

WALK, TALK, WORK



THE IMPORTANCE OF PEDESTRIANS AND PUBLIC SPACE FOR
COLLABORATION IN HOSPITAL KNOWLEDGE PRECINCTS

BY MICHAELA SHEAHAN

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I feel a bit like Bilbo Baggins. This year has been a most unexpected adventure, and I might not have made it without my companions along the way. I have many people (not dwarfs) to thank, because a researcher's most valuable asset is other people's time and I have been fortunate to have had plenty of it.

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A WORD BEFORE I START

At the beginning of this year, I thought I was undertaking an investigation into pedestrian environments in hospital knowledge precincts, and in a practical way that is precisely what I did. I have gained valuable insights into that particular focus of my research and this paper delves into those. But like all good research projects, somewhere along the path, I got a bit waylaid by a question that lingered in my mind while I travelled:

Who are the guardians of public space?

In many precincts, public space is un-designed because it is unclear precisely who is responsible for it. Yet it holds the key to creating vibrant, pedestrian friendly precincts.

The answer to the question, logically, is that public space is everyone's business. We are the guardians of public space: in the design and construction industry, decisions regarding public space, both internal and external, affect every user of that building, precinct, or city in sometimes unexpected ways.

As clients, administrators, planners, project managers, designers, and builders, we have a collective responsibility to ensure that the potential of public space in each place we work on is realised because great public realm is the key to successful spaces and places. I'm not just talking about the town square either - public realm comes in all different sizes, from Central Park in New York City to the tearoom in your workplace.

And at whatever scale, the vital ingredient for good public realm is people on foot.

Walkability is explored in this paper as a means to an end (collaboration), but is covered extensively in literature, and far more eloquently than I ever could by two authors in particular: Jeff Speck and Jan Gehl. Look them up - between the two of them they paint an undeniable picture of vitality and activity in locations where pedestrians are the focus of planning and design, and back it up with reams of research.

So what has all of this got to do with hospital knowledge precincts?

Hospital knowledge clusters are one type of precinct among many- technology, cultural, financial, media, sporting etc. But health knowledge precincts are special because they are increasingly seen as economic development anchors in strategic planning, as well as fundamental public health infrastructure. A city can thrive without a tech sector, but it can't without a hospital.

The best of these health knowledge clusters create value for their host cities (and beyond) through innovative care models, translational research opportunities, and bio-medical products, via knowledge transfer between hospitals, business and academia.

They employ a lot of people, and the growing expectation from administrators, politicians, and planners is that those people need to collaborate to generate ideas and innovation in order to stimulate the economy, as well as improving the health of the population.

So I set out to discover how leading and emerging hospital knowledge precincts around the world approach collaboration, with a keen eye in particular on how their public spaces allow pedestrians to get on with the business of innovation

This is what I found.



Manchester Children's Hospital

“All truly great thoughts are conceived while walking.”

Friedrich Nietzsche

EXECUTIVE SUMMARY

“All truly great thoughts are conceived while walking.”

So said Friedrich Nietzsche, who wasn't short on great thoughts.

While hospital knowledge precincts may not necessarily be the haunt of great philosophers, this research explores the importance of walkability in promoting ideas, innovation and collaboration.

It contends that providing high quality public spaces encourages people to walk around, through and beyond a precinct, enabling connections to be made between institutions and individuals, which will in turn lead to collaboration and innovation.

A hospital knowledge precinct can be defined as a distinct area of a city that has a concentration of clinical care facilities co-located with a university and bio-medical research facilities.

With significant growth in this type of cluster, and a reliance in metropolitan planning on these sites as employment and innovation centres, how have leading hospital knowledge precincts designed their physical connectivity to enable collaboration?

Through literature and website reviews, site visits, interviews, and mapping of building types and land uses, this study explores the public spaces and pedestrian networks of eight established or emerging hospital knowledge precincts in the US, UK, Canada, Sweden, France and Australia.

Three Elements of Connectivity

Each of the precincts has its strengths, but one amongst them stands out, with vibrant public realm, a vision that clearly articulates what it wants to achieve in collaboration and innovation, and a regeneration program that reflects those aims.

While not without its challenges, the Manchester Corridor in the United Kingdom achieves a balance of the elements identified in the research as crucial to connectivity and collaboration:

Proximity – a balance of proximity to related institutions (co-location) AND to other diverse activities (mixed use) gives people reasons to walk.

Interaction – a range of opportunities for interaction, formal and informal, in a network of intersecting paths and gathering spaces allows incidental conversations and connections to occur.

Quality – a network of places and links that look good, are safe, and comfortable encourages people to walk.

Trends

The case studies uncover a number of trends that are significantly changing the form and function of hospital knowledge precincts:

1. Translational research buildings and clinical settings are internalising interaction. This is attractive from a workplace perspective, but not necessarily conducive to a collaborative precinct.

2. Buildings are getting bigger and taller, increasing the number of people on site significantly. This has positive implications for interaction, but the management of congestion and quality of public space become critical.

3. Centralised public spaces and circulation ‘spines’ (internal and external) are becoming a common design response to congestion. These provide opportunities for gathering, retail and other uses, but coupled with larger building footprints can lead to a loss of fine grain movement networks, making connectivity more difficult. They also provide opportunities for the de-institutionalisation of the hospitals with art and community activity.

4. The US precincts visited have their own member-based precinct planning bodies to oversee energy and transport initiatives, precinct and building development, and complex stakeholder issues and relationships. This is not replicated in other regions, but holds valuable lessons and potential for the design and management of public space in these types of precincts.



Texas Medical Center, Houston

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ETSY craft market, MaRS Building, Toronto



PART 1 - CONTEXT



RESEARCH OUTLINE

With significant growth in health clusters as a development typology, and a reliance in metropolitan planning on these sites as employment and knowledge centres, how do leading hospital knowledge precincts maximise their physical connectivity to enable collaboration?

Hospital knowledge precincts can be defined as distinct areas of a city that have a concentration of clinical care facilities co-located with a university, and in many cases, a private or publicly funded bio-medical, bio-tech, life sciences or pharmaceutical research facility.

Aim

The aim of the research is to identify potential improvements in the way hospital knowledge precincts are planned, designed and constructed in Australia.

By seeking to understand how leading precincts around the world provide physical connections and public space on site, Australian construction industry practitioners may be better equipped to provide connectivity that will enable the interaction and consequent innovation so desired by city planners and institutional management.

Importance of research

While various metropolitan strategic plans outline the importance of knowledge and health clusters in economic terms, there is limited discussion within the plans of the urban and architectural design implications of these policies. The policies place significant responsibility on the institutions to plan and design the physical interfaces between the institutions involved and the surrounding communities. These interfaces are important because the facilitation of knowledge transfer and institutional interaction are fundamental to the business case for this type of precinct.

A number of cities around the world are now positioning themselves as bio-medical knowledge centres. Many of these centres have grown organically from existing hospital services located adjacent to universities.¹ Others are pursuing the strategy in response to burgeoning growth in healthcare, which is now the largest industry in the world.²

Plan Melbourne, the metropolitan planning strategy released by the Victorian Government in 2013, identifies six major employment clusters, five of which include significant health precincts.³ This anchor institution approach to strategic planning is also apparent in other Australian cities.

The world-renowned Parkville and Monash Health Precincts in Melbourne have grown gradually out of strong hospital/university partnerships. The redevelopment of the Royal Adelaide Hospital has provided an opportunity for the clustering of health and research facilities at the edge of the CBD. The Metropolitan Strategy for Sydney highlights the importance of the Westmead Medical Precinct to the city⁴ while the Herston Health Precinct, in Brisbane's Knowledge Corridor, aims to become one of Australia's top health innovation centres.⁵ Not far south along the highway, the new Gold Coast University Hospital has opened beside Griffith University, initiating the Gold Coast Health and Knowledge Precinct.

North America has many cities with leading medical precincts - Boston is renowned for its bio-science innovation. The Texas Medical Center in Houston is the largest medical precinct in the world⁶ while in Toronto, the Discovery District is one of the fastest growing biomedical business clusters in North America⁷. In Europe, the Karolinska University Hospital in Stockholm is expanding its highly respected Solna Campus⁸ and in the UK, the Manchester Corridor is emerging as a major bio-health cluster.⁹

All of these precincts share a common goal to pursue excellence in health services delivery, combining research and clinical care within an urban location. The case studies presented here differ in their form and institutional relationships, but offer a valuable cross section of typologies, from organic integrated city development (Boston, Paris, Melbourne, Toronto) to medical mega centre (Houston), urban regeneration (Stockholm) and emerging precincts (Manchester and Gold Coast).

PART 1 - CONTEXT

LITERATURE REVIEW

Innovation has become the holy grail in an increasingly competitive, globalised world. Everyone is talking about it, looking for it, designing for it. Numerous studies have explored the relationship between human interaction and new ideas: to get the latter, you need the former, and this literature review explores the links between the two.

Connectivity

Connectivity can be understood at a range of scales, from internal corridors, to neighbourhoods, cities, national and international networks. This study is primarily concerned with physical connectivity at the smaller scales of site (the cluster of buildings) and precinct (the surrounding neighbourhood). In particular, it will focus on footpaths and gathering places on sites with buildings that have been co-located to encourage interaction between the users. Virtual and organisational connectivity are vital to the aims of knowledge clusters, but not part of the scope. This is about getting people together, face-to-face, to talk and work.

From a narrow standpoint, connectivity refers to the directness of travel routes between two locations¹⁰ but it can be considered to include the travel component and the opportunity to gather, for it is in the gathering that a connection is activated. These publicly accessible spaces allow the activities that architect Jan Gehl describes as 'the life between buildings'.¹¹

Public Space

These interstitial spaces that facilitate connections at the precinct scale inevitably involve multiple landowners, both public and private. While the town square and local park are the mainstays of public space, definitions can vary, and taking Jan Gehl's assertion that "the presence of people is the most important quality of public space",¹¹ it is possible to claim much more than the park and the town square:

*"There has been a tendency to confine notions of public space to traditional outdoor spaces that are in public ownership, but opportunities for association and exchange are not so limited...To members of the public, it is not the ownership of places or their appearance that makes them 'public', but their shared use for a diverse range of activities by a range of different people. If considered in this way, almost any place regardless of its ownership or appearance offers potential as public space."*¹²

This definition, then, includes other places that may be internal (the library), privately owned (the shopping mall, swimming pool) but can also be extended to include more amorphous 'places' such as the footpath, the street, the riverbank.

This broader notion of public space is associated with ideas such as Roy Oldenberg's 'third place', neutral spaces where people can gather and interact between work and home¹³, which are now being applied in sectors as diverse as commercial workplace, hospitality, education, and precinct design to encourage social interaction, collaborative working and the transfer of knowledge.

Knowledge clusters

The effectiveness and implications of knowledge clusters (or precincts) have been researched extensively¹⁴ and architectural publications regularly report the benefits of individual buildings that encourage innovation, particularly in bio-science, and technology clusters.^{15, 16, 17, 18}

Hospital precincts garner less attention than other clusters. This lack of focused research limits our understanding of the very specific requirements of health care facilities relating to access, equity, and safety, as well as undermining the possibilities for interaction between proximate facilities in education, research and clinical care.

In addition to this, there appears to be a significant gap in the literature relating to cluster development (hospital or otherwise) at the level between individual buildings and economic aspirations – that is, the urban design dimension.

PART 1 - CONTEXT

Planning for innovation

Agglomeration, the clustering of organisations and businesses in related industries, has long been recognised as an effective driver of economic development, providing competition, critical mass for specialisation and reduced costs due to proximity.¹⁴

While Stolarick and Florida¹⁹ propose that it is the connections between individuals, not firms, that spur innovation, the importance of spillovers between firms has been the driver for co-location and clustering of industries in many sectors, and can plainly be seen in precincts in this study.

Putnam²⁰ argues that the difference between co-location of businesses and an effective cluster is the presence of social infrastructure – the interaction between people that establishes co-operative networks and trust.

While these interactions are dependent on managerial and institutional arrangements, they may also be heavily influenced by environmental factors.

The provision of collaborative (third) spaces within commercial and academic buildings is now a well-established trend²¹ but the interstitial spaces between institutions can also provide opportunities for people to connect (formally or informally) via circulation networks, gathering spaces, arrival and departure points.

Proximity and Interaction

At the individual building scale, research has revealed that innovation is an inherently social phenomenon, and that proximity to colleagues and activity in communal and outside areas promote creativity¹⁵ which is supported by Gehl's observation that people talk more when they are outside.¹¹

In the book *Where Good Ideas Come From*, Steven Johnson concludes that significant innovations in history have resulted not from competition, but from openness and connectivity, and that the physical environment is important in the formation of new ideas.¹⁷

Johnson also explores the idea of 'weak ties', posited by sociologist Mark Granovetter in the 1970s: when it comes to finding out new information, weak ties are more important for the generation of ideas than strong ties. Friends and colleagues occupy a similar world to each other and consequently know similar things. Acquaintances, on the other hand, are more likely to know something different.²²

Proximity is a recurrent theme in much of the research into collaborative working, the incidence of which has been steadily increasing in scientific fields over the last few decades, evidenced by a growing percentage of co-authored papers, and the growth in the size of patenting teams. A study from the London School of Economics contends that for inventors, local geographic proximity is becoming more important for collaboration, counter to views that technology will lead to the 'death of distance'.²³

In a one year study into factors that promote interdisciplinary work in two science buildings at the University of Michigan²⁴ the extent to which scientists shared overlapping space significantly increased both the formation of new collaborations and their success in securing external funding. Importantly, the Michigan study uncovered an interesting tradeoff in the quest for innovation and creativity that echoes Granovetter's theories on weak ties – close networks that develop familiar, strong social ties are more able to coordinate

complex collaborative work because they become more alike in work practices. However, more diffuse, open networks tend to be more effective in generating new ideas. Open networks provide the spark, closed networks the fanning of the flames, or alternatively, one relates to innovation, and the other productivity. Whichever the goal, proximity is the key.²⁵

Applying this idea more broadly to a precinct model, could it be that networks within buildings are the productive ones, and those between buildings shoulder the innovation burden?

If so, then, getting people out of their buildings and walking, gathering and socialising becomes important to the aims of a knowledge precinct. The quantity and quality of interactions between stakeholders in a precinct are likely to be affected by the design of these interstitial 'public' spaces, which become the focal point for face-to-face interaction between people in different buildings.



Imagine Institute, Hôpital Necker Enfants-Malades, Paris



PART 2 - METHOD



METHOD

This study seeks to make observations of various elements relating to connectivity and public space at eight hospital knowledge precincts around the world in order to gain insight into what limitations and opportunities there are for pedestrian environments on different types of sites.

Precinct selection

The precincts have been selected as a range of typologies: established, emerging or aspiring knowledge clusters, of a variety of sizes, some with commercial or urban regeneration imperatives, others purely healthcare and academically driven.

Criteria

Tertiary and/or teaching hospital(s)

Identified as a "Knowledge Precinct" or similar by city administration or industry source

Co-located with research/academic/bio-medical industry facilities

A. Case Studies

The major hospital and research facility zone of each site has been mapped by building type and pedestrian paths, and photographed.

Peripheral facilities, unrelated buildings and land uses have not been included in the study area.

Interviews were conducted with various stakeholders from corporate and facilities management, clinical departments and government planning authorities to collate a range of views about connectivity and collaboration.

Information relating to the city and institutional planning policies was also collated. As the precincts vary in location, climate, size, and specialisation, each is analysed as a case study of the elements below, with a focus on a particular strength.

B. Three elements of connectivity

The study uses both quantitative and qualitative methods to examine the selected precincts against three elements identified in the literature review as crucial to connectivity and collaboration:

Proximity

Walking distances, measured by size of precinct

Co-location, mixed use, and density, measured by Walkscore

Interaction

Encounter opportunity, measured by intersection density

Quality

Aesthetics, comfort and safety, documented in photographs



MaRS Stage 1 Tower, Toronto



Texas Medical Center, Houston

3

PART 3 - PRACTICE



THE CASE STUDIES

The eight case studies represent quite different approaches to connectivity and collaboration.

While each of the sites is known for high quality health care and innovation, they have their particular strengths, which are in some cases the result of recent deliberate strategies, and in others, have grown from the legacies of earlier periods of growth and development.

Manchester Corridor
Manchester, United Kingdom

Texas Medical Center
Houston, United States

Longwood Medical Area
Boston, United States

Discovery District
Toronto, Canada

Karolinska
Stockholm, Sweden

Hopital Necker Enfants-Malades
Paris, France

Parkville Health Precinct
Melbourne, Australia

Gold Coast Health and Knowledge Precinct
Southport, Australia

Partnerships

The Challenge of Diversification

Area Planning

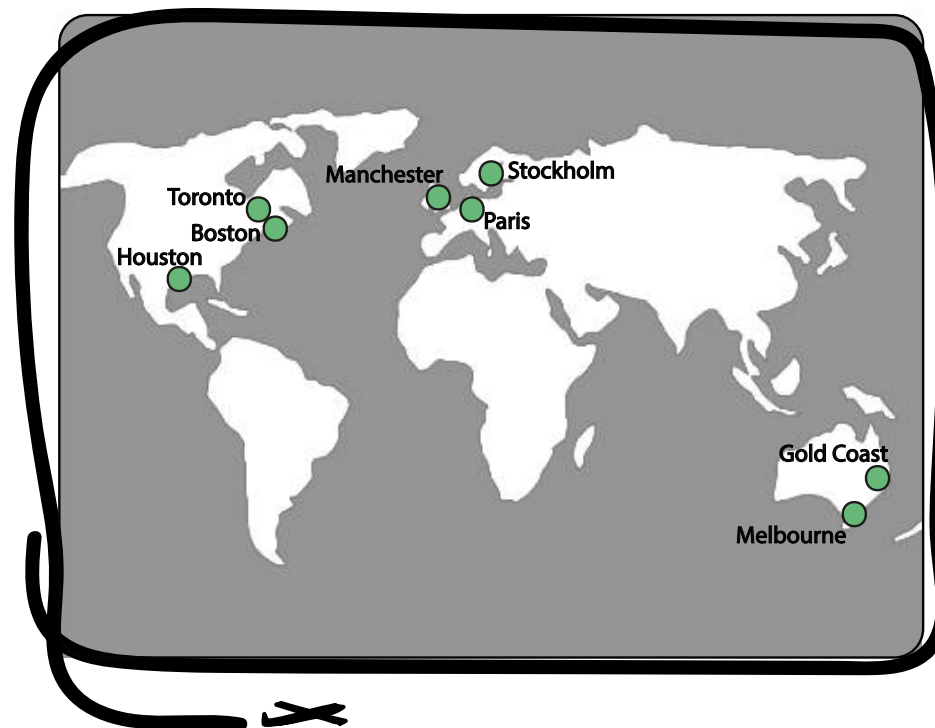
Incubation

City Integration

Density

Co-location

Quality



PART 3 - PRACTICE

MANCHESTER CORRIDOR, UNITED KINGDOM

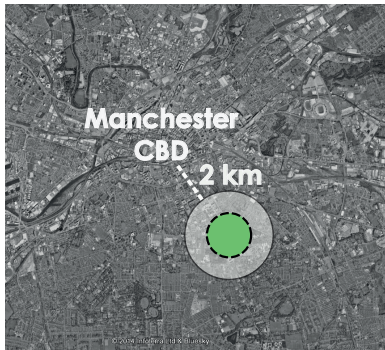
Population – 2.6 million
Total precinct size – 243 hectares
Study area – 39 hectares
Beds – 1000+

Advantages

Established mixed use,
Co-location of research,
academia and clinical facilities,
Commercial bio-tech presence

Challenges

Ongoing private investment
Integration with Manchester
Science Park



The Manchester Corridor precinct represents perhaps the best example of the integration of proximity, interaction and quality, with generous provision of public space coupled with co-location and co-habitation of research, academic and clinical facilities in a lively mixed-use precinct.

Adjacency to the University of Manchester is fundamental to the success of the precinct. The University, the largest clinical academic campus in Europe, provides 5000 graduates of medicine and biotechnology annually,²⁷ a focus for research on a grand scale.

Retail premises (hairdressers, mobile phone outlets, pubs, supermarkets) line Oxford Street, the main thoroughfare and central hub for the University of Manchester. New residential development is occurring in the area, as well as a major refurbishment of the Whitworth Art Gallery. A large public park is located across the road. This is a thriving activity centre.

But it balances this activity with safe, uncongested open space and pedestrian permeability between mixed use, research and clinical facilities.

The site is both large enough to support co-location of a critical mass of research and hospital facilities, and small enough to enable close proximity to a diverse number of other and uses.

Manchester Royal Infirmary has stood on the site for 250 years, but had become congested with buildings in various states of disrepair. A major redevelopment designed by Anshen Dyer Architects and completed in 2010 integrated four hospitals and translational research labs into one large facility, with additional buildings for research and business incubation.²⁶

“What you need is a place to develop shared purpose – city, industry, university, hospital.”

Keith Chantler, Manchester Royal Infirmary²⁸



LEGEND Clinical Academic Research Parking&Ancillary

PART 3 - PRACTICE

At the heart of the development is a large pedestrian and vehicle boulevard that separates clinical space from academic and administrative services.

This provides a relatively calm area for the drop off of patients, and movement of staff and service vehicles around the site. It is protected but not far from the undoubtedly chaotic but vibrant retail and academic area to the west that provides ready access to everyday services.

The central public space is home to the longest, most conspicuous sky bridge encountered in all of the case studies, running approximately 60 metres across the site from the hospital building to the clinical support labs and administration buildings.

A tunnel was not feasible due to extensive underground services already on site, but the walkway detracts from the otherwise attractive provision of open space.

Another anomaly is the inaccessible courtyards within the hospital itself, provided for day lighting of the internal spaces, and for art installations.

The site is planned to provide a high quality public realm that incorporates the new and the old, open space, and safe access for patients and visitors, while maintaining generous pedestrian paths close to the hospital and a lively retail strip with the finer grain of older streets.

It's greatest asset however, is the investment in money, time and energy for partnerships, through the Manchester Corridor initiative.



Skybridge, Manchester Royal Infirmary



Central boulevard, Manchester Royal Infirmary

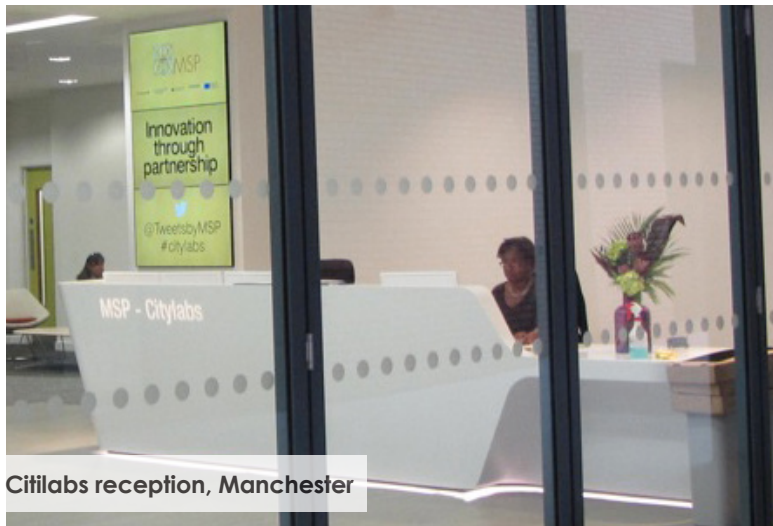


Oxford Road, Manchester

PART 3 - PRACTICE



Citilabs, Oxford Road frontage, Manchester



Citilabs reception, Manchester

FOCUS - PARTNERSHIPS

In 2007, Manchester City Council formed a strategic partnership with The University of Manchester, Manchester Metropolitan University, Manchester Science Park and the Central Manchester University Hospitals Foundation Trust (CMHFT). Named the Manchester Corridor, this strategic area of 250 hectares south of the city contains an intense concentration of commercial, academic and clinical health facilities.

It is anticipated to attract £2.5 billion private sector investment in the coming years in land, infrastructure and buildings. Already 55,000 people work in the Corridor, which is 18 percent of the city's workforce. Ten thousand of these work in the hospitals.²⁹

The partnership was formed specifically to stimulate growth in a city with a history of long term economic woes through the generation of knowledge intensive organisations in biomedical, education, creative and financial services.

At about the same time, the National Health Service (NHS) had identified a need to concentrate activity on translational research outcomes and, in Manchester, recognised the potential for the Central Manchester Hospitals to deliver significant innovations in this area.²⁸

The Director of Innovation at the Royal Manchester Infirmary, Keith Chantler, believes the growing success of the precinct is due to a shared purpose for the corridor, particularly in translational research.

While private sector involvement in this partnership is significant, the most important factor for the corridor has been the long term vision of the City of Manchester.

Backed by this vision, the partners have been able to invest confidently in incubation facilities and a variety of spaces that can be shared for conferences, informal and formal meetings of the stakeholders, business development, and translational research facilities.

This provision of a variety of pathways for development from basic research to stage five clinical trials and commercialisation of products is one of the great attractions of the Corridor.

Losing an idea from the city after the high initial costs of incubation is an unsustainable business model, so in Manchester, when a start up team outgrows the small spaces for incubation, there are other larger spaces available for bigger teams.

The NowGen and other collaborative facilities were built to bring people together in conferences and forums. And as Citilabs, a new building with labs, facilities for clinical trials, and business space for bio-tech incubation and start ups, is being completed, plans are already progressing for another.²⁸

PART 3 - PRACTICE

The Citilabs building, designed by Sheppard Robson Architects, was developed by private developer Bruntwood in partnership with the Manchester Science Park, which, slightly removed from the main precinct, suffers somewhat from an outdated suburban development model – a number of low rise buildings separated by staff car parks that fill in the morning, and empty in the evening. Planning is underway to build a social hub and café to bring more activity and interaction to this site during the day.

While the Corridor is the main hub of bio-medical activity, the Greater Manchester region is championed by the Manchester Academic Health Science Centre, a partnership between the Corridor Institutional partners plus five other hospitals trusts.

This concentration of co-operative relationships in care and research contributes to the attraction of health businesses to the region, including over 200 biomedical organisations and seven multinational pharmaceutical companies.²⁹

In addition to these health partnerships, Manchester, the UK's second largest city, is focussing squarely on the reinvention of its economy, and has many alliances working to support this goal – MIDAS, the Manchester Investment and Development Agency, acts on behalf of ten local authorities to provide assistance to organisations trying to locate in the area.²⁹

And the New Economy is an economic think tank funded by the Association of Greater Manchester Authorities, Greater Manchester Local Enterprise Partnership and the European Union. Private sector growth in Greater Manchester is forecast to outstrip growth for the UK as a whole, and for the public sector to suffer less through the ongoing economic downturn.⁹

This is a city that understands and values the benefits of partnerships.

“You need pathways, not single solutions. So you need an incubator, then you need the next size business development facility so that you don't lose the successful start up to somewhere else. You need private sector involvement, but most importantly you need city involvement. Long term vision and partnerships are crucial.”

Keith Chantler, Manchester Royal Infirmary ²⁸



PART 3 - PRACTICE

TEXAS MEDICAL CENTER, HOUSTON USA

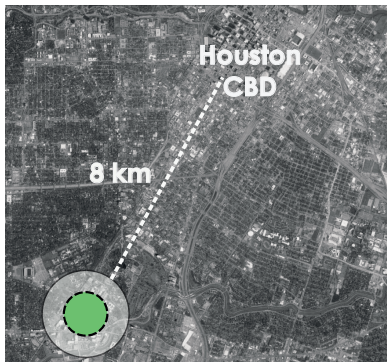
Population – 6.2 million
Total precinct size – 544 hectares
Study area – 130 hectares
Beds – 7000

Advantages

Co-location of world
leading clinical facilities

Challenges

Commercialisation
Diversity
Car dependence



With over 20 hospitals on 544 hectares, and plans to extend the site by 160 hectares, Texas Medical Center is the world's largest health precinct and the eighth largest employment district in the US.³⁰ It is, effectively, a second CBD for Houston, almost entirely devoted to healthcare institutions: 7,000 beds in 290 buildings, with commercial, retail and residential uses at the periphery only.

This study examines 130 hectares at the main campus, where \$7 billion was spent on building and infrastructure from 2008 and 2012.³¹ This "formidable row of high rise hospitals"³² has all developed since 1944, when TMC Corporation was established on a suburban site for medical institutions. The Corporation acts as a private municipal government, responsible for energy, land management, emergency preparedness and transport issues for 54 member institutions.

In 1999, in response to rampant growth, TMC commissioned a master plan that included an extensive "skywalk" system for pedestrians and services.³⁰ The external public spaces and

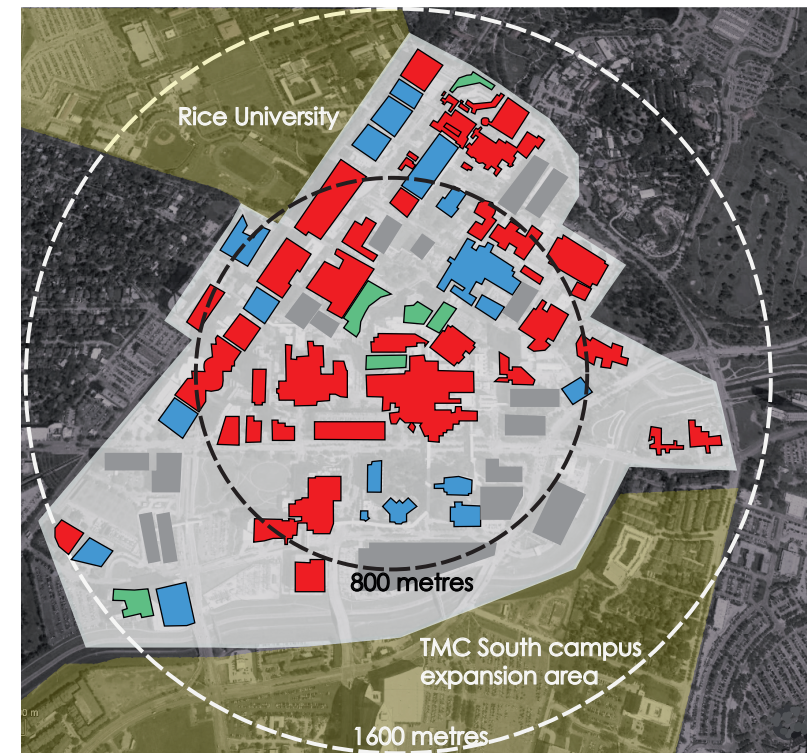
footpaths, while generous and beautifully maintained, are relatively under-used. The large site, wide busy roads, and lack of mixed-use activity appear to make walking outside the exception, rather than the rule. Shuttle buses and multi-storey garages abound – TMC operates the second largest car parking operation in the world, behind Chicago's O'Hare Airport.³⁰

But Houston's new light rail now runs along the major boulevard, the focus for mixed-use activity in the master plan.³³ The Brookings Institute has marked this corridor of Houston as the next hot spot for innovation, and there are plans to build a walking campus in the expansion area, where policy, research and clinical uses will mix with housing, restaurants, and services.⁶

The ability of a central group to coordinate development will be a valuable asset in the next phase of growth. The challenge of site transformation is great, but the potential for collaborative work is high, and while starting well behind the eight ball in a city notorious for car dependent sprawl, TMC is making tentative steps toward walkability.

"What are the most significant, meaningful collaborations that go in the TMC...? There are none."

Robert Robbins, CEO, Texas Medical Center⁶



LEGEND Clinical Academic Research Parking&Ancillary

PART 3 - PRACTICE

FOCUS - THE CHALLENGE OF DIVERSIFICATION

The intense concentration of elite healthcare institutions at the Texas Medical Center has obvious benefits for patients requiring complex care, and provides a very large pool of talented staff and students (106,000).

While the Baylor College of Medicine is within the hospital precinct, the larger Rice University is separated from it by expansive campus grounds, meaning there is limited student activity (and associated retail and services) around the hospitals.

But the University is inevitably expanding into the streets around the hospitals: Rice Collaborative Research Center has been built between the hospitals and the university to bridge that gap to some extent and represents the new push for connectivity between research and healthcare that is lacking at TMC.

Despite an estimated 15 new start up businesses a year and a new discovery every second day coming out of the precinct³⁰, the CEO has noted that co-location in the precinct has yet to be fully exploited, with competition, rather than cooperation, the hallmark of some of the institutions.

"What are the most significant, meaningful collaborations that go on in the Texas Medical Center? The answer is, There are none." (Robert Robbins, CEO, TMC)⁶

Few of the health discoveries made at TMC are commercialised, and many are developed further elsewhere. For every \$24 Texas receives in research funding, only \$1 is returned in commercialisation.

This disproportionate lack of innovation presents an opportunity for growth³² and the recent opening in the precinct of the TMCx Accelerator, a health business incubator, seeks to do this.

TMC is not alone in this challenge – another large highly regarded medical precinct in the US, the Mayo Clinic, Minnesota, suffers from the same lack of entrepreneurial success.³⁴

Not all big hospital precincts can pull it off, but TMC is working hard to provide the best business and site conditions to make it happen.



Texas Medical Center



Texas Medical Center Skywalk system

PART 3 - PRACTICE

LONGWOOD MEDICAL AREA, BOSTON, USA

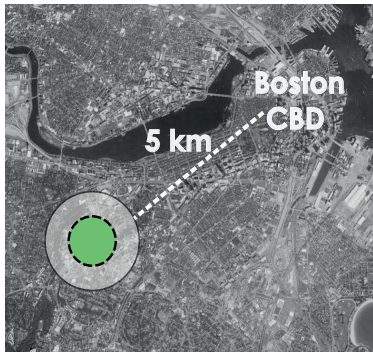
Population – 4.5 million
Total precinct – 86 hectares
Study area – 54 hectares
Beds – 1800

Advantages

Mature, established site
Highly walkable
Membership based planning body

Challenges

Congestion
Lack of mixed use activity
Limited expansion potential



The long established Longwood Medical Area (LMA) in Boston, a university town feted for its walkability and innovation, is home to one of the premier health precincts in the world. Certainly its health providers are well represented in the rankings of hospitals in the US³⁵ and the city rates consistently well in indices and publications that address livability and knowledge generation.

While the health and innovation credentials of the LMA are undoubted, much work is still required to address the lack of diversity of activity in the area. Despite a daily visitor tally of over 150,000, retail, food and beverage outlets in the precinct are limited – one food court above ground level, a handful of chain food outlets, a pharmacy...

As Charles Weinstein, the Vice President for Real Estate at Boston Children's Hospital puts it, "There is one Italian restaurant. Land is so expensive here you have to sell a lot of pasta to make retail work".³⁶ This lack of diversity combined with the daily population paints a perplexing picture – where do they all eat? And the answer is that staff are so time poor that

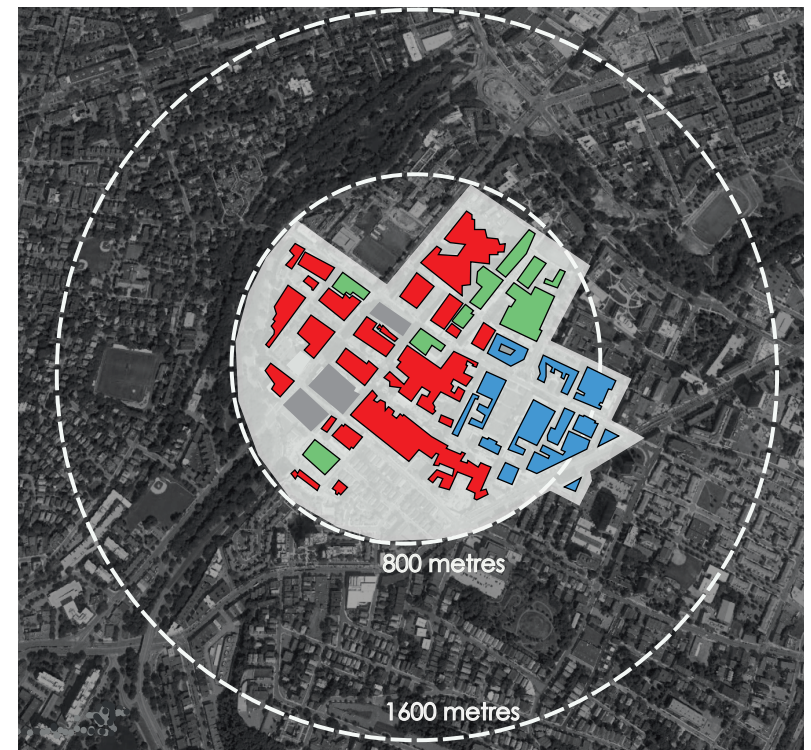
many don't leave their buildings during the day, but eat at their desks.³⁷ So many pedestrians that the precinct needs a raised system for foot traffic, but not enough pedestrians to make retail work according to Sonal Gandhi of the Boston Redevelopment Authority: "There is a role for mixed use or retail development, but there is very limited space for any use except institutional and parking. There is some need for food and small gift/flower providers, but any other use has not worked at the LMA."³⁸

And as the buildings proliferate in this under-demolished precinct, public space becomes more scarce, or relocated off the ground plane in roof gardens and sky-bridge networks, the footpaths become more crowded, and the planners wonder, is the LMA full?

Indeed, Sarah Hamilton, the Vice President of Area Planning at MASCO notes that an "Elsewhere Plan" was proposed not so long ago, but rejected by the MASCO community because despite the crowding, the synergies of co-location are too precious to forego.³⁷

"We are not over developed, we are under-demolished."

Charles Weinstein, Boston Children's Hospital³⁶



LEGEND Clinical Academic Research Parking&Ancillary

PART 3 - PRACTICE

FOCUS - AREA PLANNING

The Medical and Scientific Community Organization (MASCO) is the private area planning group of representatives from 22 organisations in the area: healthcare, academic, private companies, religious and other community groups.³⁹

The organisation was established with great foresight 42 years ago to provide energy and transport services to the medical institutions of the precinct, and has evolved over time (and with the benefit of a large endowment due to a legal dispute in the 1970s) to become a quasi planning body that provides research and planning for the benefit of all stakeholders, as well as co-ordinating transport, traffic and energy services, similarly to the Texas Medical Centre Corporation.

MASCO provides valuable research and planning for the government planning agency, the Boston Redevelopment Authority (BRA), often developing ideas and standards that are subsequently adopted by the city.³⁷

MASCO retains a small asset base (a parking garage and one building) to generate an independent income, and works with all of the member institutions as well as the BRA to ensure that issues relating to development are resolved for the benefit of all parties involved.

The trust required to make this type of relationship work should not be under-estimated – each institution develops their own master plans, and has their own confidential development ideas that MASCO must consider in their planning efforts.³⁷

The LMA is home to a significant number of 'onesies' ³⁷ – twelve sky bridges built as one-off structures to connect buildings above streets to alleviate pedestrian congestion at ground level, and increase staff and patient connectivity within the buildings. These bridges are subject to criticism regarding aesthetics, as well as their effect on vibrancy at the ground plane.⁴⁰

But pedestrian congestion and safety (in particular during the harsh Boston winter) are serious problems with the mingling of patient and visitor traffic with service vehicles and cross-town traffic.

MASCO is currently undertaking master planning work with an external consultant to investigate a multi-level pedestrian system within the precinct that will not only provide internal pathways for staff and patients, but also social spaces for families and colleagues.^{36, 37}



Longwood Medical Area 'onesie', Boston



New research buildings, Longwood Medical Area, Boston

PART 3 - PRACTICE

DISCOVERY DISTRICT, TORONTO CANADA

Population – 5.9 million
Total precinct – 250 hectares
Study area – 31 hectares
Beds – 1000

Advantages

Co-location of incubation, translational research, academia and world class clinical care

Challenges

Superblocks with large, impermeable buildings
Limited retail activity



The Toronto hospital precinct, a world leader in clinical care and research, is architecturally and spatially unremarkable – a number of superblocks of large hospital buildings around ten storeys high line a major boulevard into the CBD.

The buildings are well set back, providing numerous gathering spaces, and the footpaths are generously proportioned. Raised footbridges are prevalent as hospitals seek to move pedestrians around the site safely, efficiently and out of the extreme cold and snow in winter. These are emblems of previous attempts to provide connections between the buildings that is now increasingly addressed by co-habitation within single buildings.

While skywalks are far from fading out of fashion, the trend toward larger buildings to bring researchers and clinicians closer together may result in a lesser reliance on these overhead tunnels in precincts, Boston and Houston notwithstanding.

Despite a high Walkscore, indicating a diverse level of activity and services within walking distance, the precinct appears largely mono-use. It is not far from the CBD, and is surrounded by the University of Toronto and civic functions, but there is limited diversity in the immediate vicinity - the only visible retail is a boutique liquor outlet on the corner of the new MaRS (Medical and Related Sector) building.

This is likely due to prohibitively high rental costs for small retail outlets, similarly to issues at the Longwood Medical Area and Texas Medical Center precincts.

But with 50,000 daily (and highly innovative) employees in the area, and a prolonged high rise condominium building boom in the city bolstering the inner city population⁴¹ it is hard to imagine that a creative approach to funding this type of activity could not be found to break up the hospital superblocks and benefit the public realm.

“The Discovery District is a major economic asset for the city of Toronto and a brand all of its own.”

Erene Stergiopoulos ⁴²



LEGEND Clinical Academic Research Parking&Ancillary

PART 3 - PRACTICE

FOCUS - INCUBATION

After a concerted branding exercise by a private developer of the MaRS Discovery District, the incentive to co-locate in central Toronto has developed to the point where it has claims to the highest concentration of bio medical research in the world.⁴²

In the last 10 years a number of research buildings have been built to take advantage of the synergies with the long established, world class hospitals and the MaRS incubation program: La Ki Shing Knowledge Institute, the Terrence Donnelly Centre for Cellular and Bio Molecular Research and the Peter Gilgan Sick Kids Research Institute, amongst others.

This latest addition designed by Diamond and Schmitt Architects co-locates 2000 staff from six different locations around Toronto specifically to foster interaction between the teams.⁴³

In 2005, fourteen individual investors contributed \$1 million each to a partnership with government, with a vision to develop an intensive bio medical precinct built around an existing but informal health knowledge cluster in downtown Toronto.

The original development of MaRS Innovation in an historic hospital building provided an instant identity for the precinct and with strong support from business and a focus on real estate income to fund incubation facilities, bio-medical research and start up companies have flourished.⁴⁴

This development has not been without problems. The global financial crisis of 2008 stalled works on a second stage of development that has now doubled the amount of incubation space available.⁴⁵ This Stage 2 tower by B+H Architects also became a political issue when the government bailed out the project because tenants could not be found to fill it.⁴⁶

The facility is now open (though largely empty) and, on the day of my site visit, the main entry atrium was teeming with visitors and stall holders for a Canada wide ETSY Craft event. Not your average bio-medical activity, but a lively initiative to provide privately developed space for a public use and to bolster the creative and innovative credentials of the District.

The two square kilometres of Discovery District now employ over 50,00 people, with 22,000 of those directly related to medicine and bio-technology.

"Where once there was an informal community of researchers, facilities are now being designed specifically to get scientists to cross paths and to attract industry investment – the Discovery District is a major economic asset for the city of Toronto, and a 'brand' all of its own."⁴²



PART 3 - PRACTICE

KAROLINSKA, STOCKHOLM SWEDEN

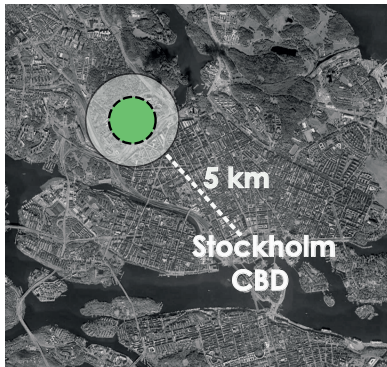
Population – 2 million
Total precinct size – 96 hectares
Study area – 71 hectares
Beds – 600

Advantages

Brand new facilities
Strong vision and partnerships
between city, university and
hospital

Challenges

Lacking mixed use



The New Karolinska Hospital, a multi-building project designed by White and Tengbom Architects is the catalyst project for the regeneration of a disused industrial area at the edge of central Stockholm.

Due to open in 2017, it is the largest single hospital development site in Europe and the largest Public Private Partnership in Sweden to date.

Previously surrounded by car parking, major roads and a significant area of parklands, the old hospital precinct is isolated and removed from the city, which is surprising given the general reputation the Scandinavian cities have for walkability.

This isolation is addressed explicitly in the new plans for the site, with redevelopment bringing the clinical and academic zones closer together, and adding a mixed development of commercial, industry, residential and public spaces to form a new district, Hagastaden.

The hospital is located adjacent to the world renowned Karolinska Institute, a university dedicated to medical sciences, and home to the committee that adjudicates the Nobel Prize for Physiology and Medicine each year.

The Institute is undergoing a significant development phase in tandem with the hospital. The addition in recent years of large multidisciplinary research and teaching facilities includes the Aula Medica auditorium, which physically reaches out to the new hospital across the road.

When development is complete, a major pedestrian thoroughfare Akademiska Straket (Academic Way) will run from the Aula Medica to the hospital precinct, strengthening the important link between academia and clinical care.

**“Akademiska Straket
will bring the academic
campus into the hospital”**

Jonas Nordquist, Karolinska Institute⁴⁷



LEGEND Clinical Academic Research Parking&Ancillary

PART 3 - PRACTICE

FOCUS - CITY INTEGRATION

The City of Stockholm's Vision 2030⁴⁸ imagines the Karolinska-Norra Station district as one of the world's foremost life sciences centres. But the site falls predominantly within the boundary of the adjacent City of Solna (66 hectares, compared to 30 in Stockholm), so the project has required a long lasting (13 years to date) co-operative effort between the two cities.⁴⁹

Five billion Euros will be invested in housing, workplaces and road and rail infrastructure in the coming years to transform the former industrial district, separated from the city of Stockholm by a major freeway, into a regenerated life sciences cluster.⁵⁰

One of the major principles of the development is that "the hospital and its activities shall be assigned an explicit high-priority role in the city".⁵¹

This undertaking includes a significant amount of ground level decking between the hospital and the city of Stockholm, built over the top of a no-man's land of freeway and rail yards. The main hospital building will form the focal point of the area's new city square, Hagaplan⁵¹ which will be surrounded by housing, commercial and public use developments.

By 2025, Hagastaden is projected to have bridged the gap between the two cities, and the green link – Akademiska Straket – will run through the heart of the hospital site, integrating the academic and clinical zones.⁴⁹

While the regeneration project progresses steadily towards one of its major milestones, the opening of the hospital, co-ordination and development of the other major spaces and buildings of the project are proving more challenging.

Complicated land ownership and stakeholder relationships in such a large and multi-faceted project create significant uncertainty for the design of the interstitial spaces according to Charlotte Ruben of White Architects:

"No-one is formally looking after the public spaces. White Architects have tried, but we are only responsible for the hospital site. It is of great importance that these public and informal meeting places are valued and defined in early stages in order to be taken care of in the normally tough competition while programming space in the planning process. In hospitals- the treatment environments and functions usually win – just because of lack of awareness."⁴⁹



New Karolinska Hospital, Stockholm



New Karolinska Hospital and the Aula Medica, Karolinska Institute

PART 3 - PRACTICE

HOPITAL NECKER ENFANTS- MALADES, PARIS, FRANCE

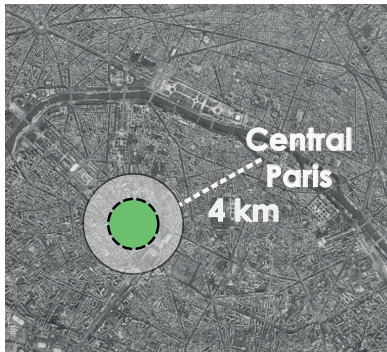
Population – 12.2 million
Total precinct size – 9 hectares
Study area – 9 hectares
Beds – 600 beds

Advantages

City integrated small site,
Highly walkable,
High-density development

Challenges

Limited land for expansion
Permeability



The Hôpital Necker Enfants-Malades is the oldest paediatric hospital in the world, founded in 1778. The current site was established in the 1920s and has recently undertaken a major reconstruction program to address the decay of old buildings, and an inward focus that was hampering integration with the surrounding urban fabric.⁵²

"The challenge was to achieve a vast upheaval to overcome the hospital's lack of relationship with its surroundings and open it into the city, while also carrying out an in-depth metamorphosis to adapt to its new requirements".⁵²

The redesign reduces the building footprint on site by creating a large park in the centre (almost one hectare), to be completed later this year, and replacing the lost floor space by building up on two smaller footprints.

The first new building, the Laennec Mother Child Center, designed by Philippe Gazeau, doubles the amount of space for the maternity and neonatal services.

The second building, the Imagine Institute of Genetic Diseases, designed by Valero Gadan Architects and Ateliers Jean Nouvel was designed specifically to encourage interaction between researchers.⁵³

While the new buildings may be achieving their aims of combining research and care for fast 'bench to bedside' results, the integration of the site with the surrounding urban fabric is compromised by the detailing.

The perimeter fencing to the site is high, aggressive and extensive, allowing only limited access to and permeability through the site. With large footprints and few entrances, the new buildings create a significant barrier at the public edge.

And while the glazed greenhouse detailing at the footpath edge of the Laennec building may protect the building users from city noise as intended⁵² and provide a literal window into the research process, the floor level is below the ground plane, creating the uncomfortable situation of pedestrians looking in at staff from above.

"The whole place was suffering from asphyxia"

*Philippe Gazeau, architect*⁵²



LEGEND Clinical Academic Research Parking&Ancillary

PART 3 - PRACTICE

FOCUS - DENSITY

As the smallest case study site, and located in one of the great walkable cities of the world, the Necker in Paris illustrates the benefits of city density while simultaneously dealing radically with the challenges of congestion.

"The whole place was suffering from asphyxia" according to Phillipe Gazeau, architect of one of the site's two new buildings.⁵² Unplanned post war reconstruction in the 1950s resulted in a jumble of buildings that made orientation difficult, and a site that lacked a "vision for Necker".⁵²

Recognising the unsuitability of the facilities for modern medical care and translational research, but also needing to expand capacity on a constrained site, the new Necker translates density from the horizontal to the vertical – going up, instead of out.

The redevelopment project is a small but concise example of the trends in health knowledge precincts - larger building footprints, taller buildings, the cohabitation of clinical facilities and translational research, and centralised public space to encourage interaction on site.

The population density for Paris is roughly 3,900 people per square kilometre, compared to 1200 for the city of Houston,⁵⁴ and as a result, the Necker precinct is surrounded by an intense mix of every day activity – businesses, restaurants, supermarkets, schools, parks, and transport connections.

At the same time, the hospital buildings contain 32 centres for treatment of rare diseases and five percent of the French national medical research units. This tiny site houses 600 hospital beds, 600 researchers and produces 1100 publications a year.⁵⁵ Density indeed.

It may well be that the Necker has achieved one of its redevelopment aims at the expense of the other – becoming more welcoming and less congested within while becoming less integrated with the surrounding city.

The public spaces within the Necker precinct will be enhanced, creating opportunities for researchers to meet and gather, but the city pedestrian environment has been left to fend for itself.

Luckily for Parisians, the next block along in any direction is likely to provide a visual delight, a gastronomic opportunity or practical everyday shopping activity to make up for it.



Hôpital Necker Enfants-Malades entrance, Paris



Fencing around Hôpital Necker Enfants-Malades, Paris

PART 3 - PRACTICE

PARKVILLE PRECINCT, MELBOURNE AUSTRALIA

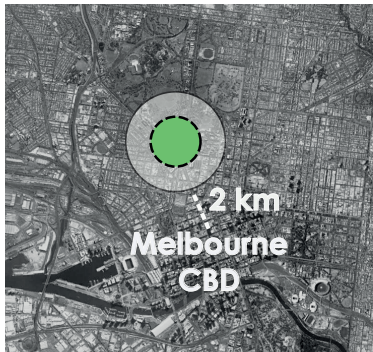
Population – 4.2 million
Total precinct size – 60 ha
Study area – 25 ha
Beds – 1100+

Advantages

Activated mixed-use location,
Public transport connections,
Strong institutional relationships

Challenges

Pedestrian circulation
Limited expansion space



Much smaller in scale to most of the other precincts, the Parkville Health Precinct exemplifies the two facets of proximity – co-location of clinical, academic and translational research facilities combined with a diverse, mixed use community – parkland, residential development, commercial, retail uses, and excellent public transport links to the nearby CBD.

What Melbourne has in common with many of the knowledge centres around the world is a central urban location with a strong socio-cultural legacy, largely arising from its co-location with the University and the vibrant surrounding suburbs of Carlton, North Melbourne, and the CBD.¹

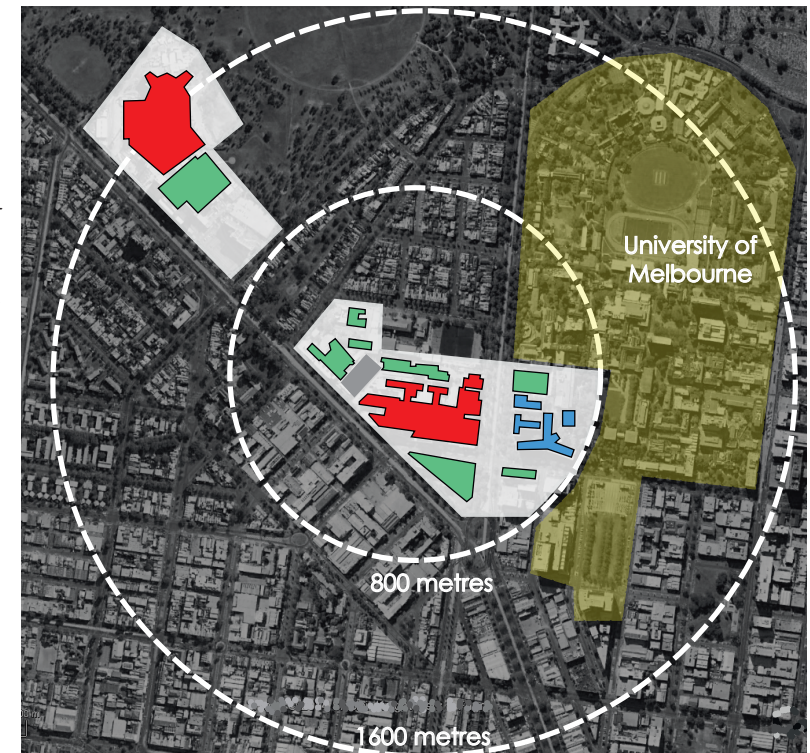
Public pedestrian and open space in the Parkville precinct is limited, with the exception of Royal Park. The hospital site itself is small enough that the mostly peripheral circulation paths provide short walks between buildings (excluding the new Royal Children's Hospital to the north west), but larger gathering spaces are further afield, within and adjacent to the university.

The footpaths are crowded with patients, staff, visitors and students, but also construction crews and equipment while building of the Victorian Comprehensive Cancer Centre, a combined research and clinical facility, continues.

The VCCC building, designed by STHDI + MCR, will accommodate the Peter MacCallum Cancer Centre, as well as research and clinical care facilities for Melbourne Health and the University of Melbourne. The building is situated on a triangular island between three major roads, and will connect to the Royal Melbourne Hospital via two large walkways across Grattan Street, the first skybridges of their kind in the precinct.

“Melbourne has the potential to become the Boston of the Southern Hemisphere.”

Yigitcanlar and Dur⁵⁶



LEGEND Clinical Academic Research Parking&Ancillary

PART 3 - PRACTICE

FOCUS - CO-LOCATION

Australian examples of knowledge-based clusters, including Parkville, are less planned than their counterparts in Asia and Europe.¹

Parkville in particular has grown organically over a long period of time - The Royal Melbourne Hospital was established in 1848, and the University of Melbourne in 1855.⁵⁷

The development of inner Melbourne well before the advent of the car gave the precinct good bones – small blocks for permeability and walkability, and natural site containment from the surrounding inner suburbs.

Adjacency to a world-class university gives the precinct convenient access to a highly skilled labour pool, with all its attendant collaborative, creative innovation advantages described by Richard Florida.¹⁹

Health and education make up the bulk of the employment sector for the suburb - Health care accounts for 62.7 per cent (16,000 people), with education at 18.2 per cent,⁵⁸ so it is not surprising that the Parkville Health Precinct is one of six critical employment and economic growth centres identified for Melbourne as part of the State Government's metropolitan planning policy, Plan Melbourne.

"The Parkville Cluster is an established, internationally acclaimed cluster that is close to the city with opportunities to facilitate the continued supply of appropriate land for commercial, housing and knowledge based enterprises."³

As the site of numerous recent developments, construction traffic must seem to locals to have become a permanent fixture around the streets – the VCCC (2015), Doherty Institute (2014), Brain Centre (2011), Royal Women's Hospital, (2008), Royal Children's Hospital (2011) and an upgrade of the Walter and Eliza Hall Institute (2012) have all occurred in the last six years.

Clearly the lure of translational research opportunities is strong, and with an economy that has survived the worst of the recent Global Financial Crisis, Melbourne is well placed to continue its strong performance in collaborative health innovations – or, as one academic paper puts it, "has the potential to become the Boston of the Southern Hemisphere".⁵⁶



PART 3 - PRACTICE

GOLD COAST HEALTH PRECINCT, SOUTHPORT, AUSTRALIA

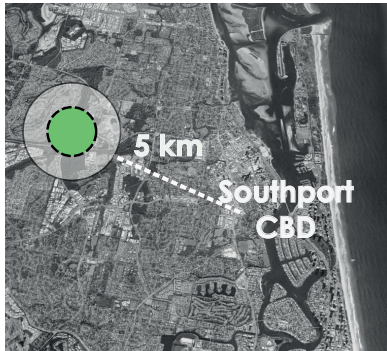
Population - 600,000
Total precinct size - 130 hectares
Study area - 51 hectares
Beds - 700

Advantages

Open space and circulation
High quality facilities
Expansion capacity

Challenges

Immature site
Lack of industry research



Built on 20 hectares of suburban land that contained a variety of community and government facilities, the new Gold Coast University Hospital (GCUH) is the centerpiece of the designated Gold Coast Health and Knowledge Precinct: 130 hectares incorporating Griffith University, three hospitals (GCUH, Robina Hospital and a private hospital now in construction), plus the Smart Water Research Facility and a yet to be built mixed use development.⁵⁹

This activity centre will provide infrastructure for the 2018 Commonwealth Games, and in the longer term form the residential, commercial and retail component of the Precinct.

The Games village will contain 1200 apartments and a town centre, and will connect to the Southport CBD by a new light rail line that terminates between the hospital and the university.⁶⁰

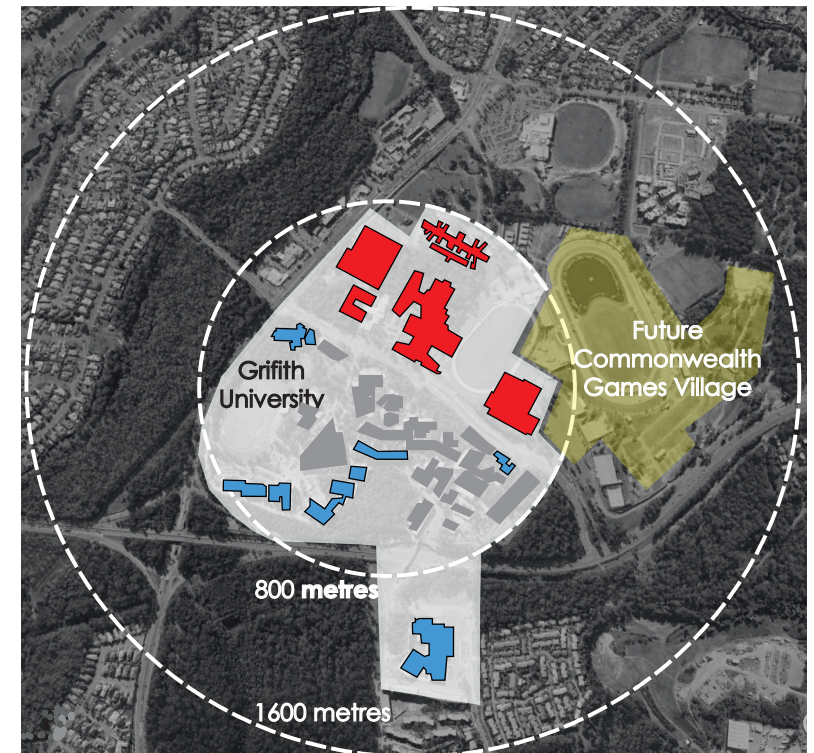
The light rail system is a crucial element not only for the precinct vision, providing students with an accessible transport alternative to the car, but also for the Gold Coast as a whole.

Once there, either by car or light rail, pedestrians are well catered for with generous public spaces on both small and large scale.

But currently, without diversity in activity, there are only limited places to walk – to the hospital, the university and the park. This will change over time as the community grows around the hospital, but the danger is that the development will be too slow to support new businesses and activities.

“The opportunity to integrate with the university prevailed as an important part of the vision.”

Adam Davies, HASSELL ⁸⁶



LEGEND Clinical Academic Research Parking&Ancillary

PART 3 - PRACTICE

FOCUS - VISION

The Gold Coast City Council and Queensland State Government are vigorously pursuing a vision of a more diverse economy for the Gold Coast, which has previously been heavily reliant on tourism.⁶⁰

Built adjacent to Griffith University, the new hospital is in some respects well placed to further this economic development, although its location brings with it some significant challenges - namely attracting talent and investment to a regional centre, and a heavy reliance on cars for transport.

Opinions on the viability of the vision vary, with some contending the Gold Coast is a rapidly growing area with its own distinct character (coastal, relaxed lifestyle) that will attract young professionals⁶¹ while others contend that the isolated suburban site will not grow fast enough to support mixed use development,⁶² and its proximity to other more established health knowledge centres in Brisbane (an hour away) will make it difficult to attract staff.⁶³

The vision for the precinct is of a different nature to the predominantly inner urban precincts in this study. The Gold Coast Health and Knowledge Precinct is conceived at a much larger scale – it includes the Robina Hospital, which is 21 kilometres away, so could be more accurately described as a Knowledge Region. Land is more plentiful, cars easier to move around, and the population density much lower. The land-poor inner city precincts develop and maintain much more intense activity, where interaction is interpreted at a much more personal level.

This raises important questions regarding the practicalities of adopting in a suburban location a vision of a hospital knowledge precinct model that has been shown to be suited to inner urban, walkable neighbourhoods.

In his exploration of radical development in health precincts, Byrne⁶³ suggests that the GCUH, with flexibility of siting and design, was a missed opportunity for town centre development in Southport, which would have provided considerably more diverse activity around the

hospital. Adam Davies, of HASSELL, the designers of the hospital, contends that the opportunity to integrate with the university prevailed as an important component of the precinct vision for research collaboration and innovation.⁸⁶

But, vision or no vision, not every successful hospital cluster can become a beacon of innovation, as the Texas Medical Center can attest to.

Only time will tell if the vision of an integrated mixed use community and health knowledge precinct will come to fruition at the Gold Coast, but in the interim, the hospital benefits from a high quality public realm that provides public spaces from the very small scale, to the large open park that, when it matures, will provide patients and staff shady respite from the hospital environment.



Gold Coast University Hospital street sign



Gold Coast University Hospital gardens

PART 3 - PRACTICE



PROXIMITY



THE THREE ELEMENTS OF CONNECTIVITY

The literature review revealed three elements that are crucial to the connectivity required to enable collaboration in a precinct:

- **Proximity**
- **Interaction**
- **Quality**

This section seeks to measure the elements of each on the sites.

First things first. While technology connects people across the globe in a bewildering network of virtual worlds, with amazing results, knowledge precincts emerge because the easiest and most effective way to collaborate with someone is to stand beside them to talk and work.

Synergies from co-location have long been recognised, and much research has been undertaken to determine optimum distances for walking and for working.

Walking distances

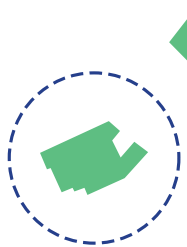
Measure - size of precinct

Studies relating to walking distances indicate that distance is the single most important factor in whether people decide to walk or drive to a destination, more than weather, safety, or physical difficulty.⁶⁴

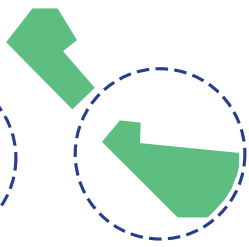
Distances anywhere between 400 metres⁶⁸ and 1200 metres⁶⁶ are suggested to be walkable, depending on the environment and motivations.

One study⁶⁷ indicates that people are willing to walk longer distances to work than for leisure activities, but does not specify how far people are willing to walk while they were **at** work, which is likely to be constrained by time, and therefore distance.

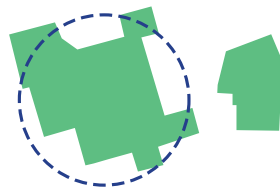
For the purposes of this study, a catchment of 800 metres diameter (10 minutes walk across the precinct) is considered suitable for healthcare professionals, and most of the precincts are entirely or predominantly within this zone.



Paris
9 hectares



Melbourne
25 hectares



Toronto
31 hectares



Manchester
39 hectares



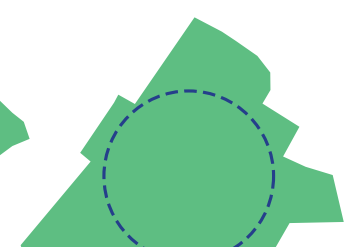
Gold Coast
51 hectares



Boston
54 hectares



Stockholm
71 hectares



Houston
130 hectares

PART 3 - PRACTICE

Co-location, mixed use and density

Measure - Walkscore

A walkable site requires good pedestrian links and gathering places along them to stop to talk, but they also need people with reasons to use them, whether that be for work or other purposes. "When tested by itself, connectivity may show little relationship with walking. When tested in concert with other design elements like proximity to mixed use, connectivity has a significant impact on walking."¹⁰

Medical professionals often have multiple roles – clinician, researcher, lecturer. Proximity of related institutions facilitates an

easy flow of staff between buildings and raises the visibility of activities, potentially triggering collaborations that may not have previously been considered.

The availability of retail and services provides opportunities for both precinct users as well as the surrounding community to travel within and through the precinct. Creative people, including scientists, thrive in a creative milieu,¹⁹ so access to retail, cultural, and dining activity provide options for workers.

Proximity to mixed use is becoming easier to accommodate in some ways - with the burden of healthcare shifting from infectious to lifestyle

disease over this century⁶⁸ the role of hospitals is changing. Hospitals no longer adhere to the modernist principle of being machines to make you well, nor the grand Victorian institutional model where physical separation is required from the populace. Gated hospital grounds on the periphery of a city are not necessary, which is fortunate, given that many cities have grown significantly, and now contain the hospitals at their heart.

But some healthcare facilities, including some in this study, still maintain a degree of separation from the urban fabric by way of physical barriers: blank walls, gates, expanses of car parks and

superblocks of intimidating institutional buildings.

Fortunately, many are re-designing to overcome these barriers, although high land and building costs make the viability of mixed use development difficult in central areas.

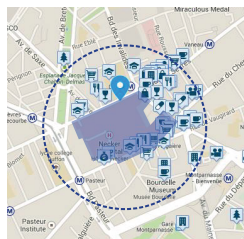
One simple method of analysing an area's performance in all of these well-established factors is Walkscore, a publically available online measurement of the walkability of a neighbourhood. Points relating to population, land use, intersection density, block length, and route distances are awarded in five categories – education, retail, entertainment,

recreation and food. Walkscore ranks an address with a score between zero and 100, where above 80 indicates a walker's paradise, and below 50 a car dependent neighbourhood. Amenities within a five minute walk are given maximum points.⁶⁹

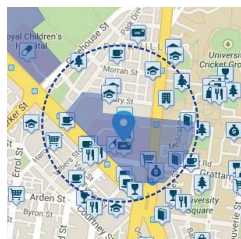
While there are criticisms of the Walkscore methodology – it doesn't account for safety, topography, aesthetics, noise or public transport, and is entirely dependent on available data⁷⁰ - it has been independently validated as a reliable, convenient and cost efficient method to objectively measure walkability.^{71,72}

Each blue icon indicates an amenity or service from the five categories of education, retail, entertainment, recreation and food

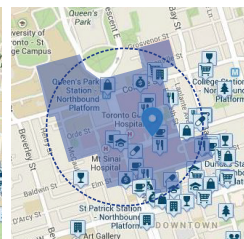
Images from Walkscore at www.walkscore.com



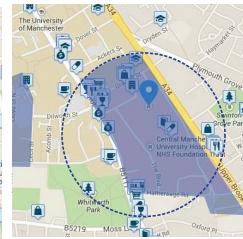
Paris
Walkscore 98



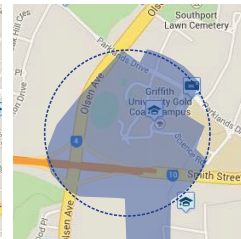
Melbourne
Walkscore 82



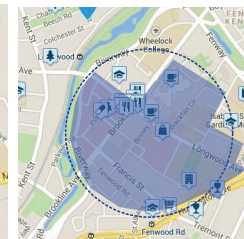
Toronto
Walkscore 97



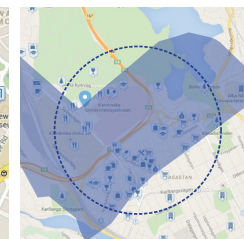
Manchester
Walkscore 98



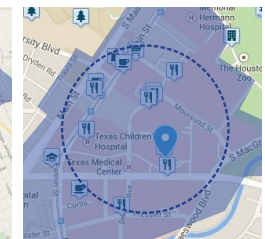
Gold Coast
Walkscore 57



Boston
Walkscore 97



Stockholm
Walkscore 51



Houston
Walkscore 65

PART 3 - PRACTICE



INTERACTION



“Hospitals with long corridors encourage conversations. Lifts don’t - they make people clam up.”

Keith Chantler, Manchester Royal Infirmary ²⁸

Footpath intersection density

Measure - Intersections per hectare

It's probably not surprising to read that half of all car accidents happen at intersections.⁷³ Workplace designers are vigorously co-opting this unfortunate statistic into workplace theory – collisions between work colleagues are the aim of the innovation game, and to procure them they are providing intersections of corridors with niches, stairs, gathering places: bump spaces.

More intersections means more bumps, and it applies as equally to the workplace as it does the road or footpaths.

In a major analysis of studies into travel and the built environment,¹⁰ it was discovered that of all measures, intersection density had the most significant effect on walking – more than population density, distance to a shops, transit stops, or jobs within a mile. This, of course, appears contrary to the research from the previous section that contends that distance to destination is the most important factor – what to conclude?

That both are important and that both must be considered in context: if my destination is too far, I will not walk to it. But if it is within a walkable distance, then the more paths I have to choose from, the more likely I am to walk.

It is worth noting that intersection density and distance are linked. More intersections equates to shorter paths to more destinations. In grid networks with short blocks, pedestrians have more options to vary their route and to return along a different way compared to hierarchical street networks with curved streets and cul-de-sacs.¹⁰

With more intersections comes greater choice and shorter travel times, but also, importantly, an invitation for conversation.

In Vanderbilt's exploration of pedestrian habits, he notes the importance of street corners for all manner of activity - in the television series *The Wire*, “drug slingers battle for control of Baltimore's choicest retail outlet: “them corners” offer strategic advantage; double the traffic, better sightlines, more escape routes, and the presence of businesses, magnets for potential customers.”⁷⁴

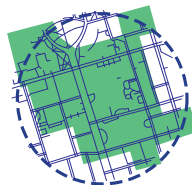
While hoping that not too much drug dealing is going on in the great hospital precincts of the world, the opportunity for interaction is obviously greater with more paths intersecting.



Paris
2.93 int/hectare



Melbourne
2.73 int/hectare



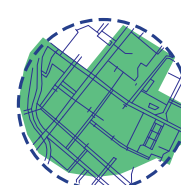
Toronto
2.15 int/hectare



Manchester
1.85 int/hectare



Gold Coast
2.03 int/hectare



Boston
2.51 int/hectare



Stockholm
1.02 int/hectare



Houston
1.39 int/hectare

PART 3 - PRACTICE

Gathering space provision

Measure - People stop to talk in both the most and least obvious places, but photographs tell the story of the good, the bad, and the ugly of public spaces.

The street corner is a great place to bump into someone, but a precinct also needs a variety of places to withdraw from the traffic to enable these interactions to become meaningful conversations.

These don't need to be large. In fact Gehl¹¹ argues that large open spaces are destructive to pedestrian activity, and urbanist William H Whyte pondered the overabundance of studies into overcrowding and the dearth of investigations into under crowding.¹³ But the public spaces should provide opportunities to relax, talk, watch, participate.

Coffee is a good start, but not the only option: a seat with a view, a pocket park to eat lunch, a corridor niche with a ledge for a computer, an incubator facility with bookable space, or just a tree to seek shade.



Royal Melbourne Hospital



Gold Coast University Hospital courtyard



University of Manchester



Perimeter fencing, Hopital Necker Enfants-Malades



Footpath, Manchester



Footpath priority for cars, Texas Medical Center



Pedestrian crossing, Longwood Medical Area

PART 3 - PRACTICE



QUALITY



There are other elements of the pedestrian journey that affect the walking experience: topography, ease of street crossing, connectivity and footpath continuity,⁷⁵ as well as noise, close or heavy traffic, views, places to stop, security, protection from weather, and other less obvious but still influential subtleties. Who wants to walk past the dusty construction site, or the six-lane road?

The quality of urban design cannot easily be measured, although many have tried.^{75,76} Footpaths and open space can, however, be observed and critiqued on three criteria:

- **Safety**
- **Comfort**
- **Aesthetics**

Safety, Comfort, and Aesthetics

Measure - Photographs, refer throughout

Pedestrian separation from vehicles is the crucial safety issue in city precincts, but continuity of footpaths, passive or active surveillance and adequate lighting must also be provided as a basic requirement for the security of person and possessions. Manageable topography, places to withdraw from traffic and way-finding signage are also important. People need to be comfortable, or they won't walk.

While climate is often raised as a problem for walkability – too hot in Houston, too cold in Stockholm, too much snow in Toronto – Jeff Speck⁷⁷ contends that evidence would suggest the link is not as strong as might be expected:

“What North American city has the most linear feet of successful retail-fronted sidewalks? Toronto. What developed country has the highest share of urban trips going to walking instead of driving? Sweden. How many months out of the year do sidewalk cafes

stay open in Copenhagen? Twelve. Get the design right and people will walk in almost any climate.”

Hospital precincts do have added sensitivity to climate because of the vulnerability of patients and some visitors that necessitates private, efficient and protected pedestrian thoroughfares. This goes some way to explaining the proliferation on many of the sites of ‘onesies’,³⁷ one off skywalks that bridge the gap between buildings above ground level.

And as for architectural quality, maintenance and views, well, of course it has to look good!

If you had to choose between walking around a precinct in the centre of Paris with a view of the Eiffel Tower, or a dilapidated muddle of 1960s concrete buildings beside a major arterial road, which would you prefer? Fortunately for Mancunians, the Royal Manchester Infirmary has just had a major redevelopment.



Emergency Department entrance, Manchester Royal Infirmary

PART 3 - PRACTICE

SITE COMPARISON

Walkscore

The Walkscores for the districts in Boston, Toronto, Manchester, Paris and Melbourne are high – Walker's Paradise – which is not surprising given their location near the centre of cities established before the car began to dominate city planning.

Karolinska's low score reflects its parkland setting, despite the dense street patterns of the city of Stockholm just a few kilometres away. The Walkscore is likely to significantly improve as the hospital redevelopment and regeneration of the Norra Station area progresses.

The low score for the new Gold Coast Hospital area is also indicative of a yet to be realised mixed use vision. The Texas Medical Center's low score tells the story of post-war car dependent development, and a very large mono-use institutional format.

Intersection density

The intersection density scores show generally predictable results. The inner urban precinct intersection densities (Paris, Melbourne, Boston) are generally higher than those further from the city centre (Houston, Stockholm) although the Stockholm pedestrian paths were difficult to map due to ongoing construction works. The low number is indicative of the existing parkland network and is likely to grow significantly as the precinct develops.

The Gold Coast figure is higher than might be expected, driven up by a concentrated and extensive pedestrian network on the landscaped campus of Griffith University. Around the hospital, the network is relatively simple and sparse.

Raised pedestrian networks and skybridges such as those in Boston and Houston are not included in the footpath density results.

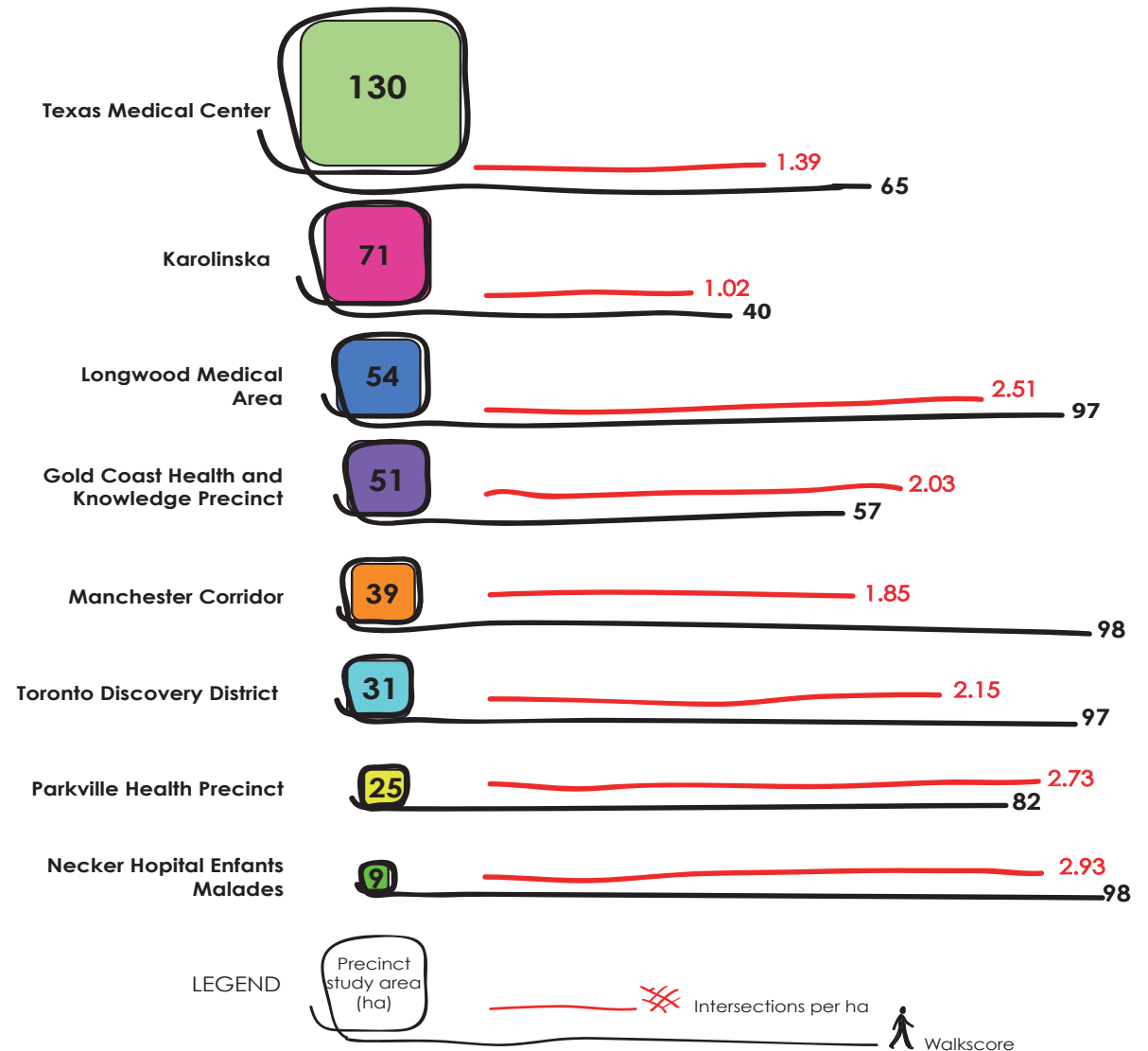
Generally the pedestrian networks are much more extensive around adjacent university campuses, and also in locations where the hospitals are located within city street grids where footpaths are supplied on both sides of the road, and at regular intervals.

PART 3 - PRACTICE

SITE COMPARISON

What can most readily be seen is that the larger the precinct, with the exception of the LMA in Boston, the more difficult it is to achieve good walkability. Boston, however, has significant pedestrian congestion, that contributes to safety issues.

A correlation can also be seen between walkability and pre-war development, as those hospitals developed this century on greenfield or similar sites- Karolinska University Hospital (1940s), Texas Medical Center (1940s) and the Gold Coast (2013) - all score poorly on Walkscore.





Gold Coast University Hospital, Southport



PART 4 - THOUGHTS



THE VALUE OF PUBLIC SPACE

William H. Whyte believed that “the social life in public spaces contributes fundamentally to the quality of life of individuals and society. He suggested that we have a moral responsibility to create physical places that facilitate civic engagement and community interaction.”¹³

The value of public space, of course, is notoriously difficult to quantify, and consequently, to advocate for, although the Commission for the Built Environment in the United Kingdom has made a number of very strong contributions to research in this field.

Perhaps its value is best understood in areas where there is bad, or non-existent public space – nowhere to comfortably sit, talk, walk, or eat away from the workplace and home. We are all familiar with places and spaces like this.

Accepted as good practice in the workplace, the translation of the ‘third space’ idea to the precinct scale sputters ahead in ad hoc fashion. Many designers and administrators understand the concepts of co-location and collaboration, but struggle to implement them in their locations because of the complex stakeholder relationships, as well as the physical, financial and institutional barriers to holistic precinct planning.

While Byrne⁶³, in his scathing assessment of the siting of the Gold Coast University Hospital development, laments that hospital executives don’t understand the role they play in city making, the interviews and written visions from the case studies herein would suggest otherwise.

City making, whilst staying within budget and working with a number of government agencies, private landholders and many other stakeholders is an incredibly complex task, and even the most innovative, collaborative, lively hospital knowledge precincts will make a few missteps along the way.

The Necker Hospital redevelopment in Paris typifies this struggle: the hospital buildings and site have been improved while short-changing the urban realm beyond the boundary of the site, despite an explicit desire from the outset to address it.

The ideas for these and other health knowledge precincts are often sophisticated and well considered, but can get lost in translation during design and implementation, particularly at the periphery - public space within the confines of a single institution (such as that which can be seen in Manchester, Paris, and the Gold Coast) is easier to realise than public space on the perimeter or beyond.

Yet, the case studies also offer fine examples, large and small of how to provide and enhance public spaces:

- The courtyard gardens for quiet conversation at Gold Coast University Hospital
- The lively interface of translational research and students on Oxford Street in Manchester
- Provision of a major public square at the front entrance to the Karolinska Hospital
- Patterned detailing of the Longwood Medical Area pedestrian crossings

- Out-of-hours use of facilities for community events at MaRS Innovation in the Discovery District
- A centralised park for children to play in at the Necker Hospital
- Lush and colourful planting along the footpaths of the Texas Medical Center
- The generously proportioned lane with seating beside the Brain Centre in Parkville

These efforts help to shape the cultural identity, unique character and sense of place for the users and local community around these precincts, and point to a generally higher awareness of the value of public space than perhaps was previously present.

PART 4 - THOUGHTS

TRENDS IN PRECINCT DESIGN

The research has uncovered a number of trends in hospital precinct design – changes in the way they are conceived, designed, and used.

These changes are driven by two quite separate forces: from the inside out, where changes in clinical practices and research methods are transforming building form and location, and from the outside in, where the community demands that a hospital precinct perform an economic role, as well as a health infrastructure role.

The trends evident in international precincts are as relevant to, and present in, the Australian context as any other. While Australian hospital knowledge precincts are not all under such extreme city expansion pressure as some of the international sites visited ('though some are), growth issues will be a problem sooner or later. It is this institutional growth that drives the following four major trends:

- 1. Internalisation and the rise of translational research**
- 2. Going up and going out**
- 3. Centralised public space**
- 4. Precinct planning**



Manchester Children's Hospital atrium

PART 4 - THOUGHTS

TREND 1- INTERNALISATION AND THE RISE OF TRANSLATIONAL RESEARCH

Translational research buildings and clinical settings are internalising interaction. This is attractive from a workplace perspective, but not necessarily conducive to a collaborative precinct.

Many of the institutions in this study have recently undertaken significant capital expenditure on translational research buildings.

Translational research is an emergent science model that focuses on translating findings from basic research into practical applications in health: basic and clinical researchers are co-located to work in teams on a five step continuum from basic scientific discovery to adoption and commercialisation.⁷⁸

This type of research is dependent on close ties between government, commercial and academic interests for funding, infrastructure and services.⁷⁹ The US has a long tradition of university owned hospitals and generous philanthropy for health care infrastructure – research buildings at the Texas Medical Center are substantially funded by (friendly) competitive philanthropy from the oil barons of Houston.⁸⁰

In the UK, where the government recently increased translational research funding by 30 percent, the National Institute for Health Research aims to bring together

the formerly separated health and academic sectors.⁸¹ Partnerships between universities, private bioscience companies and hospitals are now common: Bio21 in Parkville, the University of Manchester Bio-Science Incubator, MaRS in Toronto etc.

The effect of this changing model on clinical and research buildings is apparent around the world. In order to more closely integrate the translational research teams, imaging facilities, clinical labs and treatment facilities are being brought together, either within the precinct (co-location) or, as appears to be a discernible trend, within the same building (co-habitation).

The new VCCC building in Parkville will bring a number of cancer treatment and research bodies together, the Necker Mother and Child unit in Paris and the research facilities within the Manchester Children's Hospital do the same.

This co-habitation model for translational research borrows directly from the commercial workplace theory of 'bump space', where innovation is driven by direct interaction and collaboration between teams and individuals. The buildings now housing these larger multi disciplinary teams provide formal and informal spaces to congregate and exchange ideas, but lessen the opportunities for outdoor excursions.

The implications for precinct planning are significant. The important connections between researchers and clinicians are being considered in a fundamental way within the building.

Lobby, common areas and circulation spaces inside the buildings have become crucial connection points for those within, and raised walkways between buildings and across roads are encouraging efficient circulation in an interior environment.

In the Texas Medical Center master plan, hospitals are advised to make provision for inter-building circulation and services at levels two and three as a matter of course.⁸²

At The Brigham Building for the Future in Boston, 11 storeys of clinical and laboratory space will connect to the existing hospital campus via the "Pike," a 400 metre long internal pedestrian circulation system.⁸³

As efficient as these systems may be for the hospitals, there are implications for the ground plane of both these precincts that struggle to generate enough transactions to support more than a handful of restaurants and retail in a precinct with a daily influx of people the size of a small city.




And with a loss of small-scale activity, the goals of de-institutionalisation and mixed-use activity become that much harder.

PART 4 - THOUGHTS

GOING UP AND GOING OUT

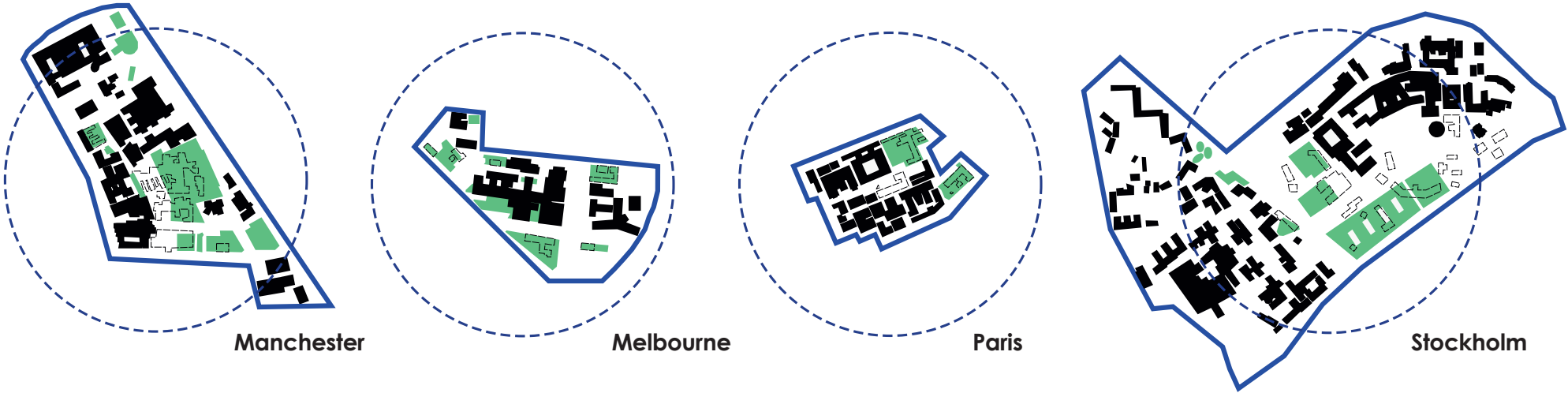
Site development 2000-2014

Gold Coast University Hospital not included as it is a fully new development.

-  New buildings
-  Existing buildings
-  Demolished buildings



GOING UP - INDICATIVE PRECINCT SECTIONS



GOING OUT - INDICATIVE PRECINCT PLANS

PART 4 - THOUGHTS

TREND 2 - GOING UP AND GOING OUT

Buildings are getting bigger and taller, increasing the number of people on site significantly. This has positive implications for interaction, but the management of congestion and quality of public space become critical.

A prime example of the 'going up' model of translational research is the Peter Gilgan Sick Kids Research Institute in Toronto, which has brought six separate but related research teams into one 21 storey building.

High rise laboratory buildings such as this have been rare until recently, but with the surge toward translational research occurring in tandem with many hospital precincts reaching the limits of their outward expansion, both research and clinical settings are increasingly turning skyward.

The North Western University medical precinct in Chicago exemplifies the vertical campus, with a number of high density facilities integrated into the high density downtown area,⁸⁴ with a new 21 storey translational research building to begin construction in 2015.

The vertical development of the health precincts in Toronto, Boston and Houston in the last decade is indicated in the diagrams on the previous page – two are severely constrained as CBD sites with limited land available for expansion, while the Texas Medical Center is expanding both outward and upward.

The Memorial Herman Medical Plaza there, built in 2007, tops out at 31 storeys, and the new MD Anderson Cancer Center Mid Campus building is 25.

In Toronto, the two latest additions (Peter Gilgan building, and the MaRS Phase 2 tower) are 22 and 21 storeys respectively. In Boston, the heights are more modest - the Yawkey Center for Cancer Care and the Brigham and Women's Building for the Future are 14 storeys.

“Street life is drastically reduced when small active units are superseded by large units”

Jan Gehl ¹¹

While growing up doesn't necessarily mean decreased public space (because dense cities often have small building lots), it does mean more people to use the existing public space.

Density of people in a public space is beneficial for activity and also for generating the collisions identified earlier, but overcrowding and congestion on footpaths is one the major problems identified in the Longwood and Parkville precincts.

This is primarily a safety issue around hospitals, with heavy traffic for services, staff and patients mingling with pedestrians. A fine balance must be struck, with careful consideration of the optimal use of public space at the ground plane.

On those sites with available land, and even on those with limited land supply, it is strikingly obvious that the footprints of healthcare and research buildings are growing significantly. This can be attributed to a number of factors: economies of scale; centralisation of tertiary care facilities, and co-habitation of research and clinical services.

The larger footprints of buildings create barriers to permeability, affecting the fine grain networks of paths that can facilitate easy movement around the site, and the niches where respite from busy traffic can be found.

*"They should do this more often."
"Yeah, we should get up and
dance!"*

Pedestrians, Longwood Medical Area



Music on Blackfan performance series, Boston



Merck Laboratories, Boston

PART 4 - THOUGHTS

TREND 3 - CENTRALISED PUBLIC SPACE

Circulation/pedestrian 'spines' (internal and external) are becoming a common design response to building up and building out.

These centralised spaces provide opportunities for gathering, retail and other uses, but coupled with larger building footprints can lead to a loss of fine grain movement networks, making external connectivity more difficult.

The current focus on internal circulation and gathering spaces should not distract from the equally important public realm and external spaces of these precincts. An appropriate urban response is not mutually exclusive to individual building solutions.

While internal spaces are crucial to collaboration, they only promote socialisation to those with access. Accessible public realm allows clinicians, academics, and researchers to socialise beyond the individual buildings that form their workplace.

In Boston ten years ago, Merck bucked the trend of locating biomedical research facilities in the Cambridge Kendall Square bio-tech cluster, and built in the Longwood Medical Area searching for the benefits of co-location.

Unfortunately, the heavily secured building is considered a 'fortress' and Merck are now contemplating how to allow greater collaboration between the clinicians of the LMA and their researchers.³⁷

The concept of the internal multi-level pedestrian network currently in development at LMA will attempt to reconcile the internalisation of circulation with the need for social spaces for staff and visitors – not so much a corridor as a series of links and gathering nodes.³⁷

In the Manchester Corridor, the large centralised open space between the hospital and the research, labs and administrative functions of the precinct proves valuable in a number of ways. It provides a calm, green space for patients to access fresh air, an arrival point for visitors on foot and in cars, and a buffer between the very busy student/retail area to the west and the hospital to the east.

It also contains a large work of sculpture (the heart and lungs of the hospital) by artist Andrew Small that lights up in response to the heartbeat of those who touch it.⁸⁵ Art is becoming an important element for the de-institutionalisation of hospitals, and these types of centralised public spaces provide great opportunities for the introduction of community activity and expression.

On an autumn day at the Necker Hospital, an installation was being erected for the Paris-wide White Night (Nuit Blanch) event, and on a Sunday at the Discovery District, the atrium of the new MaRS tower was brimming with people attending an ETSY craft market, while outside thousands walked the streets of Toronto in the Great Adventure Walk, raising funds for the Sick Kids Hospital.

The Boston Redevelopment Authority and MASCO are focusing on bringing life to the streets through public art³⁸ – on a weekday, the Music on Blackfan lunchtime event was pulling a number of people in with its brass band and food trucks.

These types of interventions in public space provide reasons to venture from the workplace, and interest for the passing pedestrian. But they require planning, and resources. Precinct scale strategic thinking can help short and sweet performances, of more lasting art such as sculpture, bring the streets to life.

“MASCO does a lot of research and thinking, then takes it to City Hall, who often adopt the ideas. But it takes time.”

Sarah Hamilton, MASCO ³⁷



Longwood Medical Area, Boston

PART 4 - THOUGHTS

TREND 4 - PRECINCT PLANNING

The Houston and Boston precincts have their own member-based precinct planning bodies to oversee energy and transport initiatives, precinct and building development, and complex stakeholder issues and relationships. This is not replicated in other regions, but holds valuable lessons and potential for the design and management of public space in these types of precincts.

If we think of hospital knowledge precincts as small cities, with circulation networks, public realm, employment, dining, housing (albeit temporary), and retail, not to mention governance structures and maintenance systems, then the planning of these sites becomes an urban policy and design challenge.

While the governance, planning and funding of development may be complex, the fundamentals of good design apply as readily to a hospital knowledge precinct as they do to any other part of the city. An open grid with a hierarchy of paths, public spaces and streets that extend into the surrounding city provides permeability for a variety of users, allows easy movement of goods and people through the site, and flexibility for change and expansion.⁸⁴

Investment in, and design of, the public realm in precincts with multiple landholders can be difficult: co-ordination with road authorities, landholders, and city councils requires strategic planning, significant attention to detail and innovative

place delivery arrangements that take a long term view.⁸⁶ This is where university campuses have great advantages over more diverse precincts with multiple land-holders.

The pedestrian and public space networks on the university campuses adjacent to the hospitals observed in this study were busy and well used, which serves to illustrate the benefits of being a single land owner precinct, but also points to the value of master-planning, of which university campuses have a rich history.

This need for integrated planning may explain why some of the larger, more established precincts (Boston and Houston) have their own quasi-government bodies; member based organisations that facilitate the planning and development of public realm and transport networks amongst other things.

The Boston Redevelopment Authority is the regulatory body that works with the LMA institutions and community to determine the best/optimum institutional master plans. "Having an independent / private planning entity managing the development of shared spaces and transport in the LMA is extremely valuable to the institutions. The BRA gets a single point of contact for the development of shared spaces and transportation."³⁸

Chantler²⁸ observes that Kendall Square in Boston succeeds because the planning of the precinct is run jointly by the Chief Executives of the companies involved.

The Manchester Corridor partnership model takes a much more commercial urban regeneration approach by actively involving a commercial development company (Brentwood) with the city council and institutional stakeholders. However, there is no formal arrangement in Manchester to oversee the Corridor connections – the original government money for the position ran out.

The Parkville Precinct was the subject of a strategic planning exercise ten years ago that perhaps indicates a move towards this co-operative approach, although it was specifically written to facilitate the development of two critical sites, the former Dental Hospital site (now the VCCC) and master planning for the Royal Melbourne Hospital, and is not an ongoing plan.⁸⁷

Whatever the approach, as more complex funding and partnership arrangements emerge, the need for integrated governance and oversight at the precinct scale is likely to increase in order to provide high quality public realm that is consistent, safe and comfortable.

PART 4 - THOUGHTS

RECOMMENDATION

Collaboration must be adopted not only in medical research and clinical care, but also in the way precincts are designed and managed.

This report does not propose a list of principles for a design and construction industry chomping on rating tools and design frameworks, nor for hospital administrators whose jobs are infinitely more complex than the task of providing collaborative workspaces for translational researchers. The recommendation put forward here is predicated on this:

Who are the guardians of public space in your hospital knowledge precinct?

From this question comes one recommendation:

Australian hospital knowledge precincts would benefit from the application of a more holistic, long term precinct planning approach through partnerships with adjacent stakeholders and government, in order to capitalise on opportunities for shared infrastructure and space.

Collaboration must be adopted not only in medical research and clinical care, but also in the way precincts are designed and managed. Master planning of individual land parcels and buildings is no longer sufficient to ensure the optimisation of public and open space, which are critical to the complex collaborative relationships between institutions.

There are a number of ways this may be achieved:

Precinct master planning – a written or drawn document that outlines a design framework, a list of principles to guide precinct development, or an appointed advisory group (design review panel) on precinct matters

Strategic Planning – a government led advisory council, an urban regeneration programme, or precinct representation in the local planning body

Partnerships – a regular meeting between CEOs, a membership-based group of institutional representatives, or a formally constituted precinct planning body

Or ideally, it might be all three. Because if no-one is thinking about the public spaces in between buildings, then no-one is looking after them either.

PART 4 - THOUGHTS

CONCLUSION

We have come a long way since the modernist idea of the hospital as a machine to make you well. When the founder of the United Kingdom's National Health Service, Aneurin Bevan, said in 1948:

"I would rather be kept alive in the efficient if cold altruism of a large hospital than expire in a gush of warm sympathy in a small one"

he perhaps did not envisage a future where hospital precincts as large as small cities could be centres of innovation and economic development as well as patient-centred care.

This study suggests, however, that size is not necessarily an indicator of quality or efficiency in collaboration, although it may increase a precinct's potential for innovation through co-location of related organisations.

The good news for Aneurin Bevan (if he was still alive) is that large hospitals no longer need be centres of cold altruism. Great progress has been made within hospitals to address their institutional nature. They will

continue to evolve, as will the burgeoning collaborative and innovative research facilities around them, which are now so critical to the hospitals' purpose.

This research was undertaken to further understanding of the role of pedestrian networks and public spaces in supporting collaboration in knowledge health precincts. The study found that innovation and collaboration are inherently social activities, and that pedestrians are crucial to a vibrant, social, public realm.

As buildings get bigger and taller, collaboration is increasingly internalised, sometimes at the expense of the quantity and quality of public space, which is a vital element for connectivity that leads to innovation.

The case studies demonstrate a variety of approaches to pedestrian networks and open space through the lenses of proximity, interaction and quality. Institutions in all of the precincts are seeking collaborative research models, and pursuing built environment visions to support them.

But the translation of the smaller scale, internal workplace concept of 'bump space' to the precinct scale is difficult, due to complex land ownership, stakeholder relationships, development costs and the sheer scale of growth. The research suggests that partnerships between government, academia, hospitals and businesses are the key to overcoming these problems.

Some of the strengths of these precincts are directly transferable elsewhere, some can be modified, and some are inherent in the city fabric and can't necessarily be replicated.

Whatever the case, they represent the broader quest for improvement and innovation in healthcare that can best be summed up by a (slightly modified) motto from the Boston Children's Hospital – Until Every One is Well.

END

"I would like to build a bridge between the university and the hospital not because it's needed, but because it would be a great symbol of partnership. Perhaps instead we will get a laser beam between the two and project a hologram onto it!"

Keith Chantler, Manchester Royal Infirmary²⁸

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