Maintaining Access

6th Annual Conference of the Health and Care Infrastructure Research and Innovation Centre

HaCIRIC International Conference 2013
25-26 September, Sofitel London St. James, London, UK
Structure

- Context / Problem
- NHS Trust Hospital Sites (Determining the scale, scope and distribution of infrastructure)
- Underpinning Research
- The Future of Healthcare Access
CONTEXT / PROBLEM
Worldwide Problem

- Demand for assets and systems is escalating
- There is critical deterioration and obsolescence of existing assets
- There may be a massive gap between the existing infrastructure assets, of which many have reached decay, and the demand for new infrastructure
- We must think about efficiency, sufficiency, durability, long Life and slow consumption of infrastructures.
Worldwide Problem

- Organisation for Economic Cooperation and Development (OECD) estimates that spending to update (in developed) or to develop new (in emerging) is $53 trillion - between 2007 and 2030.

- In the UK alone in the last decade, £150 billion is estimated to have been invested.

- Future demand is expected to rise to around £45 billion per annum until 2020.
NHS Healthcare Infrastructure

• **Investment of £1.344 billion** would be needed to eradicate the 2011 levels of High and Significant backlog.

Estimated Cost to Eradicate Backlog in Acute Trusts (Source: DH)
BMJ Reconfiguration (1999)

• The British Medical Journal has published 172 articles on “reconfiguration” since 1840, only nine of which appeared before the year 2000, of these:

• Garside¹ highlighted the need for evidence-based reconfiguration

• Sheldon and Maynard² note the acceptance of evidence regarding economies of scale and scope in hospital sizing and their influence on the balance of quality, cost, and access to care, and

• Unit costs fall little at sizes over 600 beds, that quality (in terms of mortality) may sometimes, but not always, be improved by increased volume, and that concentrating services increases travel costs for patients and carers, with differential effects on access and use according to social class.

• There were “probably about 50 district general hospitals” in Britain that were of a size “where closure might be most rational.”

3. Smith R. Reconfiguring acute hospital services: no easy answers, but there are principles we should follow. BMJ 1999;319:797-8.
BMJ Reconfiguration (2010)

- Limb\textsuperscript{5,6} and Barratt and Raine\textsuperscript{7} state that doctors must take a lead in the \textbf{co-production of evidence} to support whole-system reconfiguration and win the battle for patients’ hearts and minds.

- Seddon\textsuperscript{8} and Hawkes\textsuperscript{9} discuss the \textbf{critical need for private sector involvement} rather than public bailouts which fail to deal with underlying problems.

- Hughes\textsuperscript{10} and O’Dowd\textsuperscript{11} call for consultants to leave acute wards and join doctors in developing \textit{innovatory, integrated, out-of-hospital systems to address chronic disease}\textsuperscript{12} and expedite the reconfiguration of urgent care services in community settings. While Wise\textsuperscript{13} reports on the UK Government’s drive to spread the benefits of \textit{innovations such as telecare, telehealth, and eHealth}, but warns against implementing these new technologies without redesigning services around the patient.

- Lister\textsuperscript{14} raises \textbf{concerns that district general hospitals are out of sync, ill equipped, and too expensive to cope with demands such as managing chronic disease}.

\textsuperscript{5} Limb M. Doctors must explain benefits of reconfiguration to patients, conference hears. BMJ 2013;346:f4195.
\textsuperscript{6} Limb M. Emphasise benefits of reconfiguration to support change, says report. BMJ 2013;346:f3698.
\textsuperscript{7} Barratt H, Raine R. Hospital service reconfiguration: the battle for hearts and minds. BMJ 2012;344:e953.
\textsuperscript{8} Seddon N. Why shouldn’t private companies run failing hospitals? BMJ 2011;343:d7770.
\textsuperscript{9} Hawkes N. Competition improves health services, think tank says. BMJ 2012;344:e1516.
\textsuperscript{10} Hughes J. The primary-secondary care divide fails older patients. BMJ 2012;344:e4009.
\textsuperscript{11} O’Dowd A. After Francis, what next for the NHS? BMJ 2013;346:f2074.
\textsuperscript{12} O’Dowd A. Faster reconfiguration of NHS Services is needed for next two years says NHS chief. BMJ 2012;345:e6334.
\textsuperscript{13} Wise J. UK government signals its support for telemedicine. BMJ 2011;343:d7792.
\textsuperscript{14} Lister S. The politics of NHS reconfiguration. BMJ 2011;343:d5311.
Study of 128 Hospital Trusts

- Over 50% had more than 2 sites
- 54 had more than 3 sites (42%)
- 52 had PFIs (12 reduced, 4 increased and 35 no impact on the number of sites)
- We need to find new ways to reconfigure.
Hospital Trust Sites

- **Total Number** of Acute Sites 2006/7 - 2010/11 (ERIC) is escalating

- The large growth in acute sites in 2010/11 may be as a result of **PFI facilities reaching operational status**

- Period (2009/10) may be as a result of **ownership transfers** to community health providers, mental health Trusts and independent and third sector parties

- **Increasing access** to acute medicine.
Hospital Trust Sites

Tertiary / Specialist District Hospitals

Traditional In-Patient General Hospital

Community and Social Care

Home and Family

Longer travel to Specialist Centres

Closer to home, Non-invasive diagnosis / Chronic care management Tele-health, Tele-care, e-Health

An emerging infrastructure fault line, Source - McMahon, L and Barlow, J
## Hospital Trust Sites

<table>
<thead>
<tr>
<th>BEds</th>
<th>Acute</th>
<th>Specialist</th>
<th>Acute</th>
<th>Teaching</th>
<th>Large</th>
<th>Acute</th>
<th>Large</th>
<th>Acute</th>
<th>Medium</th>
<th>Medium</th>
<th>Acute</th>
<th>Small</th>
<th>Acute</th>
<th>Small</th>
<th>Acute</th>
<th>No. / AVE Trusts</th>
<th>AVE Income</th>
<th>AVE’ Area</th>
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<td>0-200</td>
<td>(6)</td>
<td>[S= 1.2]</td>
<td>(2)</td>
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<td>(1)</td>
<td>[S= 1]</td>
<td>(6)</td>
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<td>200-400</td>
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<td>[S= 1.7]</td>
<td>(2)</td>
<td>[S= 0.8]</td>
<td>(1)</td>
<td>[S= 1]</td>
<td>(12)</td>
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<td>(SD 1.4)</td>
<td>138 (£m)</td>
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<td>400-600</td>
<td>(1)</td>
<td>[S= 1]</td>
<td>(1)</td>
<td>[S= 3]</td>
<td>(1)</td>
<td>[S= 1]</td>
<td>(15)</td>
<td>[S= 1.9]</td>
<td>185 (£m)</td>
<td>67835 m²</td>
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<td>800-1000</td>
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<td>[S= 3]</td>
<td>(1)</td>
<td>[S= 2]</td>
<td>(17)</td>
<td>[S= 3.8]</td>
<td>(22)</td>
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<td>(SD 2.0)</td>
<td>370 (£m)</td>
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<td>1000-1200</td>
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<td>1200-1400</td>
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<td>[S= 4]</td>
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<td>[S= 5.5]</td>
<td>(6)</td>
<td>[S= 5.2]</td>
<td>(SD 1.8)</td>
<td>519 (£m)</td>
<td>194640 m²</td>
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<td>[S= 5]</td>
<td>(8)</td>
<td>[S= 4.1]</td>
<td>(1)</td>
<td>[S= 5]</td>
<td>(SD 1.1)</td>
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<td>1600-1800</td>
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<td>[S= 5]</td>
<td>(1)</td>
<td>[S= 5]</td>
<td>(1)</td>
<td>[S= 3]</td>
<td>(3)</td>
<td>[S= 4.3]</td>
<td>694 (£m)</td>
<td>287444 m²</td>
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<td>1800-2000</td>
<td>(2)</td>
<td>[S= 4]</td>
<td>(2)</td>
<td>[S= 4]</td>
<td>(1)</td>
<td>[S= 4]</td>
<td>(2)</td>
<td>[S= 4]</td>
<td>(1)</td>
<td>[S= 4]</td>
<td>815 (£m)</td>
<td>399762 m²</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2000-2200</td>
<td>(1)</td>
<td>[S= 4]</td>
<td>(1)</td>
<td>[S= 4]</td>
<td>(1)</td>
<td>[S= 3]</td>
<td>(23)</td>
<td>[S= 2.7]</td>
<td>(SD 1.85)</td>
<td>304 (£m)</td>
<td>386213 m²</td>
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<tr>
<td>(No.)</td>
<td>(9)</td>
<td>[S= 1.4]</td>
<td>(7)</td>
<td>[S= 2.9]</td>
<td>(11)</td>
<td>[S= 3.6]</td>
<td>(36)</td>
<td>[S= 3.9]</td>
<td>311 (£m)</td>
<td>118047 m²</td>
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No. of Acute Sites
(AVE) Average of Income
(m²) Average of Occupied floor area
(S= ) Average of Acute Sites
(SD) Standard Deviation in Acute Sites

must consider geography and access
UNDERPINNING RESEARCH
Healthcare Infrastructure

- Access to what?

**Context**
- Policy
- Demography
- Morbidity
- Geography

**Services**
- (Acute, Primary, Social, etc.)
  - Treatment
  - Prevention
  - Flow
  - Pathways

**Technology**
- (Science base, medical, ICT, etc.)
  - Development
  - Functionalities
  - Integration

**Infrastructure**
- (Built environment, large technical systems)
  - Size / capacity / resources
  - Type / deployment
  - Options / flexibility

**How to implement innovation**
- Strategic planning and implementation of new service models
- Impact of design on workflow
- Built environment and infection control

Simulation and modelling in managing demand and capacity
Address a Complex Evidence-Base

Public Health Intelligence
- Public Health
- Economic Context and Market
- Country Infrastructure
  - Sustainability and Resilience
- Transport
  - Catchment and Access
- Population Distribution

Health Planning and Commissioning
- Equipment, Technology
  - Throughput and Innovation
- Clinical and Care
  - Service
- Staffing Ratios, Roles and Critical Competencies
- Care Model / Pathway
  - Setting of Care
- Human Capital and Equipment Competencies
- Volume, Referral and Capacity

Developing the Built Environment
- Staff Satisfaction
- Service Quality
- Technical Systems
- Therapeutic / Healing
  - Building Design
- Staff Productivity
- Building Performance
Sustainable Access

2 live-workshops, 5 interdisciplinary case studies and 4 workshops (involving over 182 participants (May 2009 – Nov 2010) developed Planning Healthcare Infrastructure (PHI) a facilitated approach to support the use of SHAPE. Modeling with 187,912
Premises Assurance (PAM)

Loughborough University delivers healthcare infrastructure quality and safety system that provides NHS assurance and reduces DH policy liabilities on an asset portfolio of over £50 billion through the creation of PAM

Five Domains: Finance and Value for Money; Safety; Effectiveness; Patient Experience; and Board Governance

8 workshops and 3 steering group meeting involving over 94 participants (Feb 2012 – Jan 2013) developed the Premises Assurance Model (PAM).

DEA ratio = \( \frac{\sum \text{outputs}}{\sum \text{inputs}} \)

Figure 1: The SAQ ‘Dasbo d’ for acute Trusts. One of the self-assessment questionnaires is to enable Trusts to compare themselves in particular areas. Based on the responses, the NHS PAM software example enables an estates manager to determine the overall condition of their estate, and its ‘performance’ in areas such as ‘Safety’, and cost that of NHS counterparts.

Figure 2: The DEA ratio is a tool-based methodology for establishing and managing baseline (NHSC Estates 2000) – PAM.

Figure 3: Part of an SAQ ‘gap sheet’ and incorporating questions to, and incorporating questions as, risk-based methodology for establishing and managing baseline.
Critical Infrastructure Risk

Predicting the impact of age on building condition

A. Change in Critical Backlog / $m^2$

<table>
<thead>
<tr>
<th>Age</th>
<th>0 to 15</th>
<th>15 to 25</th>
<th>25 to 30</th>
<th>30 to 35</th>
<th>35 to 40</th>
<th>40+</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.5</td>
<td>0.012</td>
<td>3.8</td>
<td>4.7</td>
<td>4.5</td>
<td>4</td>
<td>5.47</td>
</tr>
<tr>
<td>0.5-1</td>
<td>4.7</td>
<td>1</td>
<td>3.7</td>
<td>7.7</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>1-1.5</td>
<td>-9.8</td>
<td>0.2</td>
<td>-3.8</td>
<td>4.2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1.5-2</td>
<td>-10</td>
<td>-13.8</td>
<td>1.9</td>
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</tbody>
</table>

Estimate: ~ 0.5% ~1% ~1.5% ~1.5% ~2% ?%

B. Percentage No. of Trusts per Age Group with Decreasing Critical Backlog (%)

<table>
<thead>
<tr>
<th>Age</th>
<th>0 to 15</th>
<th>15 to 25</th>
<th>25 to 30</th>
<th>30 to 35</th>
<th>35 to 40</th>
<th>40+</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.5</td>
<td>40% (5)</td>
<td>30% (6)</td>
<td>30% (13)</td>
<td>25% (12)</td>
<td>37% (8)</td>
<td>25% (4)</td>
</tr>
<tr>
<td>0.5-1</td>
<td>30% (3)</td>
<td>80% (5)</td>
<td>43% (7)</td>
<td>17% (6)</td>
<td>40% (5)</td>
<td></td>
</tr>
<tr>
<td>1-1.5</td>
<td>100% (1)</td>
<td>50% (2)</td>
<td>100% (1)</td>
<td>33% (9)</td>
<td>0% (3)</td>
<td></td>
</tr>
<tr>
<td>1.5-2</td>
<td>67% (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-2.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100% (1)</td>
<td>33% (3)</td>
</tr>
<tr>
<td>3-3.5</td>
<td>0% (1)</td>
<td></td>
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</table>

% Income Invested in Backlog

With the focus on the first to understand, plan and predict the future trajectory of critical backlog in England.
Case Studies (Demonstration)

Middlesbrough, Middlesbrough Primary Care Skin Service (MPCSS) – a GPwSI-led service in a purpose-built community centre. MPCSS combines a minor surgery and dermatology service led by GPwSI with a nursing team. Referrals are from GPs.

MPCSS uses a fully electronic triage system and patients with potentially serious conditions are fast-tracked to secondary care. The service triages skin referrals electronically and is paper free.

Camden, A nurse-led self-referral community dermatology clinic. This service offers primary care access to specialist services for patients with chronic inflammatory conditions and provides fast-track referrals to secondary care when needed.

The nurse consultant is an extended prescriber so most treatments can be prescribed in the clinic. The nurse consultant is an extended prescriber and the majority of treatments can be prescribed in the clinic. Patients get a chance to try out emollients before they are prescribed – this means they are involved in the decision making and this reduces the wastage of prescriptions.

Hull and East Yorkshire, A joint service where GPwSI and consultants work alongside each other with pharmacists and nurses and in both primary and secondary care settings to deliver an integrated dermatology service in a number of clinics across the city.

Two of the community clinics (together with a community pharmacy with a special license to dispense drugs usually only available in hospital pharmacies) were sited in an extremely disadvantaged area, because access to the hospital was a particular issue for the population. In addition, there is a pharmacy practitioner who does a weekly clinic alongside the GPwSIs and consultants – this pharmacist sees mainly patients with warts, diagnosed eczema and psoriasis, and patients with acne on isotretinoin.

Leeds, community-based intermediate dermatology clinics run collaboratively by primary and secondary care.

Leicester and Leicestershire, University Hospitals of Leicester NHS Trust and Leicestershire Community Hospitals – a hub-and-spoke model. The hub is Leicester Royal Infirmary, with eight community-based clinics in the surrounding small towns staffed by a mixture of consultants, GPs (working as clinical assistants or GPwSI) and nurses. Some clinics provide general dermatological care and others offer more specialised services.

The hub clinic operates in the same way but offers some further specialised care. The community clinics provide general dermatological care and some provide specialised care including ultra violet phototherapy, skin surgery and dermatological expertise. A hub-and-spoke model with community clinics was felt to be most suitable for an area in which patients from surrounding towns would have to travel 30–40 miles to get to the main hospital site.
Dermatology Shift Potential

- Nearly 50% of UHL patients are referrals from City patients.
- For general Dermatology clinics low tech equipment (cryotherapy, microscopy) is required.
- 43% of the current clinic capacity could move out of UHL with minimal spend on equipment:
  - The requirement is physical space for Consultant, SpR, Specialist nurse & med student to see patients.
- A further 8% of clinic capacity (minor surgery) could move with the right environment,
  - Surgeries that have facilities to carry out minor surgery need identifying.
- 24% of clinic activity is phototherapy (light treatment),
  - Right environment, equipment and trained staff would allow decanting of most phototherapy.
- Elements will need to remain centralised. 2 week wait clinics, Advanced surgery (flaps, grafts), Access to plastic and oculoplastic surgery, Photodynamic therapy, Biologic treatment, Cutaneous lymphoma service, Skin cancer MDT, Patch (allergy) testing, Paediatric dermatology, Renal transplant patients, Combined clinics and Rare disease clinics (vulval, immunobullous).
Review of Transport Mode

- Anonymous activity data (n = 187,912)
- Public consultation Circa ~ 629 participants
- Calculate actual patient travel distance (in-line rather than against transport networks)
- Incorporating shift in transport mode towards more sustainable modes for closer service settings
Reconfiguration Impact on Access

Shifting 190,000 patient journeys closer to home means a total travel distance reduction of **3.6 million kilometres** a year.

72% transport carbon reduction from a centralised scenario for the six care services, this attendances make up 23% of the total secondary attendance in this case study region.

These gains could be **even greater as more radical care pathway changes** are adopted or if patients are more frequently treated in their homes using remote technologies.
THE FUTURE OF HEALTHCARE ACCESS
“The hospital has changed throughout its existence and will continue to change. Many of those changes cannot be predicted. The hospital structure should adapt to the services it provides and not the other way round. The hospital should make it as easy as possible to get from A to B, or to J or to Z... The hospital must have the ability to accommodate peaks, troughs, and surges”
Remote Sensors: Wellness
Future Research

• **New technology is changing** how we access healthcare

• **A whole-system review of access** is required taking infrastructure efficiency and sufficiency

• **Advanced modelling** could demonstrate the impact of reconfiguration on access

• **Development of existing NHS tools**, such as SHAPE, to incorporate more sophisticated analytics is needed
Thank you