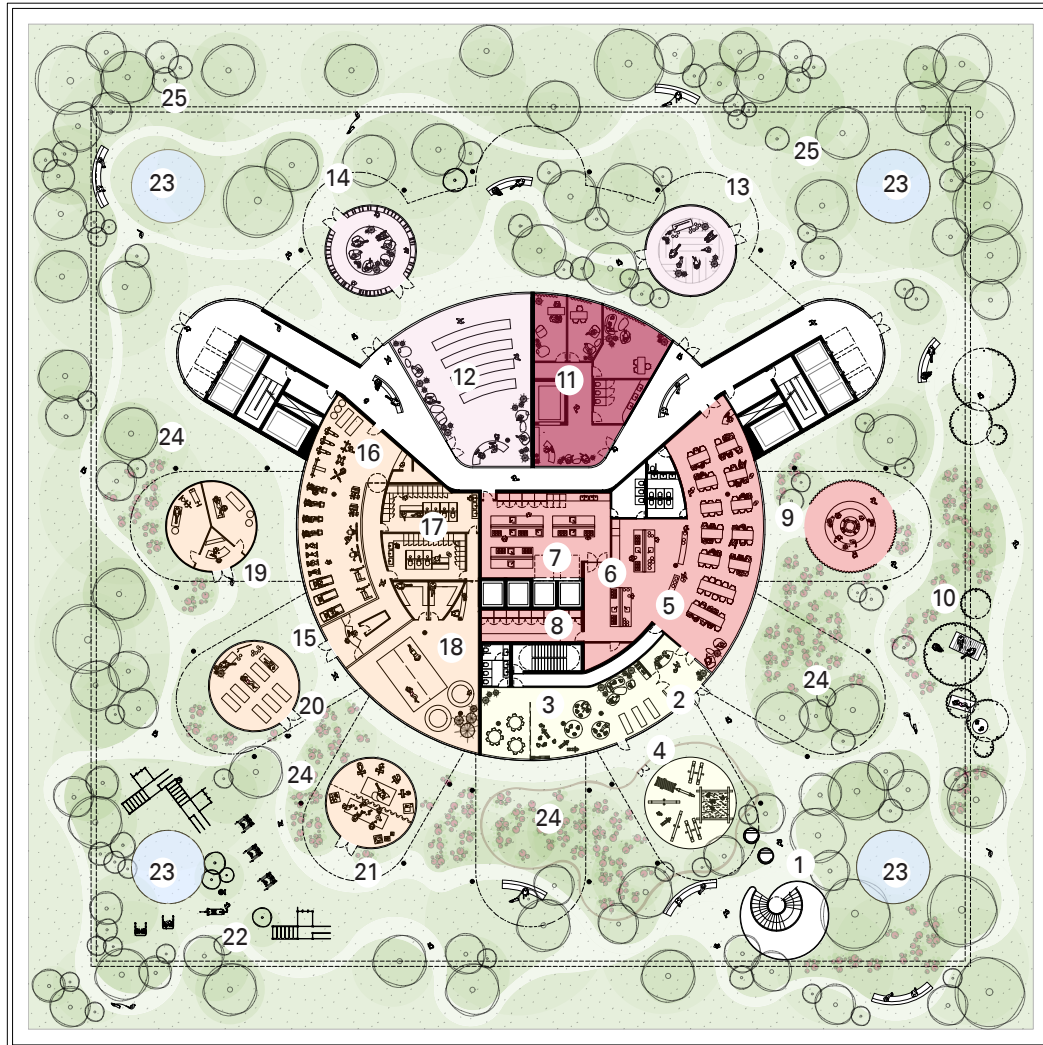
Levitated above the park, the flower-shaped tower of the health centre comprises of 9 floors including the ICU, Wards, Rooftop Allotment and Staff Forum.

The form of the tower’s petal-like wings has been determined by a commitment to bringing domestic scale, natural light and views to every patient. Each ward floor is its own self-contained neighbourhood. Their layout and configuration will balance the dual needs for privacy and social interaction. They include dedicated staff rooms and spaces for social interaction between patients, family and friends. The circular floor plan and continuous views encourage walking and mean users will always know where they are and never get lost.

The Living Systems Health Centre will utilise reconfigurable ward layouts enabling private rooms for patients who are seriously ill or highly infectious, and shared wards for less severely ill patients to lower the demands on staff.



Exploded isometric drawing exploring make-up of hospital tower including: park, cafe and pavilions, out patients, intensive care, ward floors, rooftop gardens, staff forum and bar



- | | |
|---------------------------------------|-------------------------------|
| 1. Public Stair & Lift Access | 17. Changing Facilities |
| 2. Reception for Restaurant & Daycare | 18. Hydrotherapy Spa |
| 3. Daycare Centre | 19. Physiotherapy Studio |
| 4. Playground | 20. Yoga Studio |
| 5. Restaurant | 21. Art & Crafts Studio |
| 6. Restaurant Kitchen | 22. Outdoor Gym |
| 7. Hospital Kitchen | 23. Skylights |
| 8. Cold Room & Pantry | 24. Edibles for Foraging |
| 9. Coffee Shop | 25. Hibernaculum for Wildlife |
| 10. Picnic Area | |
| 11. Bereavement Centre | |
| 12. Library | |
| 13. Contemplation Space | |
| 14. Reading Room | |
| 15. Reception for Gym & Spa | |
| 16. Gym | |

Flower-Shaped Tower: Fifth Floor

Operating Theatres and ICU

The hospital's operating theatres and intensive care unit (ICU) are located on the first floor of the building's flower-shaped tower.

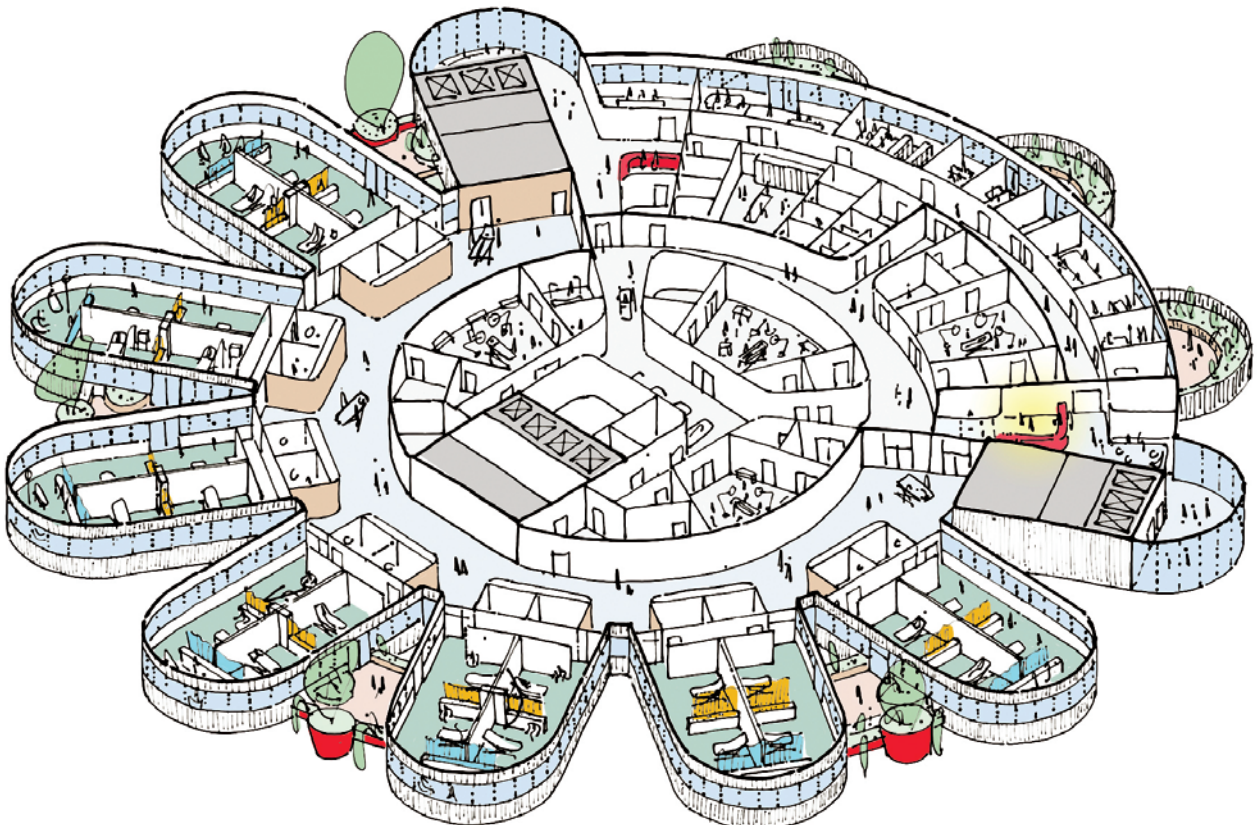
Divided from the petals on the building's perimeter by a ring-shaped thoroughfare, the operating theatres (along with storage and trolley areas) are located in an inner circle of the floor plate, where natural light is not needed. Surgical staff can access fresh air and daylight after long procedures via quick access routes to the balconies and rooms on the floor's perimeter which overlook the park.

To the north of this central area are staff and office spaces for the ICU including meeting rooms, staff breakout spaces and a staff library. All receive good natural light and are served by three balconies.

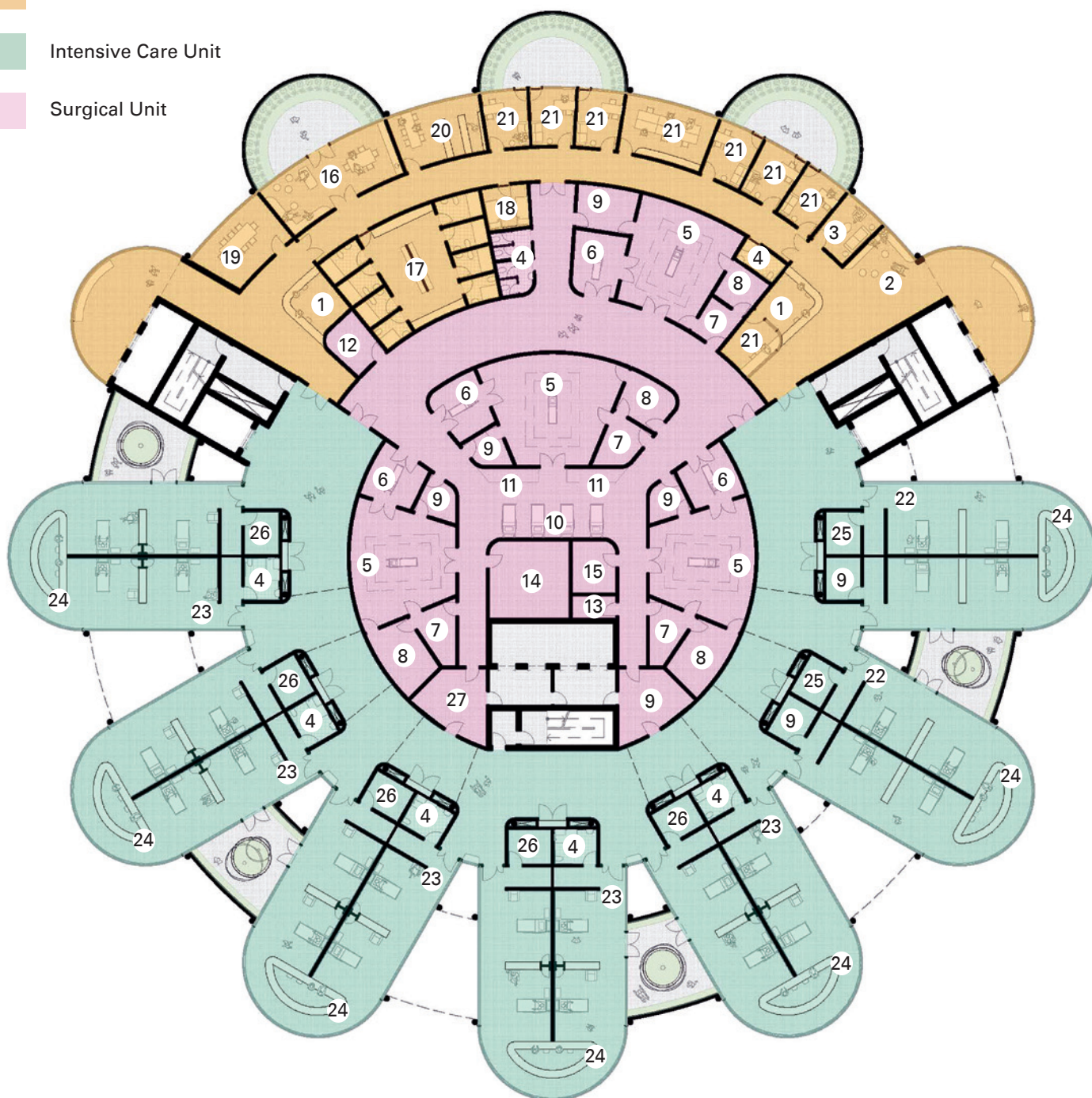
On the south side, the petals house the post-op recovery rooms and critical care units, with four beds in each. Fully glazed, the petals benefit from access to natural light and views out to the park, while an upstand to bed height prevents the sun from shining directly in patient's faces.

The nurses' stations are located at the tip of the petals, enabling sightlines across the beds and a looped route around each group of four beds for closer observation. Access to the pocket parks for staff and visitors is close to the nurses' stations, while bathrooms and storage spaces line the ring-shaped thoroughfare.

Access to the fifth floor is via lifts in Cores One and Two from the ground floor: one for staff and patients coming up from A&E for surgery, the other for visitors, outpatients and those coming down from the wards. The outpatient and visitor lifts open onto a covered platform overlooking the park, and the floor is served by a generous reception and waiting area.



- Staff Facilities & Office
- Intensive Care Unit
- Surgical Unit



- | | |
|--------------------------------------|---------------------------------------------|
| 1. Reception & Communication Base | 15. Clinical Equipment Store |
| 2. Waiting Area | 16. Staff Rest Room |
| 3. Interview & Counselling Room | 17. Staff Changing & Showers Male/Female |
| 4. WC & Shower, WC & Wash | 18. Couchette |
| 5. Operating Theatre | 19. Meeting Room/Seminar & Training Room |
| 6. Anaesthetic Room | 20. Library & Study Room |
| 7. Scrub up & Gowning Room | 21. Staff Offices |
| 8. Preparation Room | 22. Recovery Room |
| 9. Dirty Utility | 23. Critical Care Bay |
| 10. Trolley Area | 24. Staff Communication Base / Staff Spaces |
| 11. Exit / Parking Bay | 25. Clean Utility & Dirty Utility Rooms |
| 12. Near Testing / Status Laboratory | 26. Near Patient Testing & Storage |
| 13. Satellite Pharmacy & Store | 27. Pantry/Refreshment Room. |
| 14. Bulk Supplies Store | |

Flower-Shaped Tower: Sixth Floor

'Lack of easy accessibility to staff rooms and canteens means clinicians who are short of time are denied vital self-care. Providing a space for them to optimize their break and rest times would allow them to return to work primed to better care for their patients.'

Natasha Prime, Emergency Department Charge Nurse

'The fact that neurosurgeons, neuroradiologists and neurologists can sit together improves patient outcomes. It's during the casual chitchat around the computer when people are typing up their notes that really good things happen; that's when you build a team and exchange knowledge.'

Dr Ash Ranpura, Neuroscientist & Clinical Neurologist

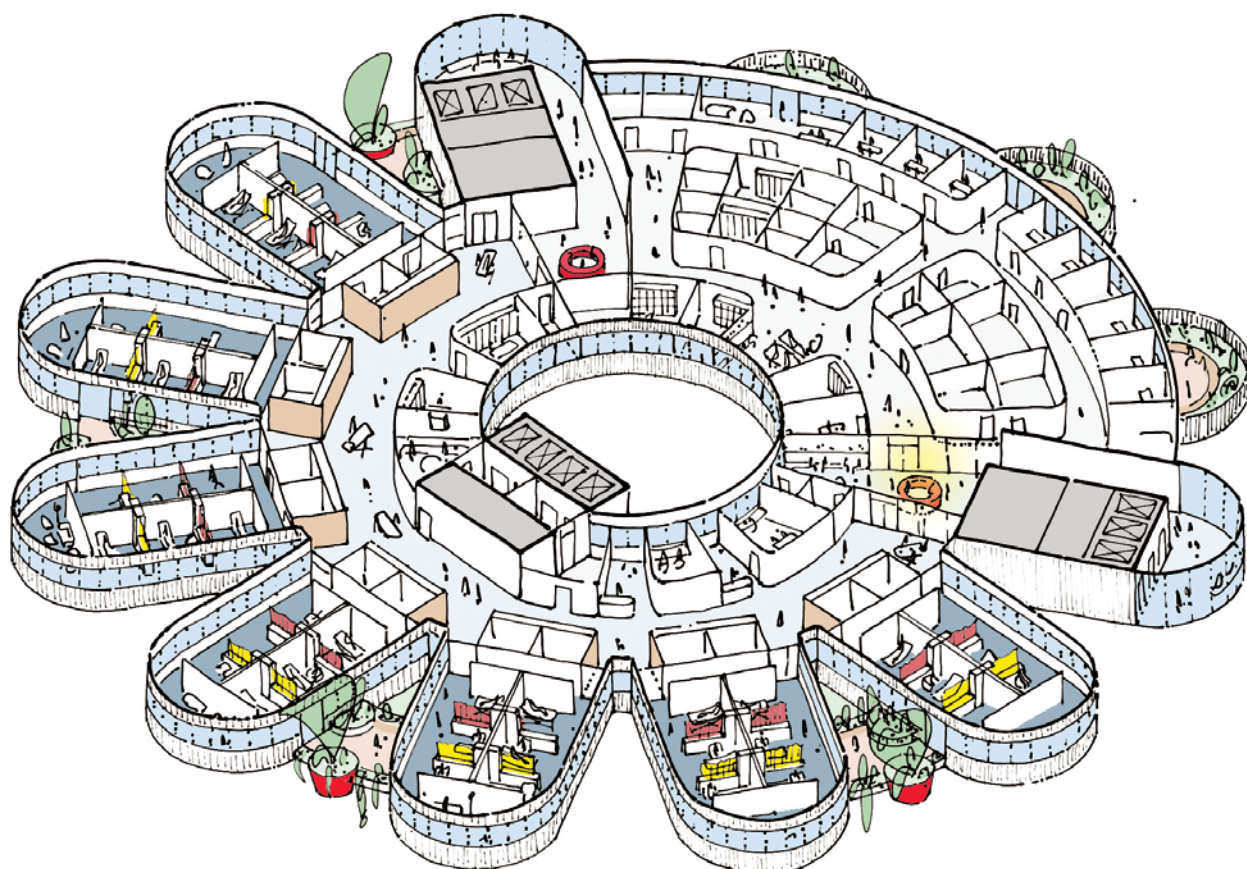
Outpatient Zone

Located directly behind the continuously curved northern façade, the outpatients zone houses the offices, comfortable seating and waiting areas, staff rooms, bathrooms and consulting rooms that support each ward.

A lightwell in the centre of the floor allows natural light to permeate the offices, nurses' stations and sitting areas around the internal perimeter, as well as offering continuous sightlines across the floor.

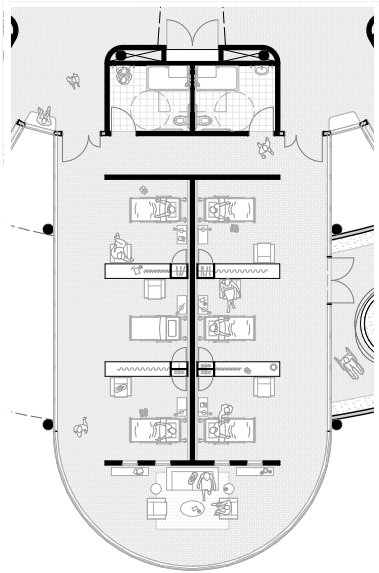
The rooms located between these inner and outer ring spaces will be dedicated to functions that do not require natural light, such as staff changing rooms, storage, sleep couchettes, private consulting rooms and imaging equipment.

Access to the wards for outpatients and visitors is from the main entrance on the ground floor via a lift in Core Two, and for staff and patients coming from A&E (who may need more privacy), a lift in Core One. On exit from both sets of lifts, patients and visitors will be welcomed at the ward reception by a dedicated host.

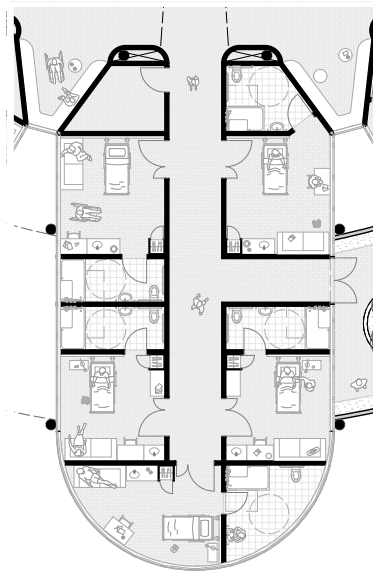


Inpatient Zone

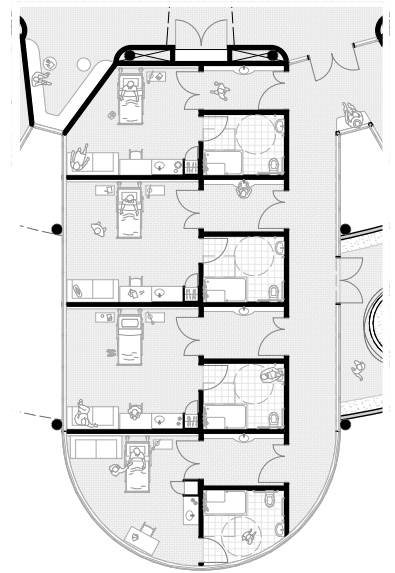
Located in the petals of the south façade, the general wards give their occupants maximum exposure to the sun's light and warmth. The wards are constructed from a kit of prefabricated, modular panels and an unfixed floorplate. This means the interior can be easily transformed to configure different room types, including shared wards, single and isolation rooms.



Shared Wards



Private Rooms



Isolation Rooms

‘Is there somewhere in the hospital you could go to feel safe? It makes a hell of a difference if you get treated right in a hospital when you’re homeless.’

Bug, Hospital Patient

Shared Wards

In the shared ward configuration, each petal houses six beds. The petal shape allows each ward to have natural light, cross ventilation and a view out to nature. In the centre of each petal, two rows of three beds lie back-to-back to ensure that patients do not face one another directly. A suspended curtain and joinery (comprising drawers and a desk) delineate each bed’s zone. The bed area also has a hand sanitising unit and a comfortable chair for visitors and doctors.

Each row of three beds shares a bathroom, containing a sink, shower, and toilet.

At the petal’s tip is a common area looking directly out to the park. Here, patients can spend time out of bed and socialise with one another, their families, or other visitors.

Nurses’ stations are located on the inner circle of the floor, giving nurses a clear view of the wards, and facilitating observation without the need to patrol each bed.

Access to the wards is via the ring thoroughfare between the nurses’ stations and the wards.

Private Rooms

In this configuration, each petal houses four private rooms, each with its own adjoining bathroom. A central corridor bisects the floor area of the ward creating access to two rooms on each side. The nurses’ stations in this configuration are half-way down the corridor on either side. An optional fifth bedroom is possible at the tip of the petal, in which case, the common areas will be reduced to both sides of the petal entrance.

Isolation Rooms

In this configuration, the petal houses four isolation rooms, each with its own vestibule, for visitor cleaning and decontamination, and a private bathroom.

Common areas for visitors will be to the left of the petal entrance and the nurses’ station will be on the right. Access to the rooms is via a single corridor along the right perimeter.



Shared Wards



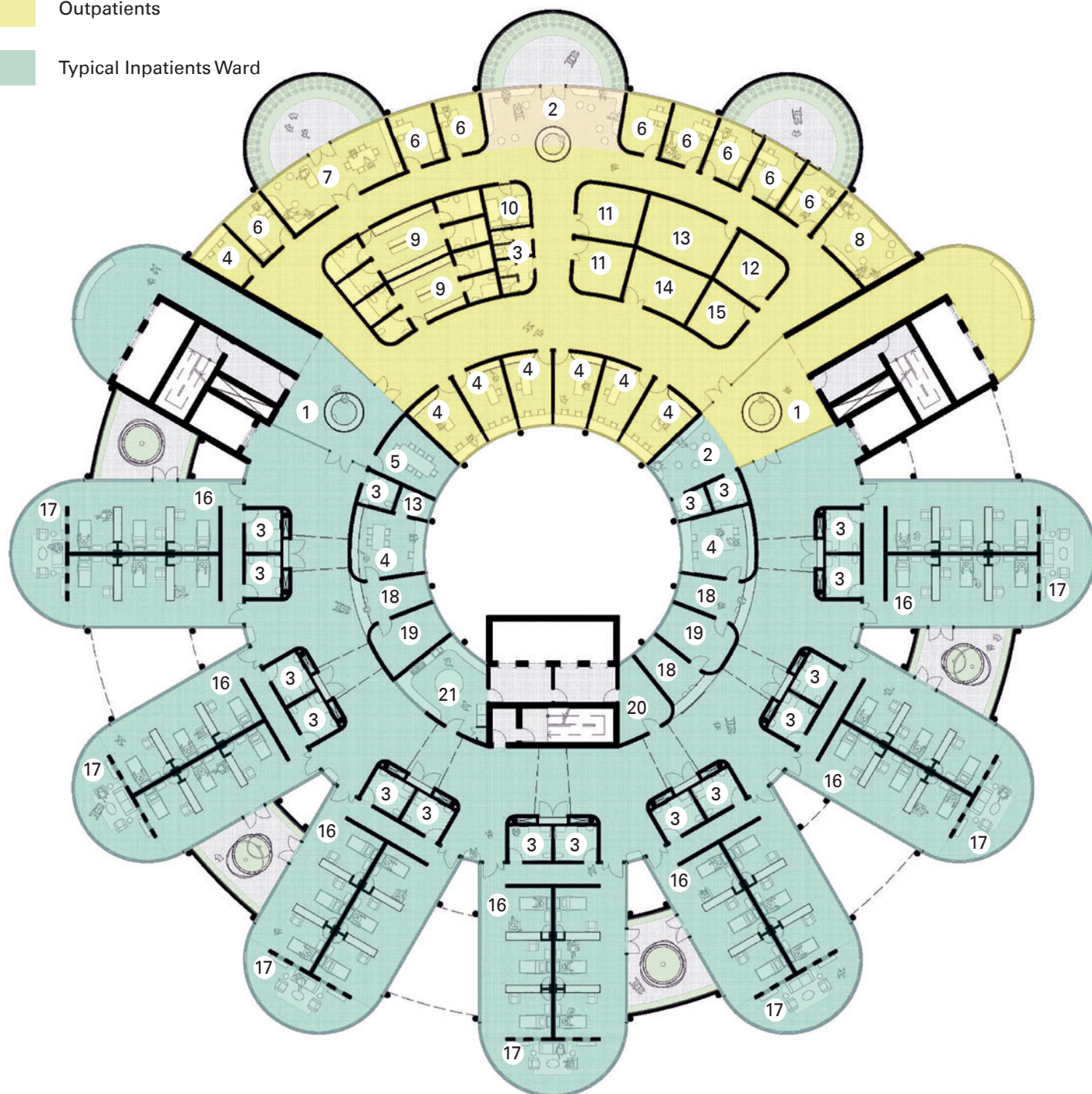
Private Rooms



Isolation Rooms

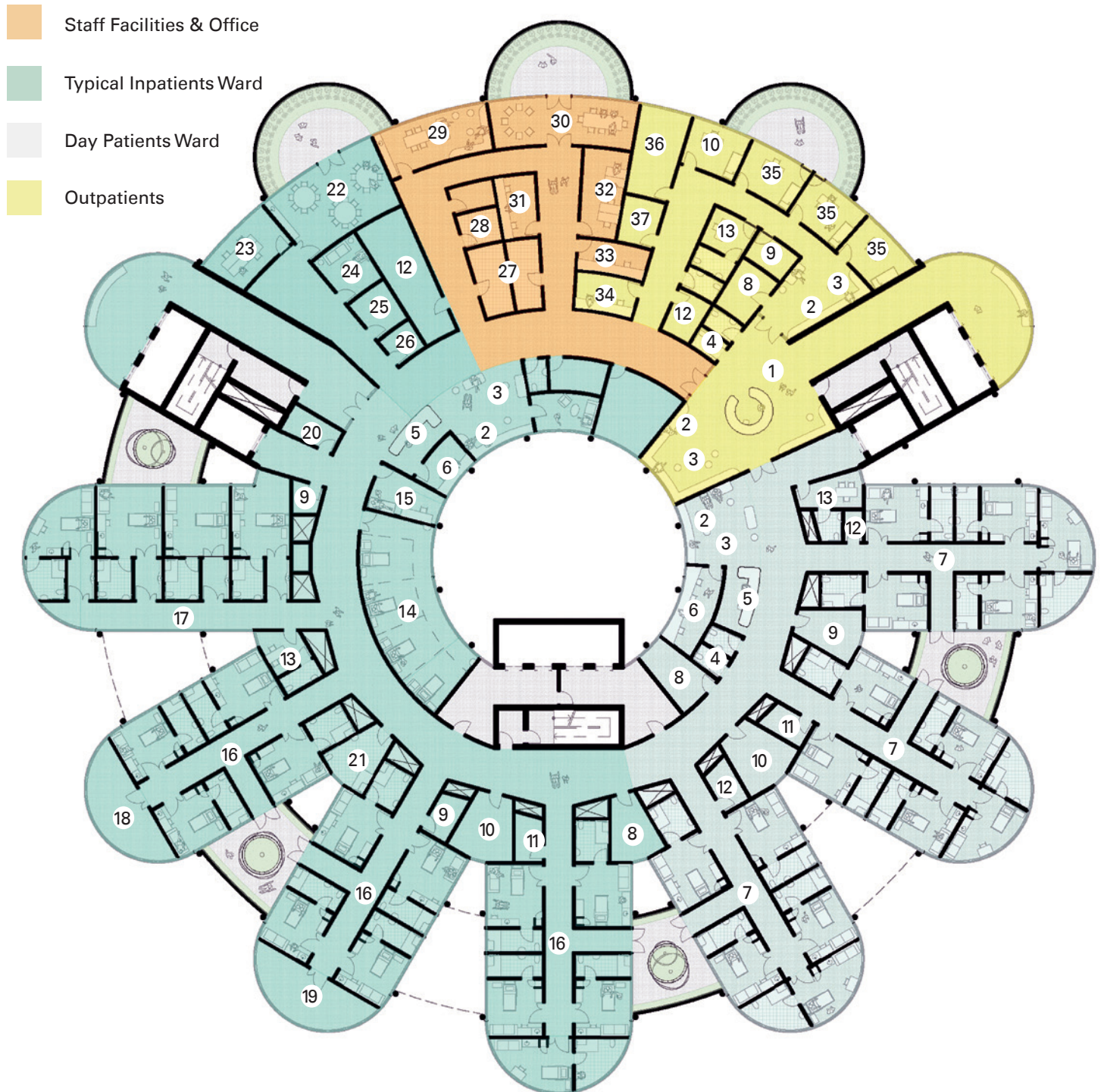
Flower-Shaped Tower: Sixth Floor (Typical Ward Floor)

- Outpatients
- Typical Inpatients Ward



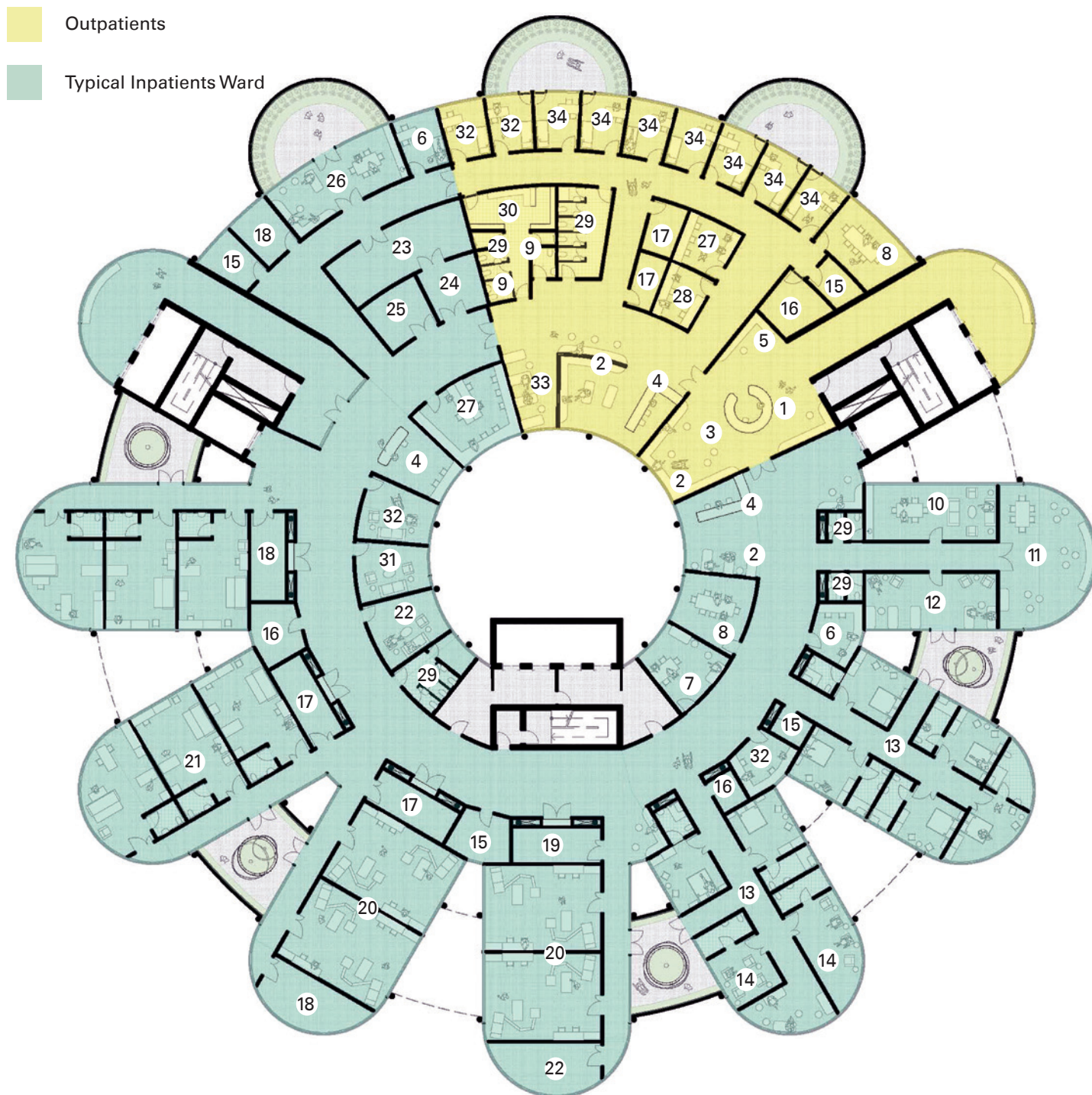
- | | |
|------------------------------------------------|-----------------------------------------|
| 1. Reception | 11. Large Equipment Store |
| 2. Waiting Area | 12. Pharmacy |
| 3. WC or Shower, WC & Wash | 13. Medical Supply Store |
| 4. Outpatient & Administration Staff Offices | 14. General Store |
| 5. Seminar & Training room / Meeting Room | 15. Cleaners Room |
| 6. Consultation, Examination & Treatment Rooms | 16. Bedroom / Shared Wards |
| 7. Staff Rest Room | 17. Patient Recreation / Breakout space |
| 8. Interview & Counselling Room | 18. Staff & Communication base |
| 9. Staff Changing & Showers Male/Female | 19. Clean Utility |
| 10. Couchettes | 20. Dirty Utility |
| | 21. Patient Meal Preparation Kitchen |

Flower-Shaped Tower: Sixth Floor (Optional Paediatrics Layout)



- | | | |
|--------------------------------------------------|-----------------------------------------------------|-----------------------------------------------|
| 1. Reception | 14. Paediatric Assessment for Emergency Patients | 24. Calm Room |
| 2. Waiting Areas | 15. Admission Room for Well Elective Patients | 25. Snoezelen Room |
| 3. Play Areas | 16. Inpatient Bedrooms w/ Shower, WC & Wash x13 | 26. Breast Pump Room |
| 4. WC & Handwash – Accessible | 17. Isolation Bedrooms w/ Shower, WC & Wash x4 | 27. Staff Changing & Shower Male/Female |
| 5. Staff & Communication base | 18. Patient Playroom | 28. Accessible Changing & Shower |
| 6. Staff Office | 19. Recreation Room w/ Beverage & Snack Preparation | 29. Staff Rest Room w/ Kitchen |
| 7. Day Patient Bedrooms w/ Shower, WC & Wash x15 | 20. Near Patient Testing/Status Laboratory | 30. Meeting Room/Seminar & Training Room |
| 8. Dirty Utility | 21. Bath, WC & Wash | 31. Outreach Staff Office |
| 9. Clean Utility | 22. Patient Dining Room & Pantry | 32. Clinical Staff Office |
| 10. Treatment Room w/ Preparation Area | 23. Patient Study Room | 33. Administration Staff Office |
| 11. Linen Store | | 34. Outpatient Staff Office |
| 12. General/Bulky Store | | 35. Consulting, Examination & Treatment Rooms |
| 13. Interview & Counselling Room | | 36. Assessment & Therapy Room |
| | | 37. Observation Room |

Flower-Shaped Tower: Sixth Floor (Optional Neonatal Layout)



- | | | |
|-----------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------|
| 1. Reception | 14. Expression Room | 28. Inpatient Office |
| 2. Waiting Area | 15. Dirty Utility Room | 29. WC & Handwash |
| 3. Play Area | 16. Clean Utility Room | 30. Staff Changing & Showers Male/Female |
| 4. Staff & Communication Base | 17. General Store | 31. Examination Room |
| 5. Handwash Area | 18. Near Patient Testing Room | 32. Treatment Room w/ Preparation Area |
| 6. Staff Office | 19. Freezer Room | 33. Information/Resource Centre |
| 7. Rest Room with Staff Beverage & Snack Preparation | 20. Multi-Cot Nursery – HDU | 34. Consulting, Examination & Treatment Rooms |
| 8. Interview & Counselling Room | 21. Single Cot Nursery – ICU | |
| 9. WC & Handwash – Accessible | 22. Bereavement Interview Room | |
| 10. Restroom w/ Kitchen | 23. MRI Scanner Room | |
| 11. Playroom | 24. Patient MRI Trolley, Wheelchair & Equipment Parking Bay | |
| 12. Parents Room | 25. MRI Scanner Control Room | |
| 13. Relative Overnight Stay Double Room 'Rooming-in Room' | 26. Meeting Room/Seminar & Training Room | |
| | 27. Administration Office | |

Flower-Shaped Tower: Green Spaces

Pocket parks and a series of open balconies on the fifth and sixth floors will give staff, patients, and visitors – regardless of their mobility and including those in intensive care – access to fresh air and greenery.

‘If you’re laid up in a hospital bed for weeks, a hospital can be an unpleasant place to be. Being able to go downstairs and get fresh food, or having somewhere green to go and sit would be nice.’

Bug, Hospital Patient

Accessed via the wards, the pocket parks will link each petal on the south façade to the next. Each will have a tree in a sunken planter with its own dedicated drain, terracotta tiled flooring and a garden bed with integrated seating.

The garden beds will be sited to allow plants to cascade down or climb up the building exterior, softening the façade.

'The trees on the balconies must be able to withstand exposed conditions, like sea buckthorn, honey spurge, myrtle, rosemary, figs, and strawberry tree. Seating places for conversation and contemplation can be nestled in groves of evergreen strawberry trees.'

Dan Pearson, landscape designer and horticulturist

Balconies

Curved balconies will be spaced at intervals along the façade on the north side, where the outpatient and staff spaces are located. Vertically, the balconies will be spread out over every other floor so there is always a double-height gap overhead.



Rooftop urban allotments growing seasonal produce for the health centre

Rooftop

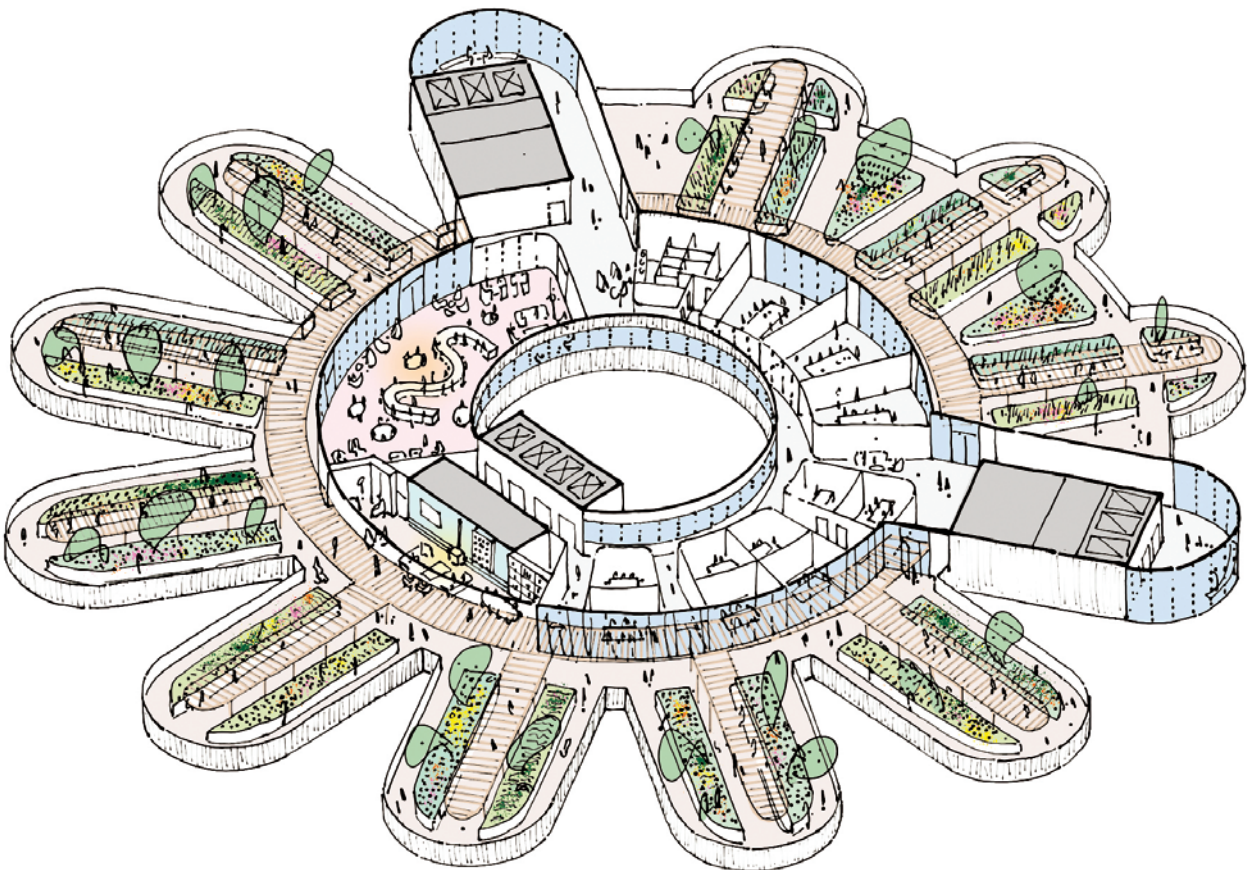
The building's rooftop is primarily for the use of employees. Benefitting from spectacular views over the city, the rooftop will provide holding offices, meeting rooms, and relaxation and event spaces, including a bar/lounge and canteen area.

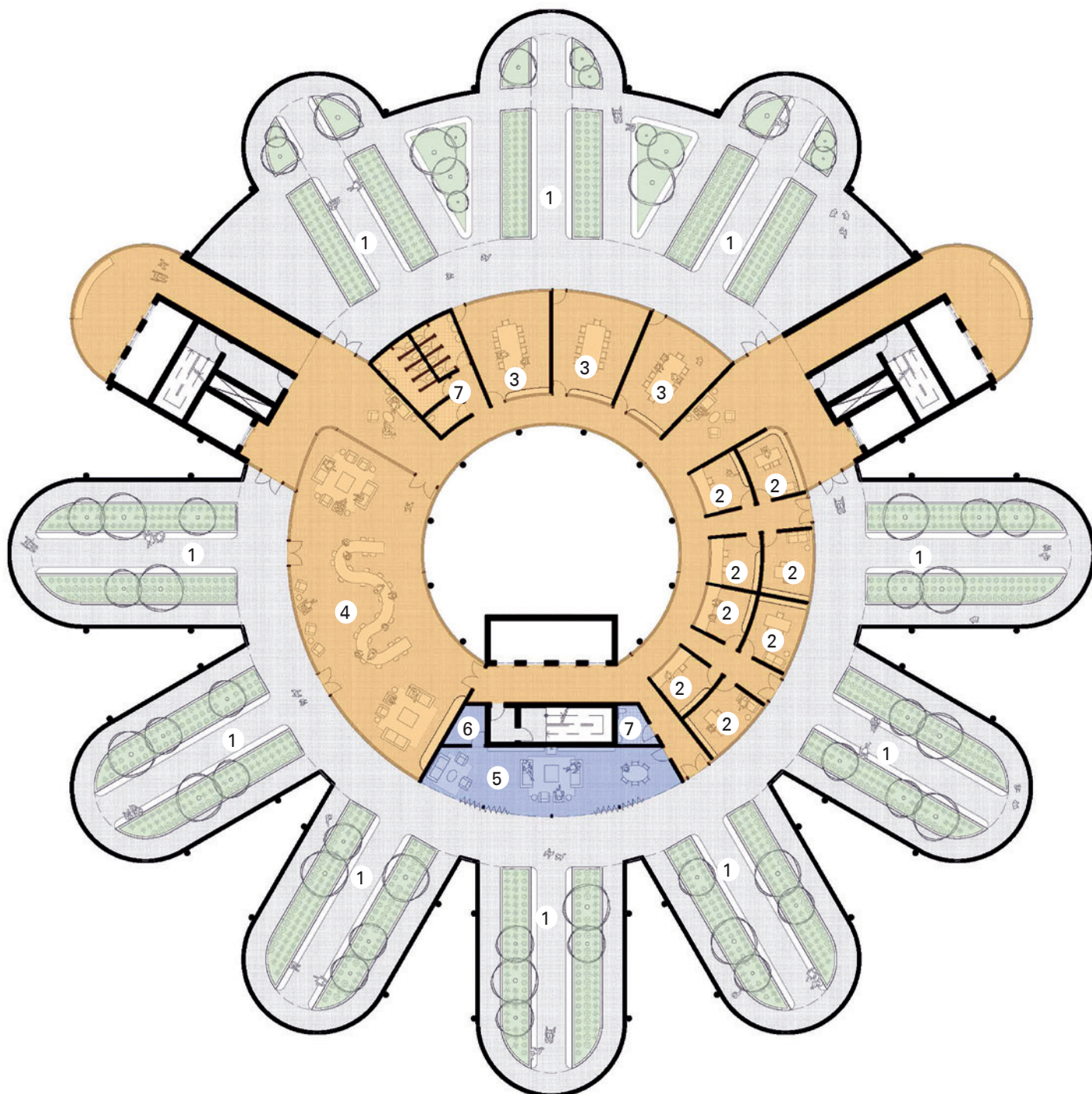
Access will be through both main lift cores from the ground floor but will be restricted to staff, volunteers, and guided patient visits only.

Allotments

The rooftop allotments (planted and maintained following the principles of permaculture) will provide fresh produce that can be turned into the meals consumed by patients, staff, and visitors. The allotment's raised garden beds will be situated in the rooftop's petals, with seating areas integrated throughout. The south facing beds will be planted with seasonal food crops and the north facing ones with blossoming and fruit trees for foraging; cherry plum, bird cherry, hawthorn, rowan, elder and hazel.

Managed access to the garden allotment will support a wider programme of education on diet and lifestyle, explaining the importance of natural food sources, the benefits of fresh ingredients and encouraging people to grow vegetables at home.





- 1. Allotment/Garden
- 2. Forum Meeting Rooms
- 3. Forum Large Meeting Rooms
- 4. Staff Bar
- 5. 'Shed'/Garden Room
- 6. Storage
- 7. WC

Area Schedule Summary

Below is the area schedule looking across the whole of the Living Systems Health Centre, including the podium, park and tower.

The standout numbers are – the ratio of architecture to site is 4:1 while ratio of green space to architecture is 1:1 due to the Rooftop Allotments, Park and Pocket parks.

It is a small hospital accommodating 200 beds which overall works out at 152 sqm per bed.

Area & Beds Schedule		Hospital GEA sqm	Non Hospital GEA sqm	Outdoor amenities sqm	Av. number of beds
GF	A&E – Lobby – Market	4,300	2,500		
Level 1	Innovation centre	300	4,000		
Level 2	Support areas	4,000			
Level 3	Park	1,800	300	7,600	
Level 4	Plantroom	2,200			
Level 5	ICU	3,700			28
Level 6	Ward / Outpatients	3,000		200	35
Level 7	Ward / Outpatients	3,000		200	35
Level 8	Ward / Outpatients	3,000		200	35
Level 9	Ward / Outpatients	3,000		200	35
Level 10	Ward / Outpatients	3,000		200	35
Level 11	Ward / Outpatients	3,000		200	35
Level 12	Hospital forum	2,000		1,200	
		36,300	6,800	10,000	238
Plot area		sqm			
				10,000	
Density		sqm		Ratio plot / sqm	
		Built area		43100	
		Green spaces		10000	
				4.31	
				1	

6. Technical Performance and Maintenance

Mechanical and Electrical Engineering by Phil Armitage, Senior Partner at Max Fordham

Planet Earth, our home, is a system. For materials the system is essentially closed, with elements being conserved in cycles of assembly and degradation. For energy, the system is predominantly open, powered mostly by incoming solar energy. A myriad processes work in tension to produce an equilibrium which creates the narrow range of conditions needed to support life. Life uses energy to increase the level of organisation of components, from atoms to molecules, molecules to cells, cells to organisms and organisms to ecologies, seemingly cheating the second law of thermodynamics, if only briefly.

Through our collective vision of a health centre of the future we bring this system level thinking to help address some of the major challenges of our time – countering global warming by decarbonising the construction and use of buildings, using materials in a much more respectful way and reversing the shocking decline in biodiversity.

Our approach prioritises passive design, the extensive use of naturally

produced organic materials and the therapeutic powers of natural light.

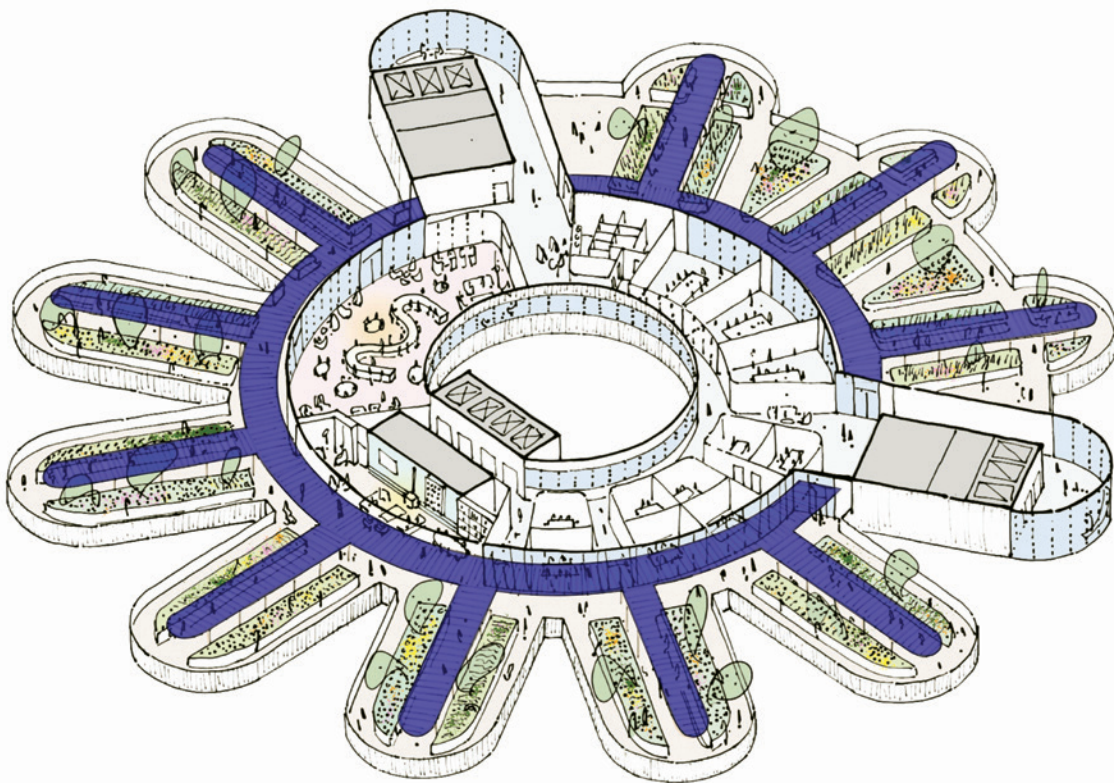
The aim of passive design is to create spaces which remain comfortable with the minimum use of active systems. The circular plan of the upper parts of the building has a low form factor creating a thermally efficient envelope with minimal quantities of insulation material.

The petals provide a shallow plan allowing excellent access to natural light, views and ventilation in the bed and working spaces. The balance between daylighting, sunlighting, solar gain and glare is met using a combination of balconies, shading devices and planting in a way which responds to the different orientations of the façade. The podium garden is porous, allowing light and fresh air into the spaces below. Access to natural light, with all its variability in intensity, direction and colour provides a fundamental connection with the natural world. Much research has shown that access to daylight reduces the average length of a hospital stay, quickens post operative

recovery, reduces requirements for pain relief and quickens recovery from depressive illnesses.

The materials have been selected to have inherently low embodied carbon. The structure is predominantly of timber, engineered for durability and fire safety. The spine and rib design of the services distribution minimises the volume of materials. Internal structures and finishes are predominantly of organic materials. Although in its infancy, the reuse of materials from other buildings at the end of their life will be prioritised over new.

We have set ourselves challenging quantitative targets that the design development should achieve. We are aiming for zero carbon in both construction and operation. We would rather aim for real zero and share the learning and limitations than rely on masking the shortfall with carbon offsets. This is not to say that external carbon reduction measures are not useful or worthwhile, but we should be striving to avoid the long term negative impact of a less efficient building. We will also achieve



Photovoltaic pergola

Passivhaus certification for the building which guarantees a high thermal performance and quality of construction.

The ability of a building to adapt and change over time underpins a long and useful life. The building is modular in concept and serviced with vertical spines of long term infrastructure which provide all the needed connectivity between spaces. The individual spaces are conceived as regenerative limbs where components can be disassembled and re-used to create new configurations and functionality. Each pair of petals at every floor level is locally serviced with heating, ventilation, power, and communications and can be adapted without impacting the use of surrounding spaces. The high intensity use spaces such as the ICU, operating suite and outpatients are located above and below a re-configurable plant floor containing specialist equipment. Locating the plant internally allows the roofs to be used for high value amenity and therapeutic activities.

Passive design alone is not sufficient to meet the comfort and environmental

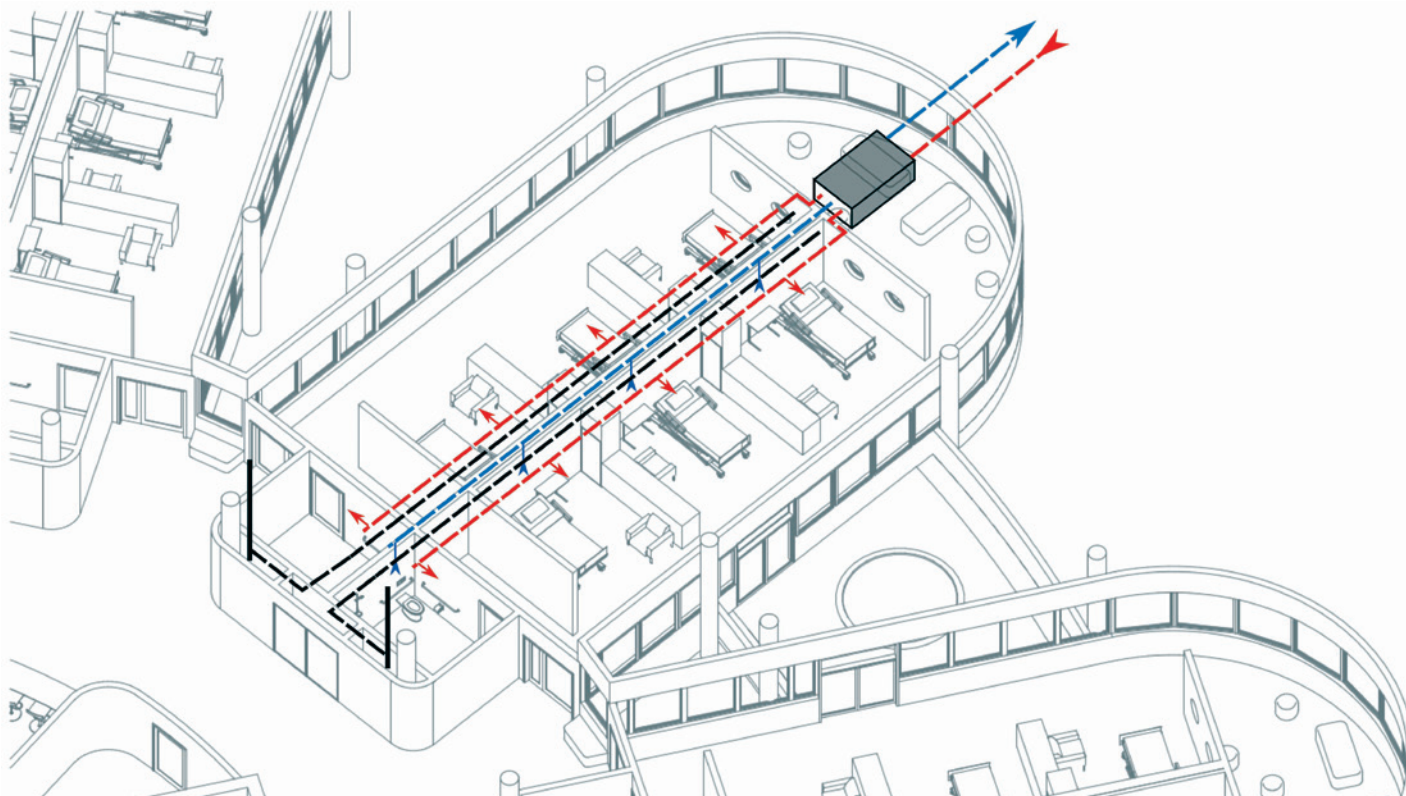
quality needs of all spaces all the time. We propose an efficient, all electric approach where heat energy is recycled within the building to minimise the overall needs for heating and cooling. Heating and cooling will be generated by water to water heat pumps located in each module of spaces, connected to an external heat exchanger via a loop of pipework containing water at close to ambient temperatures. Heating and cooling will be provided generally via an underfloor system which is well known for comfort and efficiency. In cold weather, ventilation will be provided by small scale mechanical ventilation systems incorporating efficient heat exchange serving each module.

Our building will also incorporate electrical and thermal storage to facilitate its integration into the smart grid, an essential part of an all electric future.

It is unreasonable to expect an individual city centre hospital to generate all its own energy needs. We propose PV sheltered walkways within the rooftop

garden as a genuinely useful structure but recognise that this will only generate a tiny proportion of the electricity used by the building. Rather than relying on individual buildings to generate energy inefficiently, a much more cost effective strategy would be for the NHS to develop an estate-wide renewable energy generation portfolio to provide sufficient zero carbon electricity at optimal efficiency to supply all of their buildings.

The building provides a foundation for planting which is at a sufficient scale to support urban ecology and a link between green corridors. Appropriate planting would be selected for each location and managed to promote a rich diversity of fauna. In addition to enhancing the quality of space and improving local biodiversity and microclimate, the growth of plants and soil bacteria directly removes CO₂ from the air through the accumulation of biomass, further reducing the carbon emissions of the project as a whole.



Ward services distribution

Structural Engineering by Gary Elliott, CEO and Founder of Elliott Wood

Structural Form

The core principles of the structural frame revolve around flexibility, sustainability, reuse and the circular economy.

While the building form is bespoke, the structural frame is still simple. We have minimised inefficient features such as cantilevers and transfer structures in order to keep embodied carbon levels down.

The podium is arranged in a regular 9×9 m grid. This provides a balance between open, flexible spaces and relatively constrained levels of embodied carbon. This structural grid varies only around the building perimeter, in the retail and entrance areas where larger column-free spaces are needed.

A single transfer level is detailed at the top of the podium under the rooftop gardens. This allows the regular structural grid of the podium to switch to the more bespoke grid of the wards, which is crucial to achieving the views offered by the tower.

The perimeter columns of the tower are all expressed externally. This frees up the internal façade, maximising views and the flexibility of the wards. Thermal breaks are kept to a minimum with 4 points of connectivity on each petal requiring thermal break detailing. We envisage the raised balcony gardens as precast elements to be lifted onto the external steel frame.

Built for Flexibility and the Circular Economy

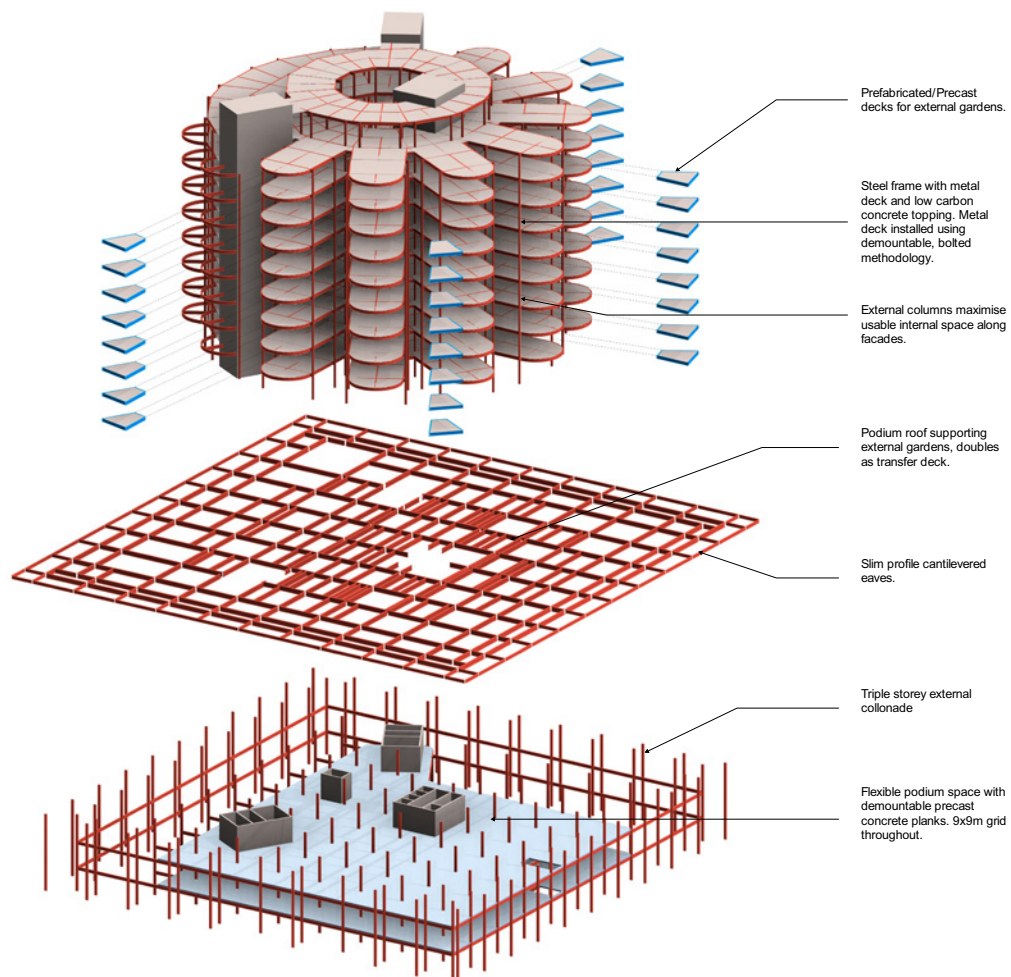
Almost all hospitals must adapt over their lifetime as they respond to changing technologies and methods of healthcare. It is therefore crucial that this hospital be prepared for these adaptations. We have designed it so that these can be undertaken with maximum ease and minimal waste.

The building frame uses circular economy principles throughout and is designed to be demountable. Precast flooring systems can both be efficiently constructed and deconstructed should there be requirements for connectivity

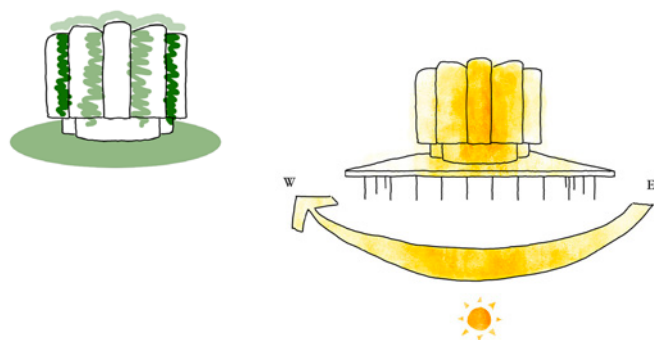
between floors (eg. risers, atria etc). The floor system may be reused elsewhere in the building or taken off-site for use in other developments.

Similarly, the exposed steel frame will use demountable, bolted connections throughout. The 9×9 m grid of the podium is common in developments across the UK so there will be no shortage of demand for reused steelwork at the end of the building's life. Alternatively, the steel frame can be easily adapted on-site to accept additional connections should the building be extended in its lifetime.

As the circular economy grows it may even be possible to source and construct significant parts of the health centre from reused steel framing. This will drastically lower the embodied carbon emissions of the building and further demonstrate the potential for developing public healthcare facilities using sustainable methods.

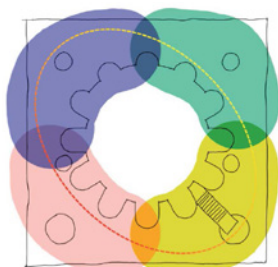


Landscape Design by Dan Pearson, landscape designer and horticulturist



The health centre landscape would take inspiration from a cliff, where vegetation grows when favourable micro-climatic conditions allow – these being the sun (temperature), soil, shelter and water. Plants have evolved to cope with different levels of stress creating a wide variety of different ecosystems.

The landscape is a key component in the design of the health centre, integrating landscape on multiple levels, mimicking how plants grow on a cliff: at ground level where the cliff offers shelter and protection on ledges and perches, in crevices and cracks, as the cliff rises upwards; with more abundant planting on the southern aspect and cooler, more shade-tolerant species to the north and at the top of the cliff, where soil conditions become more stable, allowing a more complex, multi-layered environment.



Zoning Plan

The forest garden would contain:

- Edibles for foraging
- Fruiting hedges
- Orchard trees
- A nuttury
- Seasonality – spring blossom trees and bulbs
- Autumn berries for birds
- Hibernaculum for wildlife



The planting at 'ground level' provides the space and opportunity to ground the building, as a forest would grow at the foot of a cliff.

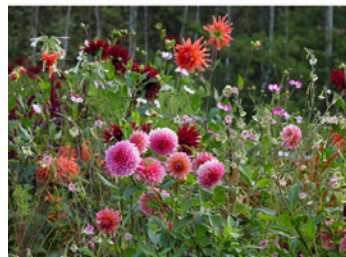
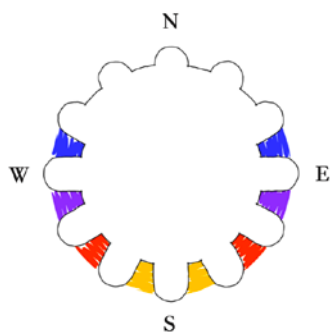
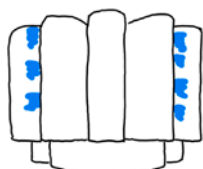
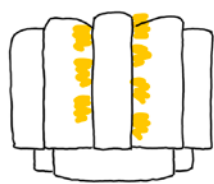
The building programme on this level is divided into four distinct functions, and the landscape that wraps around them provides spill-out areas and breathing space.

In addition to these four zones, there would be a number of pavilions with a variety of uses sitting within the landscape and looking out from all aspects. All these spaces would be linked by a circular woodland walk with special moments along the journey to pause, meet, sit and reflect.



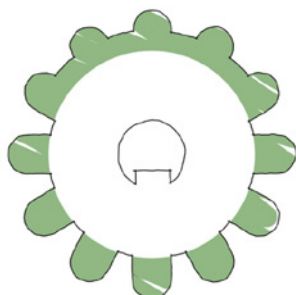
The balcony gardens would be concentrated where the building receives most sun and extends towards the east and west. No balcony gardens are proposed on the north elevation. The most abundant planting would appear where the growing conditions are most favourable, just as they would grow on a cliff face.

These balcony gardens would contain plenty of edibles to provide produce for the health centre, such as vegetables, salad crops, fruit, herbs as well as seasonal flowers for cutting. These sunny, sheltered gardens will allow a range of exotics and scented aromatics to grow to ensure moments of delight and wonder for all.



On the roof the planting would be split into two distinct zones, in the south facing balconies these would contain vegetable gardens, to the north the five connected balconies would be a fruiting forest garden, which would provide a visual connection to the forest garden on the ground and reference the forests growing on the top of cliffs.

These balcony gardens provide an important physical connection to landscape for patients, visitors and staff, in the form of picking produce to eat and helping to care for these planted spaces throughout the year.



Landscape Areas Roof Plan



7. Value and Economic Viability

'A society can be measured by the level of care it provides its citizens. All resources invested into building and operating hospitals need to be driven by a strong vision to deliver care and value for the community. More and more hospitals have been developed by following the logic of the construction industry and property market. The Living Systems Health Centre needs to be designed and built differently: by putting users' needs and the local community at the heart of the process.'

Ernesto Bartolini, Architectural Director,
Ab Rogers Design

The value of the Living Systems Health Centre's design can be seen in its local investment, increased employment, commitment to urban regeneration, introduction of improved community healthcare facilities and the propagation of social care services.

Its environmental value is delivered through a sustainable approach to materials, construction, and maintenance and via the public park and associated green spaces, which provide access to natural landscapes and help mitigate air and noise pollution.

The impact of the design on its patients, staff, and visitors underpins the entire proposal. It will be quantifiable over time through accelerated patient recovery, reduction in staff absences and reported instances of mental health issues, as well as better satisfaction ratings across the board.

Procurement and Cost

A new approach to healthcare design requires a new approach to its procurement. The swift, environmentally efficient, and cost-effective construction of our proposed building relies on the use of prefabricated, modular components and a radical, centralised procurement process via directly contracted and vetted experts. This process will ensure a greater understanding of the health centre's ambitions and economic model across the team, building confidence in delivery.

The model that underpins the proposal is based on the understanding that the efficiency of the design will increase long-term savings. Its initial capital investment is a small proportion of the overall project and will significantly reduce expenditure over time.

The active integration of maintenance into the building's modular infrastructure will substantially reduce hospital running costs. In addition, by designing the health centre as a nurturing workplace, staff absences and their associated costs will also be reduced.

Economic Viability by Javier Botella, economist at Tesco PLC

Our approach is designed to reduce the costs in the long term for the Department of Health, meanwhile putting the people at the core of what the health centre does and redefining sustainability in healthcare.

It requires the health centre to ask itself what its key role is and if it can play a more meaningful part in the health of our society and planet. The protagonist must pause and think where it goes next and the type of suit this requires.

We believe that funding headroom and economic viability can be achieved by acting on five pillars. Many of the efficiencies described are closely aligned with NHS's 10-point efficiency plan which we see as a positive. We go beyond these and take a Doughnut model approach, an economic model that situates economic goals in a framework of planetary and social needs. Ultimately, this entails measuring the health centre's economic prosperity in terms of local, global, social and ecological benefits.

In some ways, our approach is a paradigm shift, as it appreciates hospital health as a long-term social investment rather than focussing on immediate cost savings, as this is often a Sisyphean task.

1. Prevention – a new role

- At their core, operational costs are driven by case volume and case 'severity'.
- The first of the pillars of our economic model is prevention, as a means to mitigate the growth trend in demand and thus lower the reliance on the NHS.
- We envision each visit as an opportunity to work on prevention and to inspire patients to lead a healthier lifestyle.
- Our health centre would play a role in prevention by providing patients with tailored advice on nutrition, exercise or mental health. Any visit to a hospital is most often a reminder of how vulnerable we are and how important health really is. This provides a window of opportunity to inspire patients, and their entourage, by opening up the health centre to the community.

- The Yoga and Gym sections serve as places to get exercise advice, start new routines and make them the new normal by breaking down barriers to of knowledge and motivation.
- Education and inspiration would be supported through a number of ways. For example, through the health centre's media, within the marketplace's 'how to make' recipes, and included into the discharging process. This will give more importance from a prevention perspective. At discharge, technology (patient wearables, online portals, etc.) would support the nutrition and exercise plans provided at minimal cost.
- An attractive design, improved acoustic approach and better integration of the community into the health centre will lead to a better healthcare experience and in turn support mental health.

2. Capital expenditure optimisation – live assets for lives

- Capital expenditures is very much determined by the health centre's spatial needs, building costs and healthcare equipment.
- We envision freeing up space and surface to build a multi-lever approach for which modularity, the circular approach to ward floor design, technology, free flow between spaces and technology are key.
- If we think about space utilisation, our modular design approach is the base for creating consultation rooms of different sizes and flexing them based on the patient/client contact space requirements. Why use a big room prepared to accommodate a patient and a relative/friend if the patient has come on their own?
- The health centre's space would adapt and 'live' like an organism, based on the type of contact and the patients' personal circumstances. This can help, for example, increase the amount of rooms for a given space, or reduce the space for a similar amount of rooms. The operational metric changes from classic room utilisation to space utilisation.
- The circular approach to the ward layout allows for the reduction of corridor space.
- The size of rooms from which to do telehealth consultations would be smaller than the traditional primary consultation rooms, therefore freeing space.
- Some processes would also be revisited: for example, today, many patients are discharged but still occupy the room as their medicines are not ready at the health centre's pharmacy. By having the medicines sent home or scheduled for collection, the room can be freed earlier.
- We also challenge the traditional preference for single rooms and believe that many patients would want to be offered the option of co-sharing with one or more patients. Our hypothesis is that in many cases sharing and not suffering in loneliness could also have long term positive mental health implications. This offers 'space around the bed' opportunities.
- Waiting in the park, market, café or gym and being called a few minutes before the doctor or nurse are ready implies a reduced need for waiting area space as well as provide an enhanced patient experience.
- From a healthcare equipment capital expenditure optimisation perspective, the question we think hospitals need to ask themselves is whether they need to own or lease all of their equipment.
- We propose to conduct research to review the utilisation rates and cost of the equipment and adopt 'sharing economy' principles where relevant.
- The sharing of medical equipment among nearby hospitals would allow the health centre to expand into new procedure areas or provide access to more minimally invasive robotic surgical equipment at a much-reduced cost, as well as positively influencing theatre productivity.

3. Operational costs – focus to make a positive difference

- On absenteeism and staff retention, a hospital environment that looks after you, that you love and admire for its integration in the community can be a positive catalyst. This would lead to lower reliance on more expensive external staff and improve productivity.

- A design that fosters the embracing of technology offers efficiency opportunities across the full hospital visit and administration cycle. Below are some examples.
- Starting with the first stage, giving patients the option to complete a pre-assessment could save time for nurses and doctors while allowing for more focused consultations and time spent on communication clarity and compassion.
- Some patient wearables could allow to detect grave cases earlier. If connected with the health centre, the centre could prepare admissions, teams, etc., saving precious time for patients and minimising the degree of intervention and thus cost required.
- Non-show ups could be reduced by giving patients the option of doing telehealth consultations.
- Leverage of artificial intelligence to automate some of the services a hospital provides, from transportation of items between departments to analysis of oncology scans, will also lead to reduced costs.

4. Shadow costs – not ignored

- If we were to value the time spent by visitors 'waiting' rather than 'being seen' or 'treated', what would be the true budget of hospitals? What is the environmental cost of hospitals' standard building materials or of the single use plastics used in hospital catering, when considering these materials' full life cycle?
- The 2019 review of NHS standards proposed including average waiting time in A&E and time to initial clinical assessment. We believe this should be complemented with a cost-benefit analysis of waiting times that looks at the wider costs to the UK economy and productivity.
- Our design and investment in technology that allows for 'calling patients a few minutes before' so there is no need to stay in the waiting area and patients can 'continue with their life while waiting' is fundamental to addressing that cost-benefit equation.
- Our suggested building materials and our vision for their procurement would help lead the way in terms of ecological costs.

5. With the community, for the community

We see reintegrating the health centre into the community and into the fabric of the city as a value generator catalyst at multiple levels.

At a global level, the health centre can be a force for good environmentally by setting the trend through its linkage with nature. There is an opportunity to create a multiplier effect if other health centres and hospitals around the world replicate this approach.

The pocket parks and the rooftop allotment play a role in carbon sequestration. Vegetables are grown on site and a self-supporting eco-system help with food miles, as well as local traffic. Our use of Glulam structures and the approach to second-life building materials would set standards to be followed to build more sustainably.

At a national level, our health centre can show sector leadership internationally and has the potential to become an example of knowledge export and basis of soft power for the UK. By showing the world how the NHS is proactively working on testing different approaches to healthcare efficiency could be a case study to show gilt or bond long term investors how health budgets, and thus UK debt, is proactively positively managed. If we succeed in showing patients that prevention is fundamental and that regular tests are vital, this could spur the UK's laboratory testing industry.

Given the dual function of the space, council partnerships could be explored to fund the health centre's park. Sponsorship from for example health insurance groups, nutrition companies or the fitness industry could be easier to obtain, given the new role of the health centre. Patients with positive healthcare experiences would also encourage donations or endowments.

At a local and social level, we see the relationship with the council as key. The council should be part of the governing board of the health centre to influence its policy and shape the local ecosystem. The health centre can regenerate the local area through employment, teaching of local healthcare students, access to park or gym, sponsoring of local food producers, etc. providing the community with pride in its new urban landscape.

We also see an important relationship between the health centre, the community and the council. As an example, secondary schools could visit the health centre and listen to doctors retell their experiences dealing with smoking, knife crime or obesity related operations. This has the potential to change a teenager's behaviours for life. Clearly, there is a lot of social value in this.

This integration into the community can also foster volunteering. A better healthcare experience would lead patients to be more open to returning there to support others. Patients will feel better looked after, and the volunteers will receive the satisfaction and sense of purpose derived from helping others. Volunteering also opens the health centre up to a greater diversity of people, contributing to an open and inclusive community and fostering behaviours that are essential to the fabric that many councils try to achieve.

8. Conclusion

The Living Systems Health Centre and Beyond

This proposal is founded on a belief in the radical potential of design. We believe that, when properly applied in a built space, design can anticipate the needs of its users and facilitate positive interactions. Applied to healthcare, good design can make spaces more accessible, nurturing, diverse, agile, and responsive, allowing them to grow and develop as they keep pace with a changing world. This is how we have approached the design of the Living Systems Health Centre, which will function as a third carer – supporting medical professionals, patients, and visitors by taking an active role in both healing and prevention.

In the conclusion of our original proposal for the Wolfson Economics Prize, we pledged that, if we were to win, we would establish a combined research unit, think tank, and pressure group dedicated to campaigning for a new generation of healthcare architecture devoted to health creation.

Since winning the prize, we have begun the work of establishing this research unit, which we have named the DRU+ after the Design Research Unit (DRU) of post-war Britain. The first modern design consultancy in the country, the DRU worked with architects and designers as well as artists, scientists, and writers to re-design public utility services, creating highly effective (and often iconic) design that was for everyone.

Inspired by the DRU's socially progressive ambitions and founded in the spirit of post-Pandemic reconstruction – in the same way that DRU was founded in the spirit of post-WWII reconstruction – the DRU+ will combine medical knowledge, scientific rigour, and biocentric design innovation (addressing human needs within planetary limits) to deliver holistic solutions that support the science of prevention and treatment as well as the art of care.

The unit will be informed by diverse, cross-sector learning and experience, reflecting the value of collective intelligence. Through transdisciplinary research, empirical testing, and real-world application, we will create reimagined healthcare spaces that give users greater agency while enhancing welfare and improving their quality of life.

Championing health creation through effective design, the DRU+ will be launched in late-2022 as the first major step towards our envisaged healthcare centre of the future.

'The Design Research Unit was firmly convinced that designers had an obligation to use their skills in a socially conscious way. [...] The DRU+'s vision is a consultancy that can use its creative skills to work with professionals and experts to explore new ways of doing things. It's the beginning of an important and optimistic reminder of what design can do.'

Deyan Sudjic

'The work of the DRU+ will forge an interrelationship between design and science so that the rigour of one can underpin the creativity of the other and together generate sensitive, responsive and efficient spaces of care.'

Ab Rogers

Team

Expert Panel



Dr Laura Benjamin
Neurologist and
Principal Clinical
Research Fellow,
University College
London



Victoria Jessen-Pike
Principal Projects
Director at Publica



David Powell
Project Director/
Development Director
at Velindre University
NHS Trust / Alder Hey
Children's NHS Trust



Dr Mando Watson
General Paediatric
Consultant, St Mary's
Hospital, Paddington



Javier Botella
Economist at Tesco PLC



Dr Hammad Khan
Consultant
Neonatologist at
St Thomas' Hospital



Natasha Prime
Emergency Department
Charge Nurse



Marina Willer
Graphic Designer and
Filmmaker, Partner at
Pentagram London



Dr Ellie Cosgrave
Director of Community
Interest Company and
Research at Publica



Nick Luscombe
Broadcaster, Radio
Producer and Sound
Collector



Dr Ash Ranpura
Neuroscientist and
Clinical Neurologist



Chris Wise
Senior Director at
Expedition Structural
Engineering



Ugo Faraguna
Associate Professor
of Human Physiology,
University of Pisa
Medical School



Dr Kate Mayer
General Practitioner



Patience Renias-Zuva
Biomedical Research
Centre Patient and
Public Involvement
Manager UCLH



Jane Withers
Design Curator and
Consultant



Luna Gargani
Cardiologist and
Senior Researcher at
the Institute of Clinical
Physiology for the
National Research
Council, Pisa, Italy

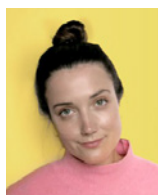


Magda Mostafa
Autism Design
Consultant, Associate
Professor of Design at
the American University
in Cairo, Architect,
Progressive Architects



Helen Starr
Afro-Carib World-
building Curator
and Founder of The
Mechatronic Library

Design Team



Zara Ashby
Senior Designer



Ernesto Bartolini
Architectural Director



Ania Chorzepa
Designer



Blue Farrier
Art director and fashion designer



Danielle Fountain
Designer



Julia Moraes
Senior Designer



Ab Rogers
Creative Director



Cameron Short
Associate



Sabrina Summer
Associate



Dean Walker
Design Director



Yosuke Watanabe
Associate Director



Feng Yang
Designer

Consultants



Phil Armitage
Senior Partner at Max Fordham, a practice of Building Services Engineers



Gary Elliott
CEO and Founder of Elliott Wood Structural and Civil Engineers



Sergio Luzzi
Professor of Acoustics at the University of Florence, President and Technical Director of Vie en.ro.se Consultancy



Alex Manning
Fire Safety Engineer and Associate at Warringtonfire



Paul Nulty
Architectural Lighting Designer and Founder of Nulty lighting design practice



Dan Pearson
Landscape Designer, Gardener and Journalist



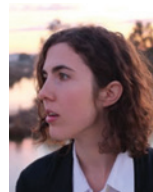
Stuart Bertolotti-Bailey
Graphic Designer and Editor



Francesca Bertolotti-Bailey
Curator, Cultural Producer and Director of Cove Park, Scotland



Ana Botella Diez del Corral
Creative Producer, Programmer and Cultural Strategist



Emma Capps
Editor



Caroline Escobar
Lead of Research Strategy, DRU+



Elizabeth Glickfeld
Design Writer and Editor



Christina Huber
Researcher and Spatial Designer



Philippa Wyatt
Associate Writer

Editorial Team

About ARD

Ab Rogers Design is a multidisciplinary design and architecture studio with 30 years of international experience. Expanding its work in the fields of culture, retail, hospitality and residencies, more recently ARD has been exploring health, realising the Maggie's Centre at the Royal Marsden Hospital and winning the 2021 Wolfson Economics Prize, which called for design proposals for the hospital of the future.

ARD creates spaces defined by the needs of their users, believing that design can influence behaviour and elevate experience. This approach manifests across its portfolio, from the 2022 furniture collection commissioned by Hyundai's Livart, to the 2001 Comme des Garçons' flagship store in Paris, unchanged to this day. In the case of hospitals, ARD has pioneered the notion of design as the 'third carer', the belief that design can actively nurture its users, working alongside medical staff (first carers) and patients' support network (second carers) to deliver the art of care as well as the science of treatment. This notion underpinned our winning proposal for the Wolfson Economics Prize, and influences all our work, in healthcare and beyond.

Our work celebrates inside out design, starting with the human at the heart of the space and letting their needs define the architecture. We seek to engage the senses, favouring tactile materials imbued with the vivid colours of the natural world. From the oceans to the forest, from the octopus to the sun flower, our design draws on worlds near and far to stimulate the imagination and enhance the user's experience

The studio's creative abilities result from a broad skill base that includes architects, interior, industrial, furniture and graphic designers and writers. We champion collective intelligence and draw on expertise outside our immediate field, collaborating with scientists, medical practitioners, cultural producers, artists and craftsmen of all kinds.

Our commitment to sustainability drives every project, visible in our belief in creating more with less. We use low waste, low maintenance, second life materials combined with low energy construction methods that utilise modular, standardised components and flexible, efficient procurement processes that allow for change.

ARD is privileged to have worked with clients including 180 The Strand, The Barbican Centre, Tate Modern, Centre Pompidou, Hyundai/Livart, Maggie's, Scape, the Fat Duck, Comme des Garçons, Selfridges, as well as London Hospitals including Charing Cross, St Thomas', Queen Charlotte and St Mary's.

For further information and press images please contact:

Philippa Wyatt
philippa@abrogers.com

Or Lucie Hepton
info@abrogers.com

+44 (0)207 6825020

www.abrogers.com
www.dru-plus.org