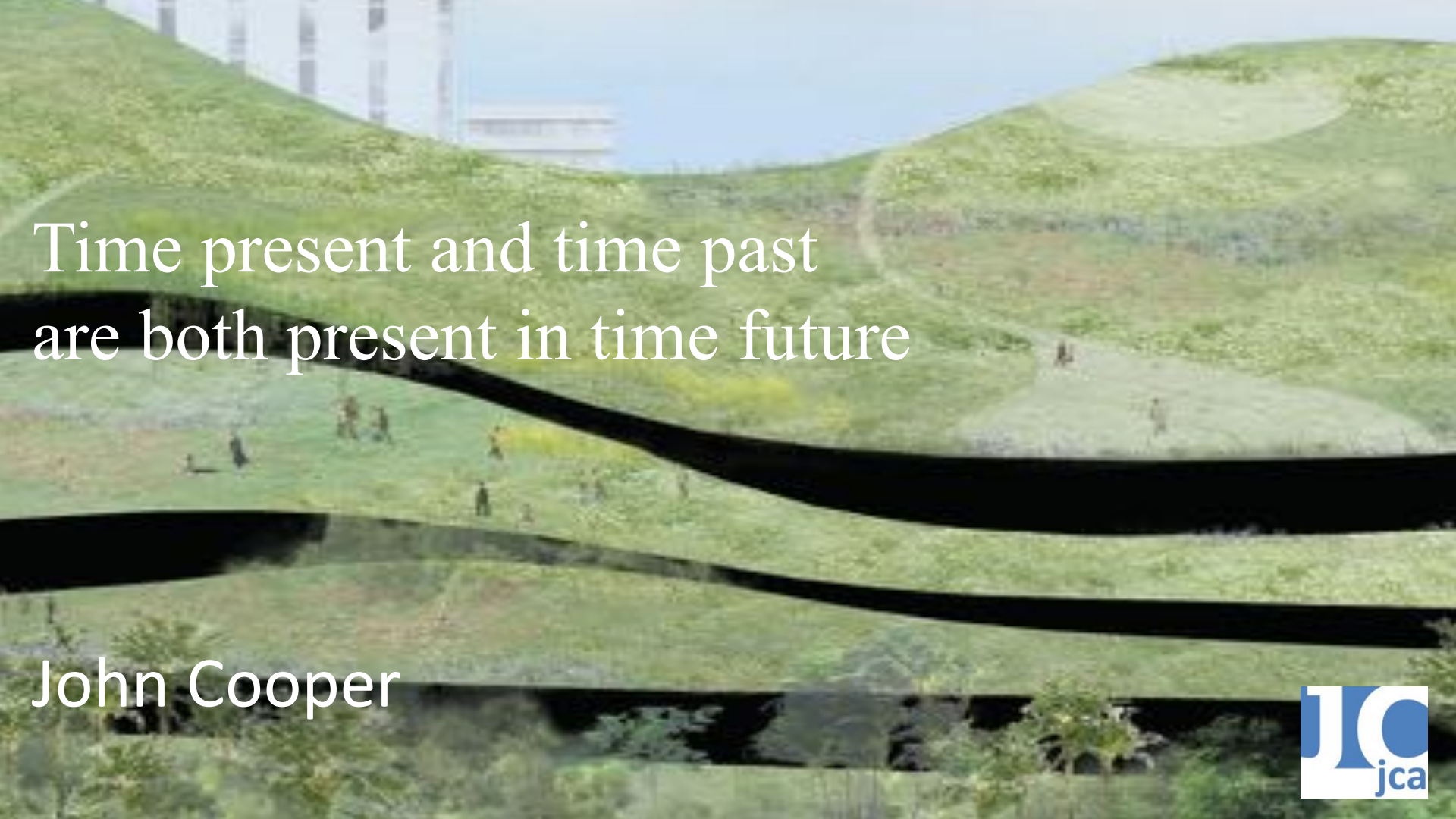
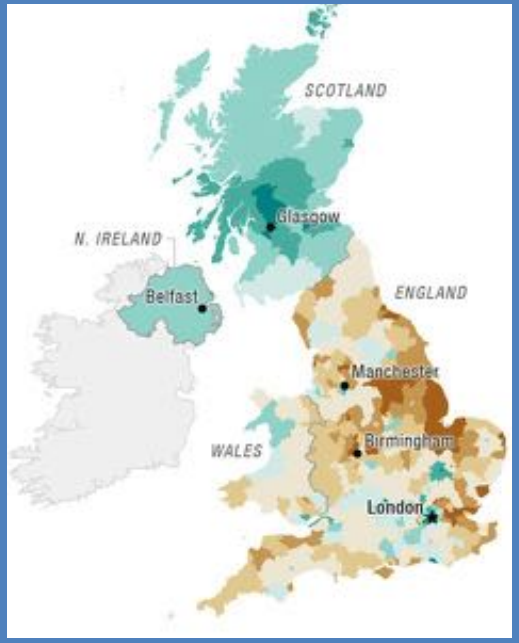

Time present and time past
are both present in time future
John Cooper
jca

Utopia-Dystopia
Binary choices

Map of the English Civil War loyalties

Brexit spread



Utopia-Dystopia
Binary choices

Utopia-Dystopia
Immeasurable change

The First Industrial Revolution used water and steam power to mechanize production.
The Second used electric power to create mass production.
The Third used electronics and information technology to automate production.
Now a Fourth Industrial Revolution : characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.
The Fourth is characterised by:

- Velocity
- Scope
- Systems impact

The speed of current breakthroughs has no historical precedent.
When compared with previous industrial revolutions, the Fourth is evolving at an exponential rather than a linear pace.

Probable fixes or near fixes

Migratory patterns

Urbanity

Travel

Patterns of settlement

Human institutions

Human health

Human needs

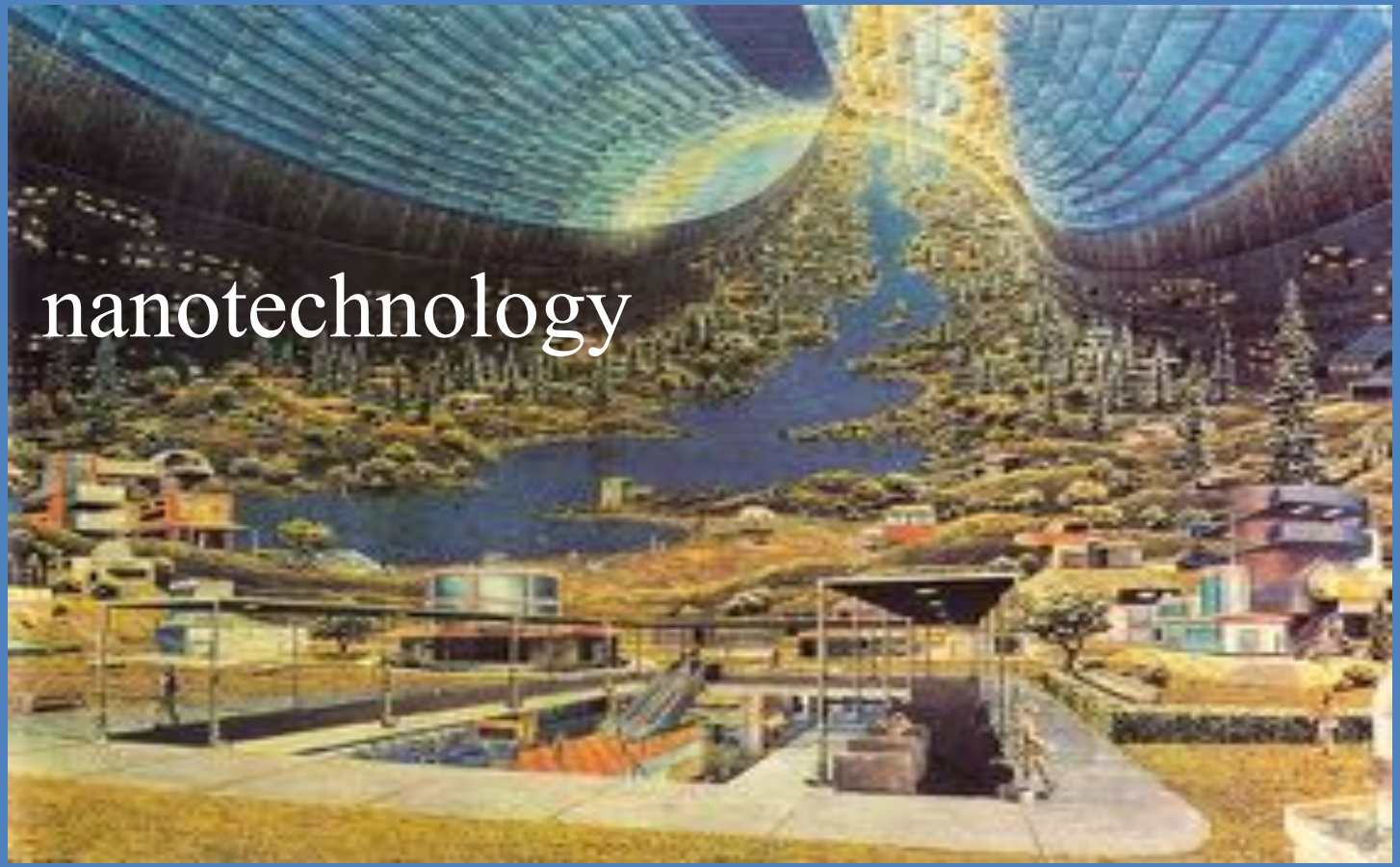
Certainties for the healthcare future

- AI will have a profoundly disruptive effect on all levels of the workforce
- AI will perform many diagnostic tasks
- AI will enable huge reductions in imaging costs
- Smartphones enable real time point of care diagnostics
- Smartphones enable remote examination
- Smartphones enable remote monitoring
- Networks: doctors with doctors, doctors with patients and patients with patients

Certainties for the healthcare future

- Medicine will become increasingly predictive and therefore preventative
- Robotics
- Nanotechology

Remote possibility: end of scarcity



My thoughts on the matter

1852

2013

The strange links

NOTES ON HOSPITALS:

BEING

TWO PAPERS READ BEFORE THE NATIONAL ASSOCIATION
FOR THE PROMOTION OF SOCIAL SCIENCE,
AT LIVERPOOL, IN OCTOBER, 1858.

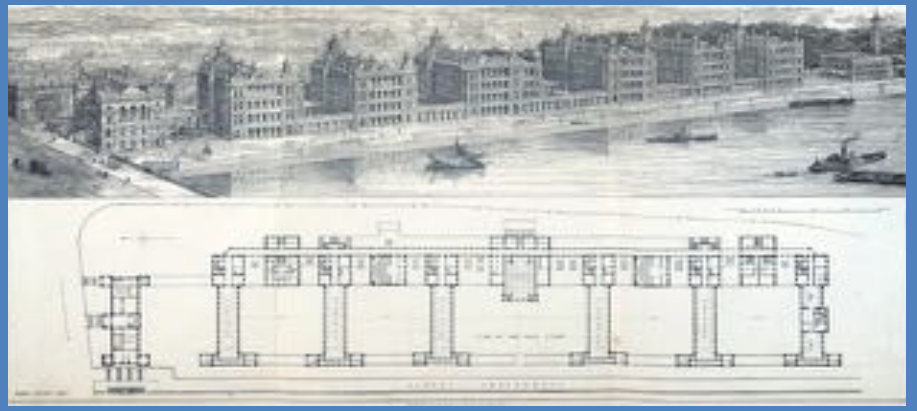
WITH

EVIDENCE GIVEN TO THE ROYAL COMMISSIONERS
ON THE STATE OF THE ARMY IN 1857.

BY

FLORENCE NIGHTINGALE.

LONDON:
JOHN W. PARKER AND SON, WEST STRAND.
1859.



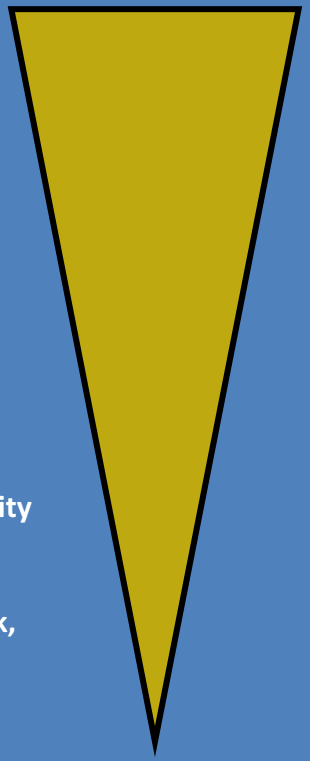
A lost decade: institutional torpor

Home

Health and social care centres up to 10k close to home

Community care centres 100k heart of the community

Specialist care centres 250k, 500k, 1000k on central city sites



Self care
Monitoring
Automated treatment
Information and advice
NHS direct

Social care
Primary care
Outreach care
Information and advice

Basic diagnostic services
Day interventions
Minor injuries
Nurse led inpatient care
Intensive rehabilitation
Chronic care management

Planned interventions
Emergency care
Complex diagnostic treatment
& inpatient care

jca

A lost decade: institutional torpor

1950s

1970s

2000 2005 2010 2015 2020

Reasons: Procurement:

commissioning buildings through the construction industry

Simple economics: PFI

Even as its future remains uncertain in the UK, PFI has become one of Britain's most successful exports with countries from Canada to India and Australia in the process of rolling out billions of pounds worth of PFI schools, hospitals, roads and infrastructure.

"The UK has created a market for British companies with PFI expertise," says Richard Howson, chief executive of Carillion, which is among the more significant companies in the PFI sector, earning about 8 per cent of underlying operating profits from public/private sector partnerships (PPPs) worldwide.

With projects in the UK slowing to a trickle as a result of the government's year-long review into the PFI's future, contractors including Carillion have been beefing up their overseas teams, particularly in Canada, where more than $7bn of health, education, leisure and transport projects were signed off last year.

Do the Maths

PFI Bid Cost:	**£4-5 million**
Average profit for a top twenty contractor:	**say 3% (actually nearer 1.5%)**
Cost of recouping bid cost:	**£130-150 million contract**
If you make a £45 million loss	**£1.5 billion contract repays this loss**
	(60% of the 8th largest contractor's turnover)

Do the diligence : commissioning design through the construction industry

Latest Rank By Turnover	Latest Rank By Profit	Company	Latest Turnover (£m)	Previous Turnover (£m)	Change (%)	Latest Pre-tax Profit (£m)	Previous Pre-tax Profit (£m)	Change (%)	Latest Margin	Previous Margin
1	49	Balfour Beatty	8,683.0	8,444.0	2.8	8.0	-199.0	N/A	0.1	N/A
2	1	Carillion	5,214.2	4,586.9	13.7	146.7	155.1	-5.4	2.8	3.4
3	94	Kier Group	4,211.0	3,275.9	28.5	-15.4	39.5	N/A	N/A	1.2
4	99	Interserve	3,685.2	3,204.6	15.0	-76.4	79.5	N/A	N/A	2.5
5	9	Morgan Sindall	2,561.6	2,384.7	7.4	43.9	-14.8	N/A	1.7	N/A
6	98	Amey UK	2,531.0	2,531.9	-0.0	-43.9	23.6	N/A	N/A	0.9
7	100	Laing O'Rourke	2,513.2	3,127.4	-19.6	-245.6	12.4	N/A	N/A	0.4
8	2	Galliford Try	2,494.9	2,348.4	6.2	135.0	114.0	18.4	5.4	4.9
9	97	Mitie	2,126.3	2,231.9	-4.7	-42.9	96.8	-144.3	N/A	4.3
10	40	Mace	2,041.1	1,811.3	12.7	10.7	36.2	-70.4	0.5	2.0
11	4	Keller	1,780.0	1,562.4	13.9	73.9	56.3	31.3	4.2	3.6
12	12	Skanska 1	1,678.0	1,383.5	21.3	35.1	42.1	-16.6	2.1	3.0
13	14	Costain	1,658.0	1,263.6	31.2	30.9	26.0	18.8	1.9	2.1
14	11	Wates	1,531.9	1,206.9	26.9	35.5	28.1	26.4	2.3	2.3
15	65	ISG 2	1,329.3	1,648.6	-19.4	4.8	-12.9	N/A	0.4	N/A
16	13	Willmott Dixon	1,223.0	1,323.9	-7.6	31.1	4.4	603.5	2.5	0.3
17	7	Keepmoat	1,133.5	1,094.9	3.5	61.6	54.1	13.9	5.4	4.9
18	16	BAM Construct	1,072.2	897.5	19.5	26.2	13.0	101.5	2.4	1.4
19	32	Multiplex	1,035.9	620.0	67.1	16.0	21.9	-26.8	1.5	3.5
20	15	Mears	940.1	881.1	6.7	29.4	25.9	13.4	3.1	2.9

Procurement: Business Cases

Components

The five key components of this methodology are;

- **The Strategic Case**:

It demonstrates that the spending proposal provides business **synergy and strategic fit** and is predicated upon as a robust and evidence based case for change.

- **The Economic Case**:

It demonstrates that the spending proposal optimizes **public value.**

- **The Commercial Case**:

It demonstrates that the 'preferred option' will result in a **viable procurement** and well-structured deal.

- **The Financial Case**:

It demonstrates that the 'preferred option' will result in a fundable and **affordable deal.**

- **The Management Case**:

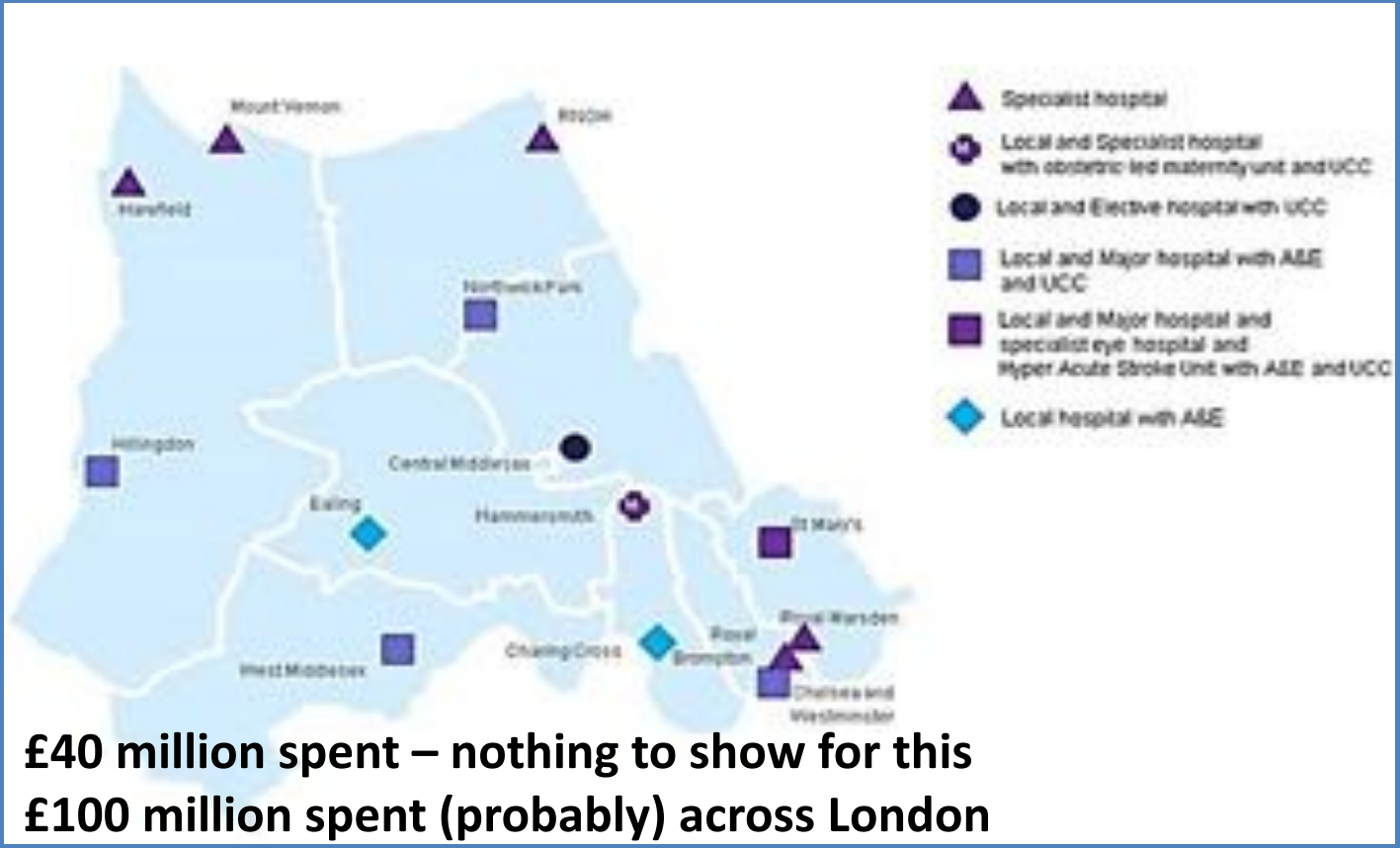
It demonstrates that the 'preferred option' is **capable of being delivered successfully,** in accordance with recognized best practise.

APMG International Better Business Cases

The cost
£1.5 - £3.0 million

JC jca

Procurement: Business Cases



£40 million spent – nothing to show for this

£100 million spent (probably) across London

Disposal based funding: do the Maths

Example 1

Small to Medium Size Trust

- Turnover £272 million

Commercial opportunity

- A plot of surplus land can be sold for £15 million

Finances 10 days' Trust activity

Finances a 2500 -3500 square metre healthcare development

Disposals: Do the Maths

Example 2

Large Size Trust

- Turnover £650 million

Commercial opportunity

- A plot of surplus land can be sold for £50 million

Finances 28 days' Trust activity

Finances a 10 -12 000 square metre healthcare development

Briefing and planning

we start in the wrong place

90% of what specialists do is the same yet we identify their spaces by the 10% difference

Meanwhile: tech change accelerates

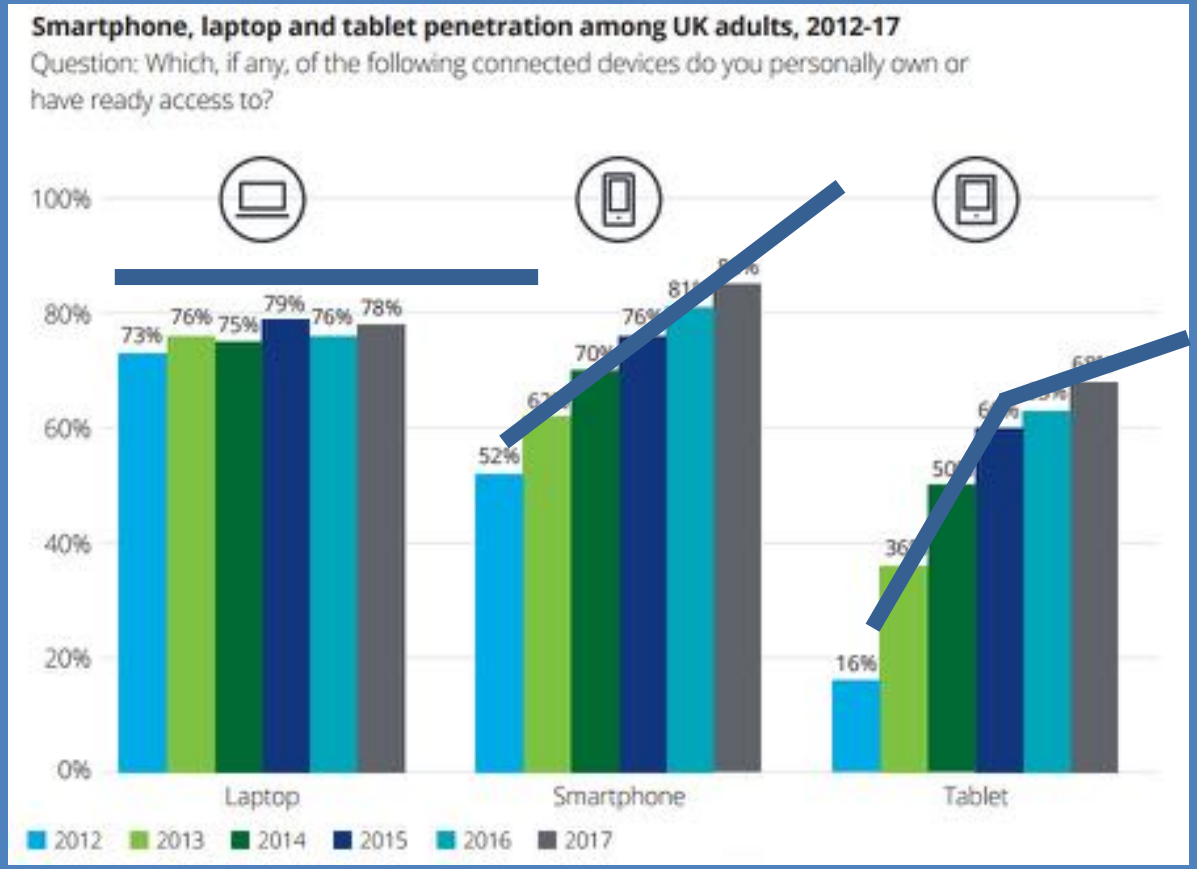
2001- 2018 Information technology

The extraordinary and accelerating advances that are taking place

Healthcare talks about yesterday's technology as today's and today's as tomorrow's:

- smart phone technology
- algorithmic triage and diagnosis
- telemedicine
- miniaturisation – real time remote diagnosis
- miniaturisation- imaging
- nano-sensors
- robotics
- pharmaceuticals / genomics

Smart phones



Monitoring

Examination

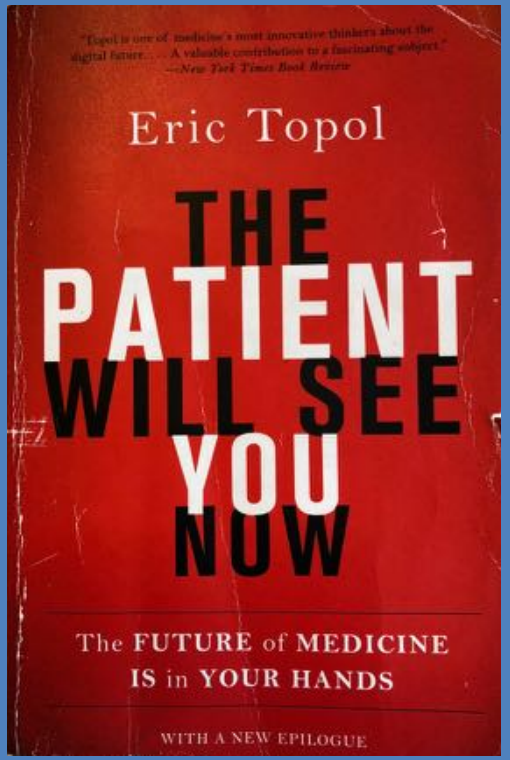
Networking

Communication

Telehealth

Remote monitoring

- respiratory rate
- heart rate
- blood oxygen levels
- blood glucose levels
- systolic blood pressure
- temperature
- urine output
- sleep and movement



Real time against the patient's record and the patient's personal assessment

Monitoring

respiratory rate

heart rate

blood oxygen levels

blood glucose levels

systolic blood pressure

temperature

urine output

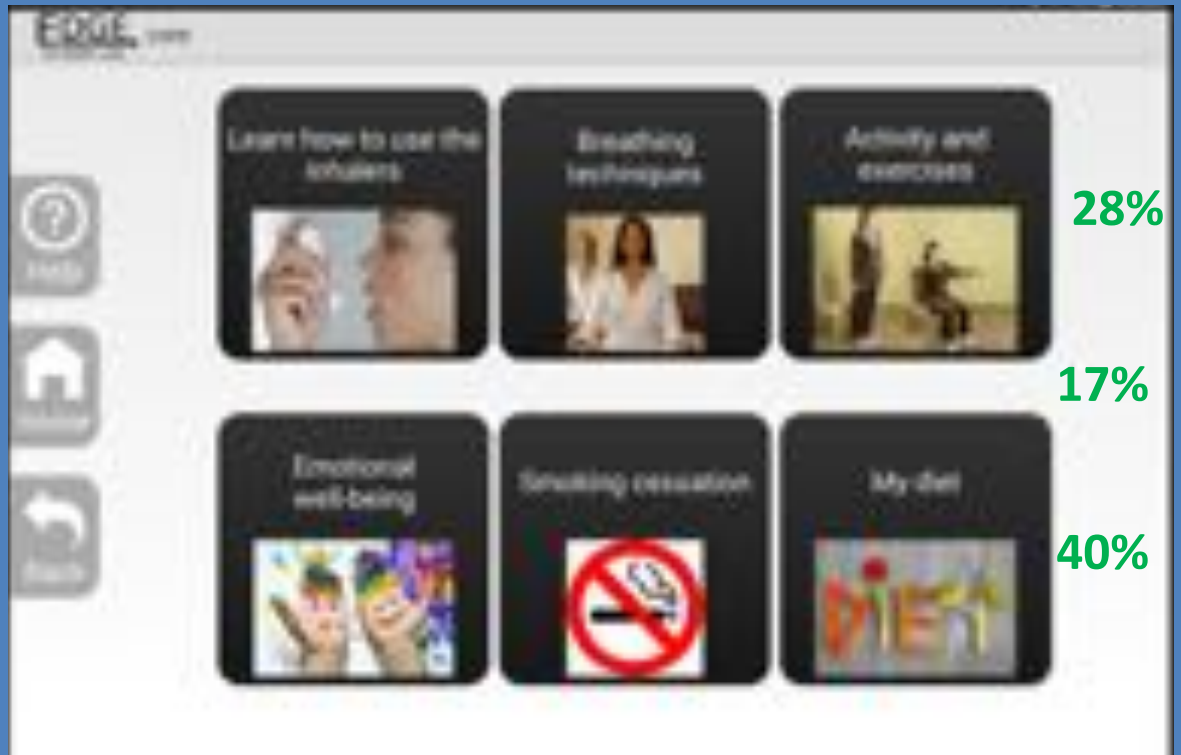
sleep and movement

Real time against the patient's record and the patient's personal assessment

Networks: linking patients, clinicians and researchers

We develop clinically validated software applications powered by artificial intelligence including prescribed digital therapeutics and hospital systems for clinical care. Our products connect patients, clinicians and researchers, generating large databases of phenotypic data, enabling discovery research and improving patient outcomes.

EDGE is a prescribed digital therapeutic for monitoring chronic obstructive pulmonary disease (COPD) at home that was developed by Oxford University (the Institute of Biomedical Engineering and the Department of Primary Healthcare Sciences), with support from the Department of Health and the Wellcome Trust through the Health Innovation Challenge Fund.



28% reduction in visits to see a GP

17% reduction in hospital admissions

40% reduction in hospital visits to see practice nurses

The dot com bubble risk

Real time point of care diagnostics:

Cambridge University Colormetrix

The app, developed by researchers at the University of Cambridge, accurately measures colour-based, or colorimetric, tests for use in home, clinical or remote settings, and enables the transmission of medical data from patients directly to health professionals.

Decentralisation of healthcare through low-cost and highly portable point-of-care diagnostics has the potential to revolutionise current limitations in patient screening.

Hand held technology

Tricorder Prize

Hand held technology:

Tricorder Prize

Required Core Health Conditions (10):
Anaemia, Atrial Fibrillation (AFib), Chronic Obstructive Pulmonary Disease (COPD), Diabetes, Leukocytosis, Pneumonia, Otitis Media, Sleep Apnea, Urinary Tract Infection, Absence of condition.

Elective Health Conditions (Choice of 3):
Cholesterol Screen, Food-borne Illness, HIV Screen, Hypertension, Hypothyroidism/Hyperthyroidism, Melanoma, Mononucleosis, Pertussis (Whooping Cough), Shingles, Strep Throat.

Required Health Vital Signs (5):
Blood Pressure, Heart Rate, Oxygen Saturation, Respiratory Rate, Temperature

Patient responsibility

The winner is actually a small collection of specialized and smart medical devices that interact with the user's tablet.

This includes a compact spirometer that can measure the strength of a patient's lungs, a Mono test kit, medical-grade heartrate and respiration monitors, and devices like the DxtER Orb, which doubles as a thermometer and stethoscope.

These devices can't scan patients at a microscopic level like *Star Trek's* device, but Basil Leaf technology co-founder George Harris says it improves on the show's tricorder in one key area: It's designed for patients to use themselves.

Technology is getting smaller

MRI Technology

AI

Algorithms:

Embedding data in algorithms for computer application to problem solving

Examples: Cancer and ICU

Deep learning: recognising patterns in distinct layers

The accuracy gap between the human and digital eye is expected to widen. As deep-learning approaches gain traction, they will continue to advance such diagnostic fields as:

- **radiology (CT, MRI and mammography interpretation)**
- **pathology (microscopic and cytological diagnoses)**
- **dermatology (rash identification and pigmented lesion evaluation for potential melanoma)**
- **ophthalmology (retinal vessel examination to predict the risk for diabetic retinopathy and cardiovascular disease).**

Catalytic change

Mtech co-existence with system failure and a polarising society – first and third world health provision within the same service

Their ability to extend medicine's reach to the excluded or underserved

The changes which they will catalyse in the health professions and the buildings types

The likelihood of their narrowing or widening the health gap between rich and poor

What has this got to do with hospitals?

Present :

70% of the NHS budget is devoted to chronic disease management

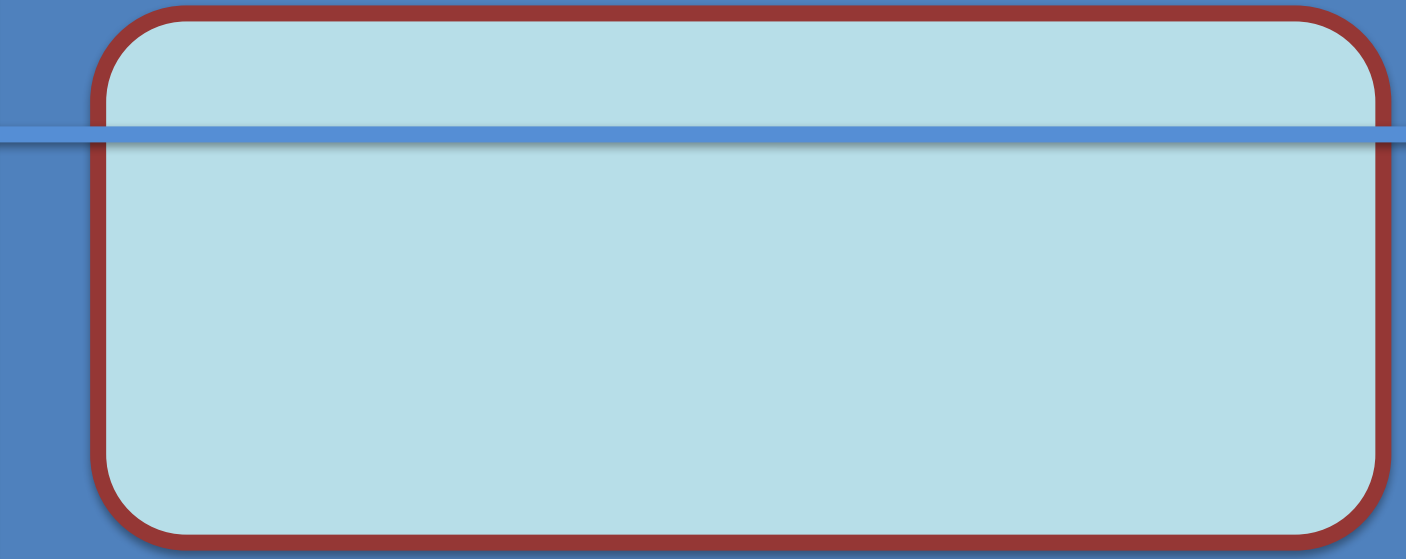
40% of the NHS budget is devoted to people over 65

50% of medical beds are occupied by patients who could be cared for elsewhere

On average elderly patients spend 4 times longer in hospital than their consultants' initial care plan

Current position:

number of acute beds in England

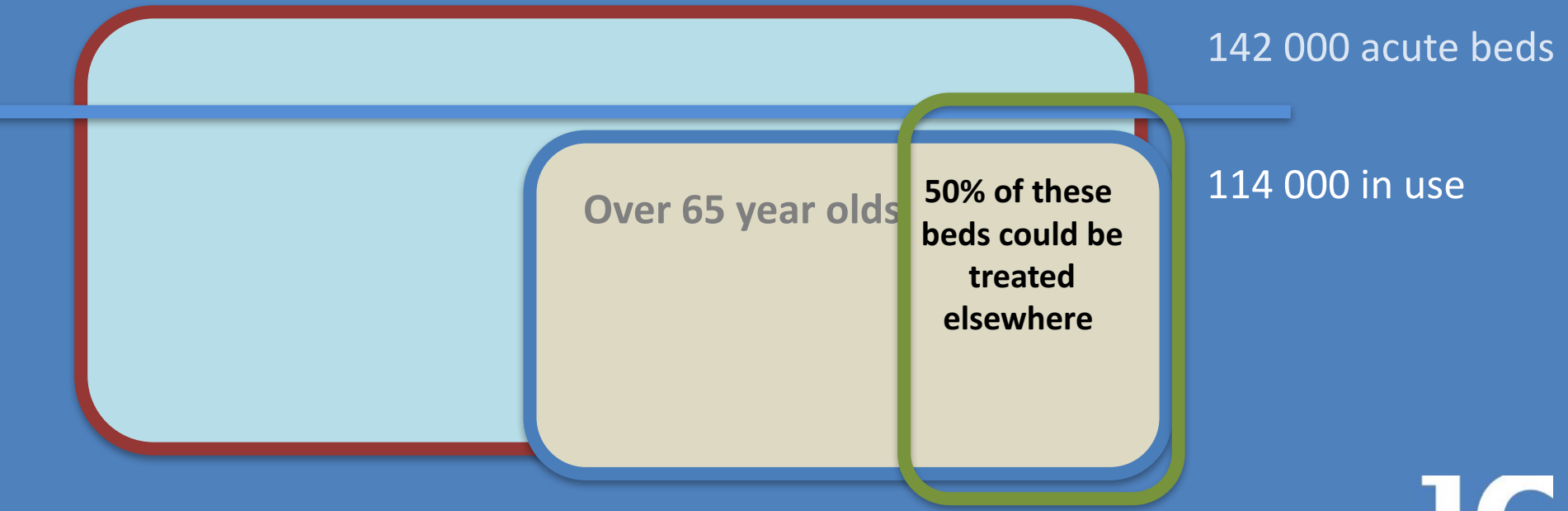


142 000 acute beds

114 000 in use

Current position:

number of acute beds in England



Change:

50% of these beds could be treated elsewhere

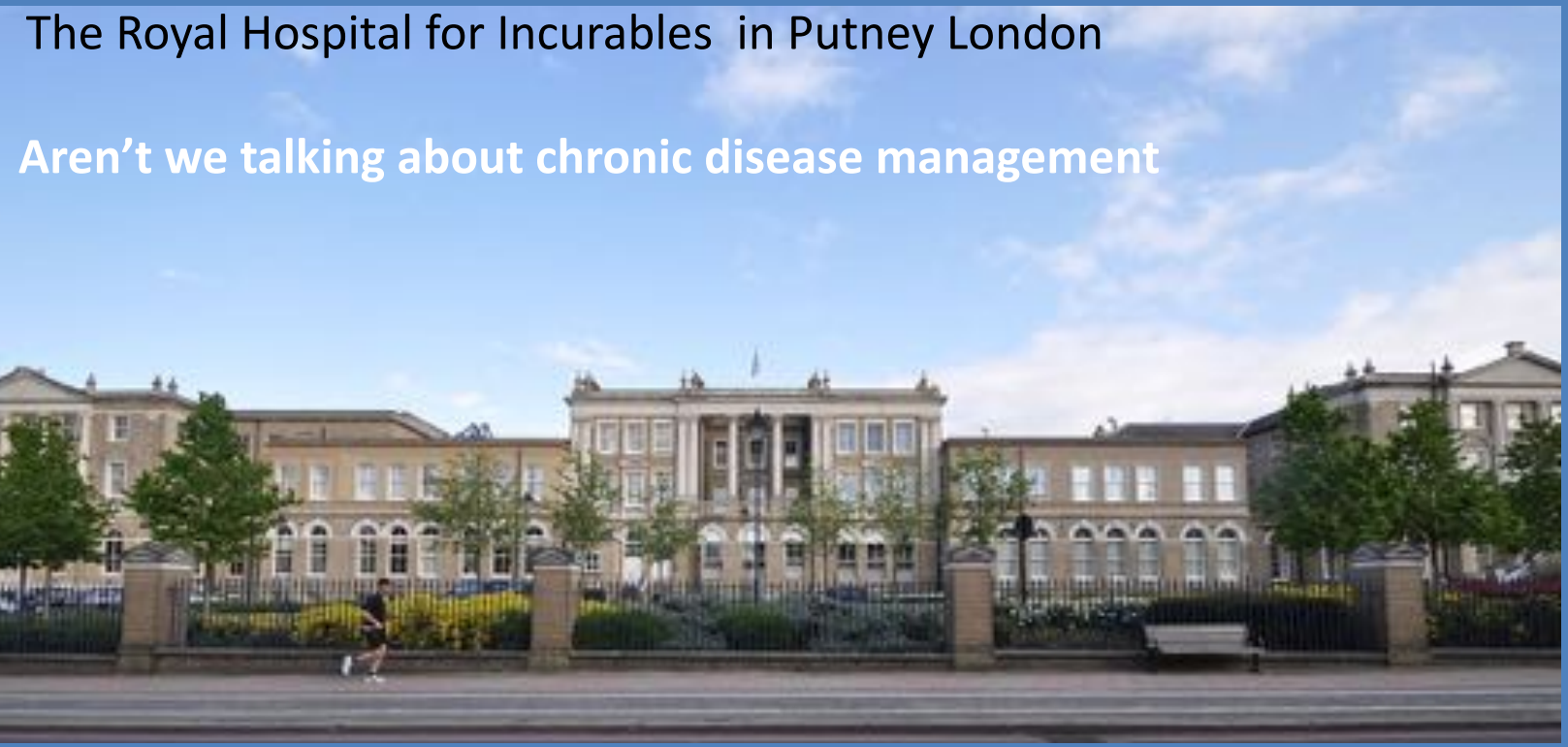
- Preventative medicine
- Virtual wards
- Extra care housing

Rehab/ step up/
step down beds

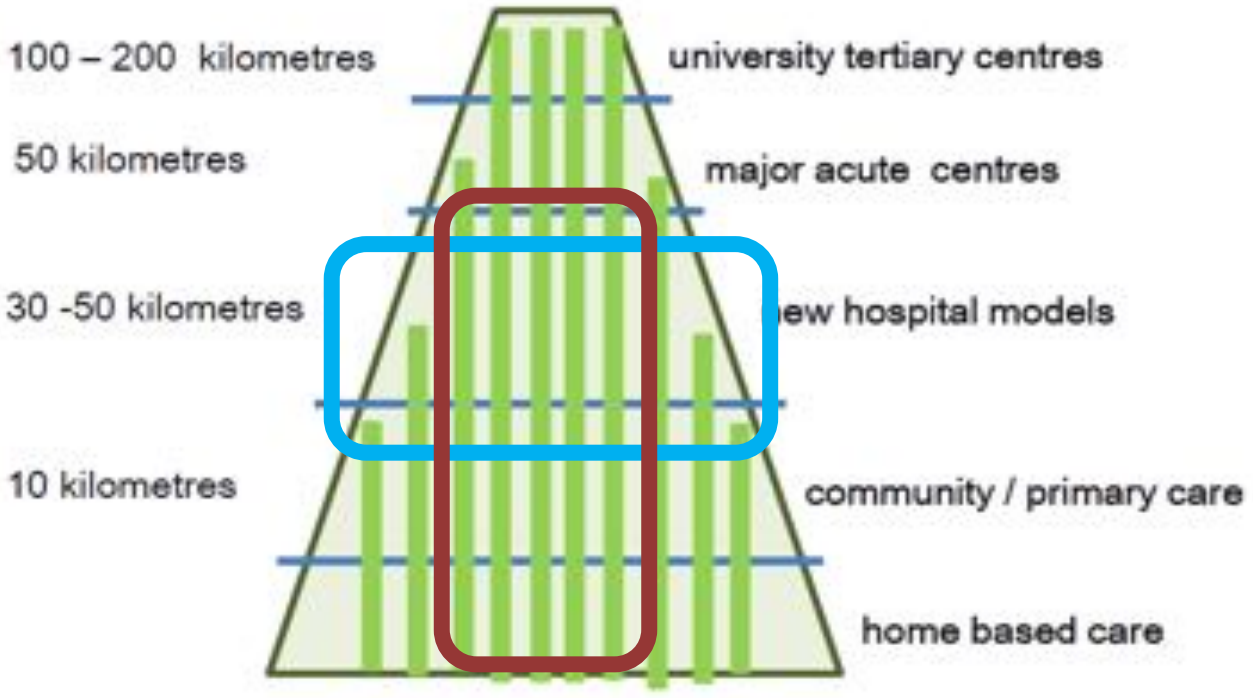
Let us think back

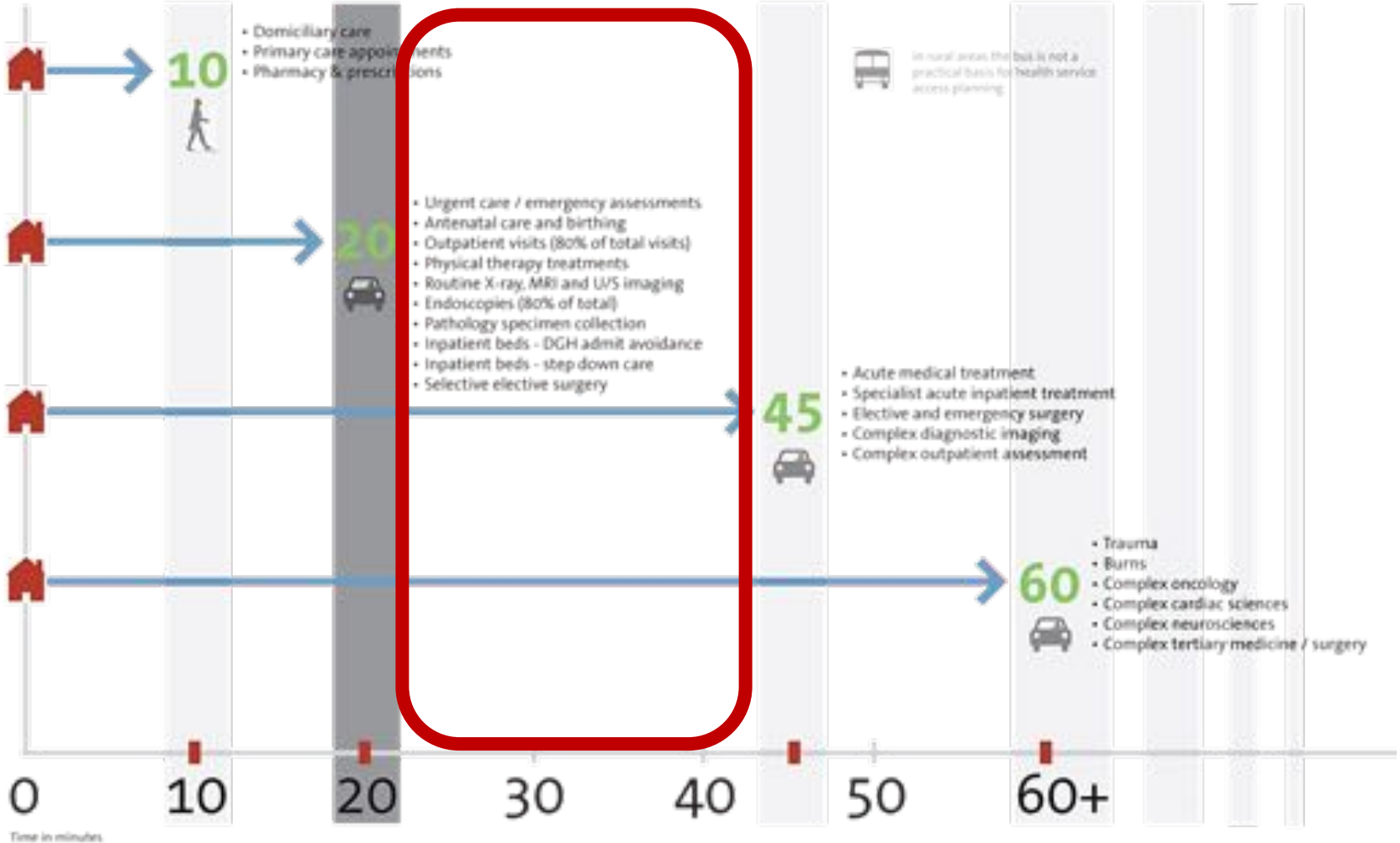
The Royal Hospital for Incurables in Putney London

Aren’t we talking about chronic disease management



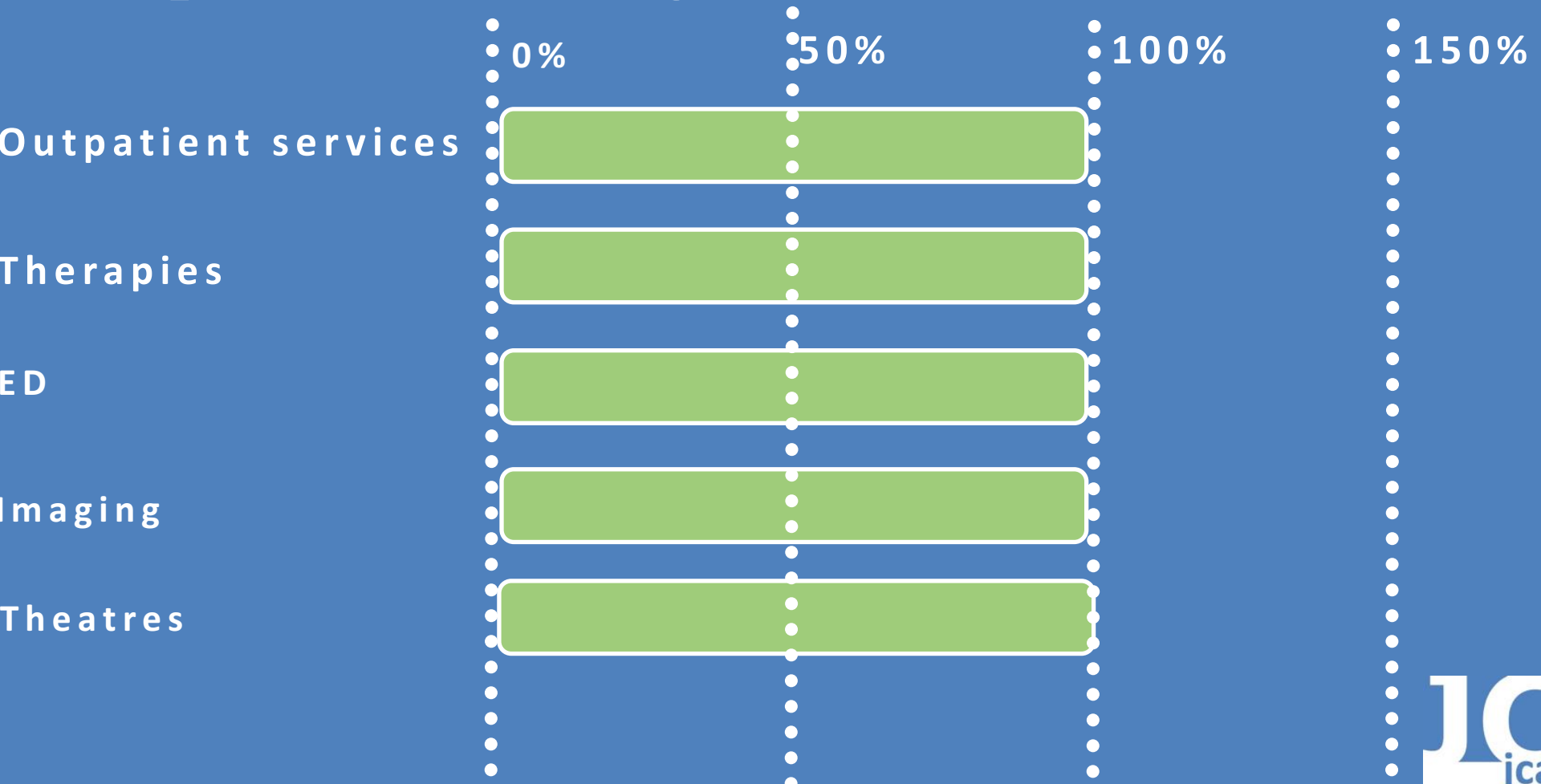
The need for new models for acute



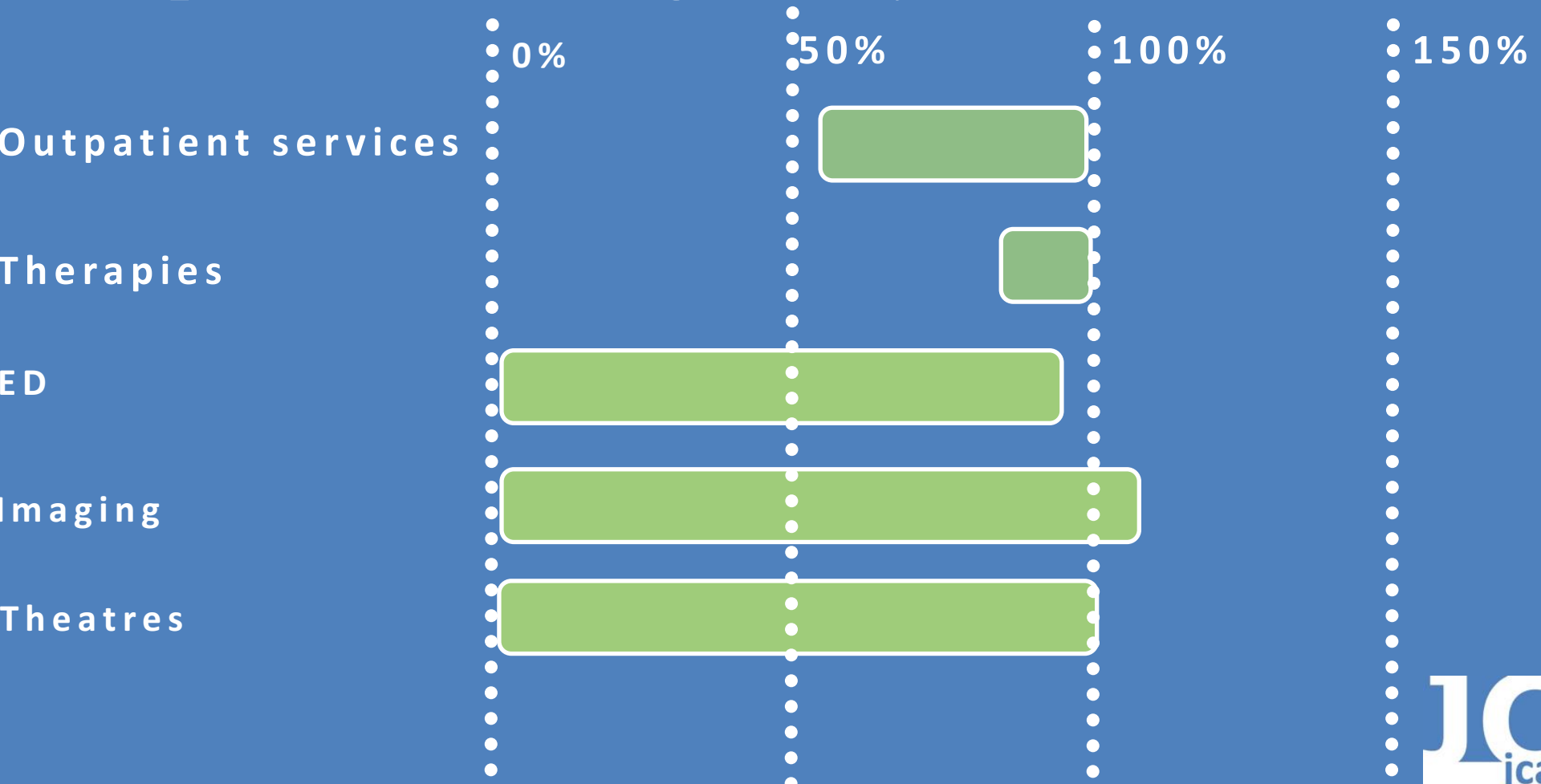

10
• Domiciliary care
• Primary care appointments
• Pharmacy & prescriptions
20
• Urgent care / emergency assessments
• Antenatal care and birthing
• Outpatient visits (80% of total visits)
• Physical therapy treatments
• Routine X-ray, MRI and U/S imaging
• Endoscopies (80% of total)
• Pathology specimen collection
• Inpatient beds - DGH admit avoidance
• Inpatient beds - step down care
• Selective elective surgery
45
• Acute medical treatment
• Specialist acute inpatient treatment
• Elective and emergency surgery
• Complex diagnostic imaging
• Complex outpatient assessment
60
• Trauma
• Burns
• Complex oncology
• Complex cardiac sciences
• Complex neurosciences
• Complex tertiary medicine / surgery
0
10
20
30
40
50
60+
Time in minutes

Brand

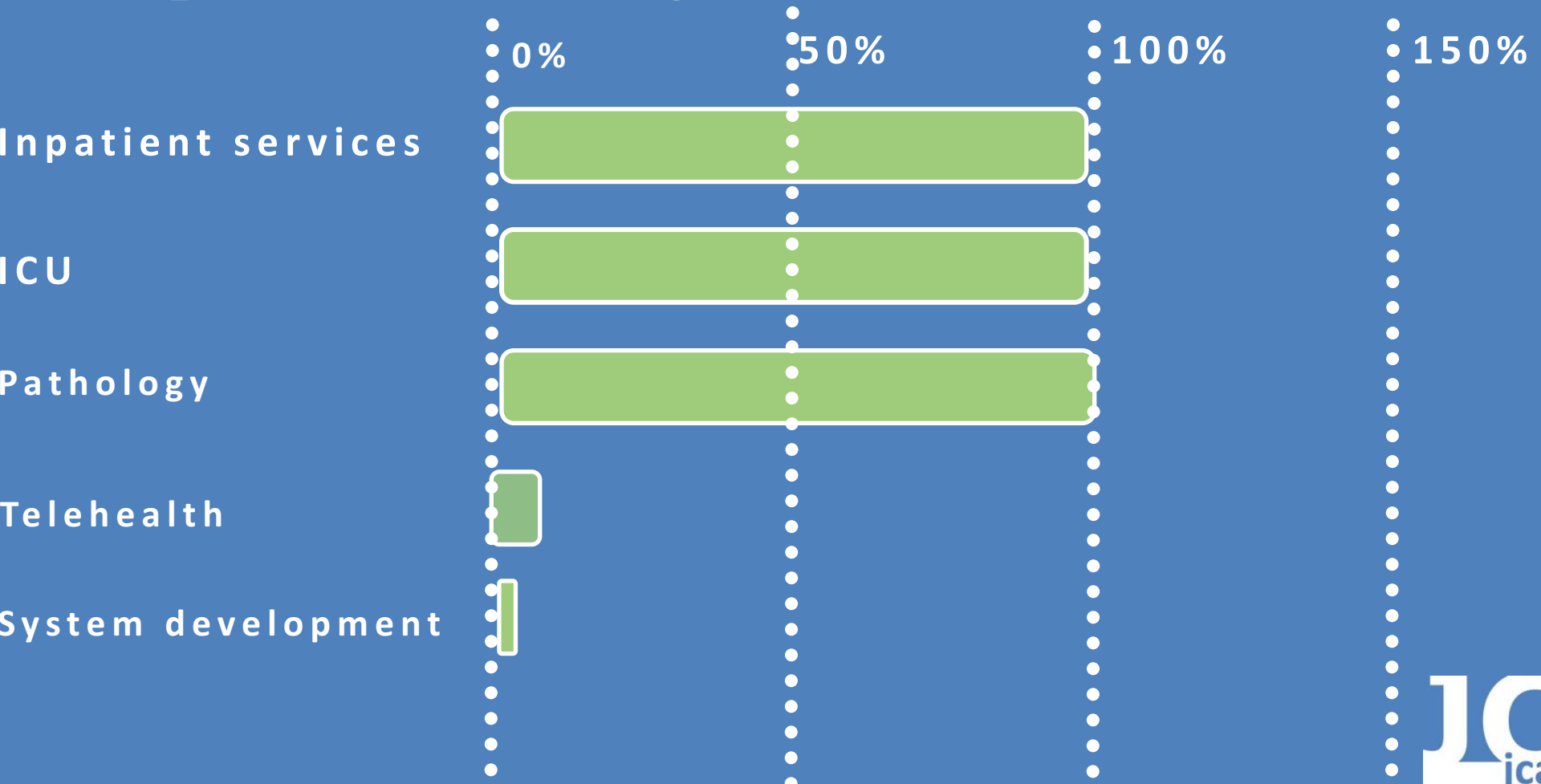
Components of change: now



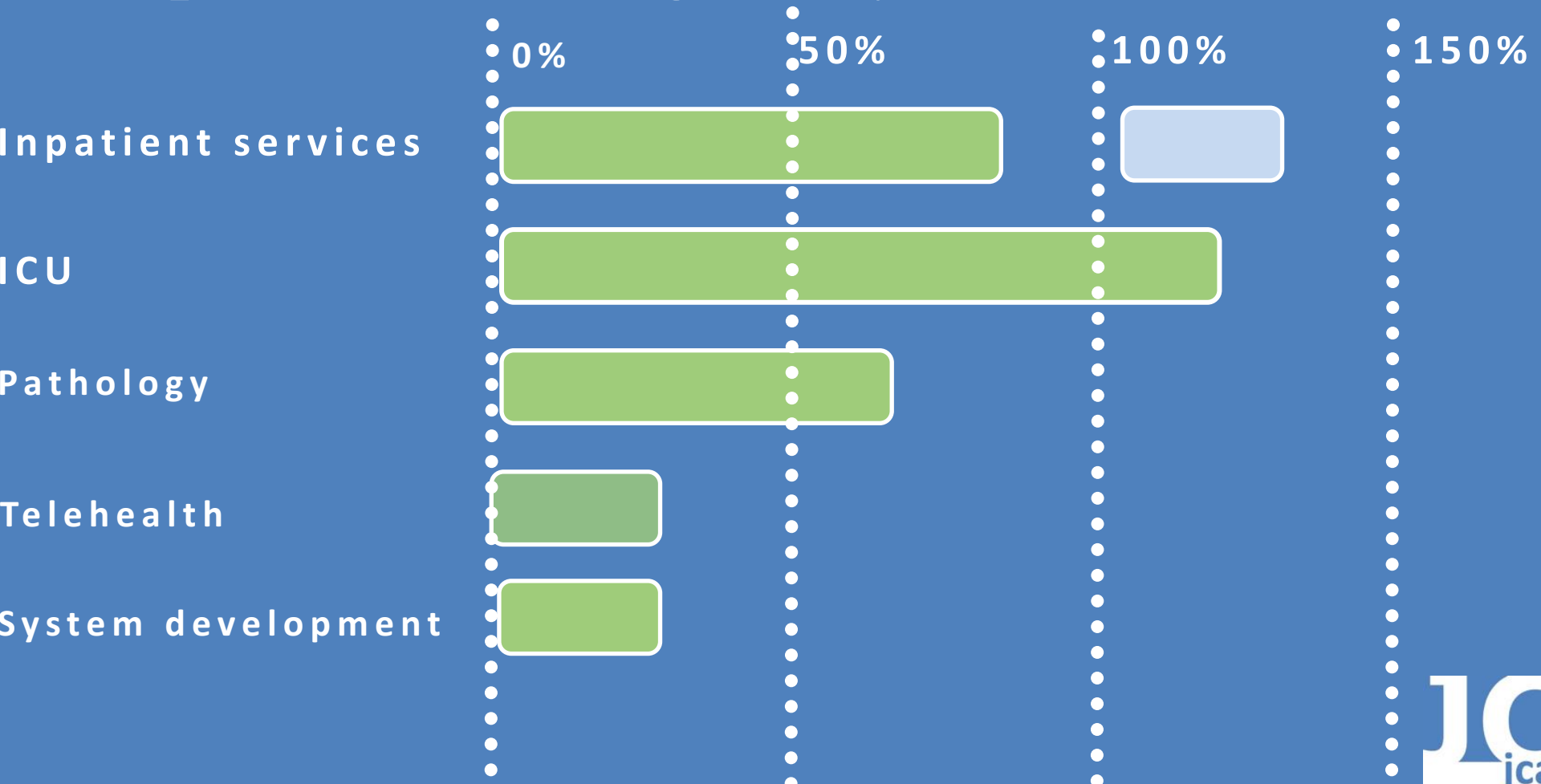
Components of change: very soon



Components of change: now



Components of change: very soon



How do we make sustainable buildings

Good buildings get re-used

Poor buildings are demolished

Design: Lariboisiere

NOTES ON HOSPITALS
BY
FLORENCE NIGHTINGALE.

- Space
- Ventilation
- Light
- Patient groupings
- Management

Lariboisiere Hospital

Design:

Space

Ventilation

Light

Patient groupings

Management

Lariboisiere Hospital


WHITEHALL
PARLIAMENT ST
HOUSES OF PARLIAMENT
ST THOMAS HOSPITAL
MAPCO
MAPCO
MAPCO

Hospital in the city

Hospital in the City

New Necker Hospital

No hierarchy within

The re-usable hospital: maxims

Location

Chassis

Space

Ventilation

Light

Patient groupings

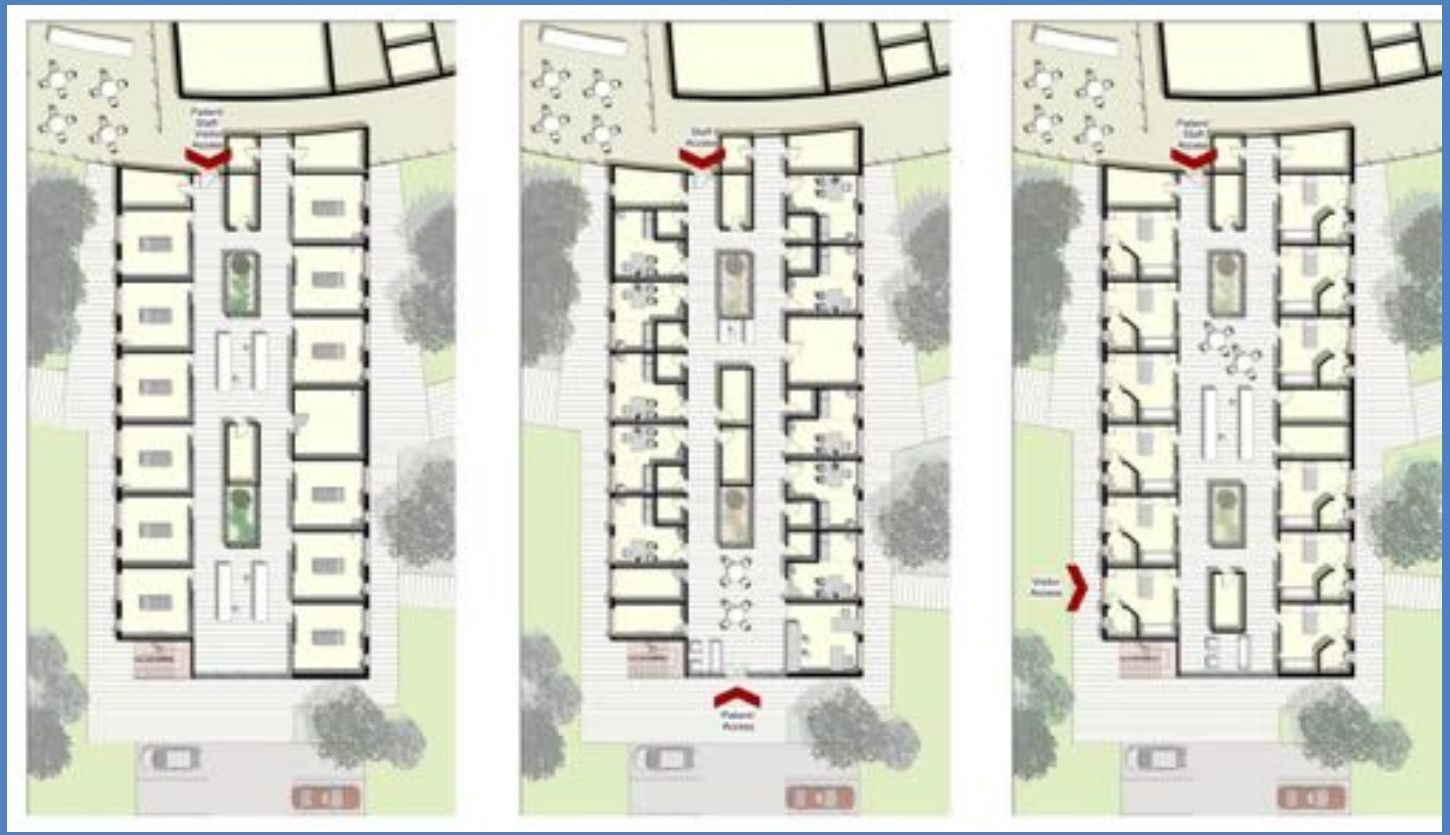
Chassis

Residential accommodation

Theatres

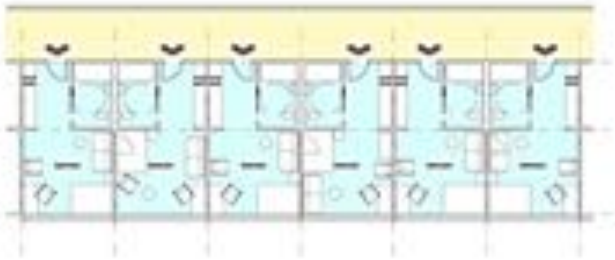
Width of floor plate

The re-usable hospital: maxims



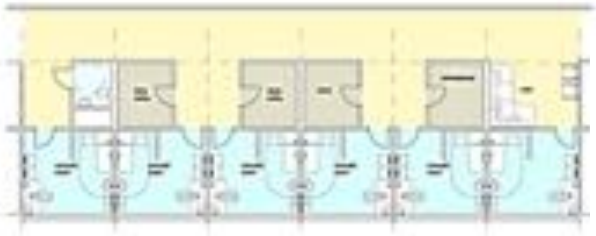
ICU outpatients inpatients

The flexible building block



nursing home

extra-care flats

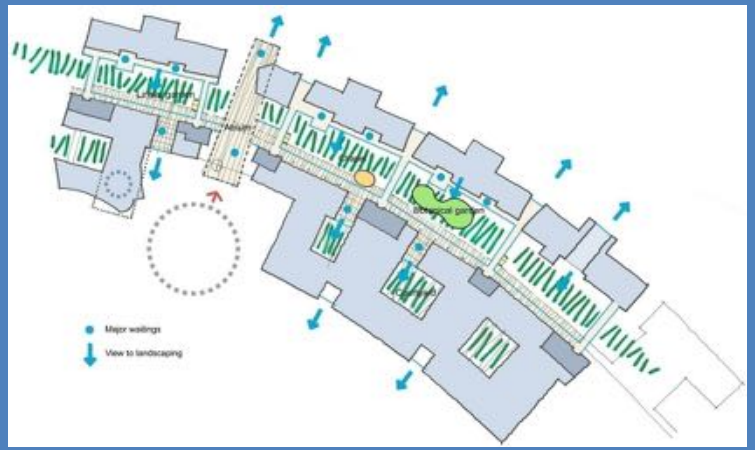


GP practice
community hub

The flexible chassis

Eliminating hospital-land

success

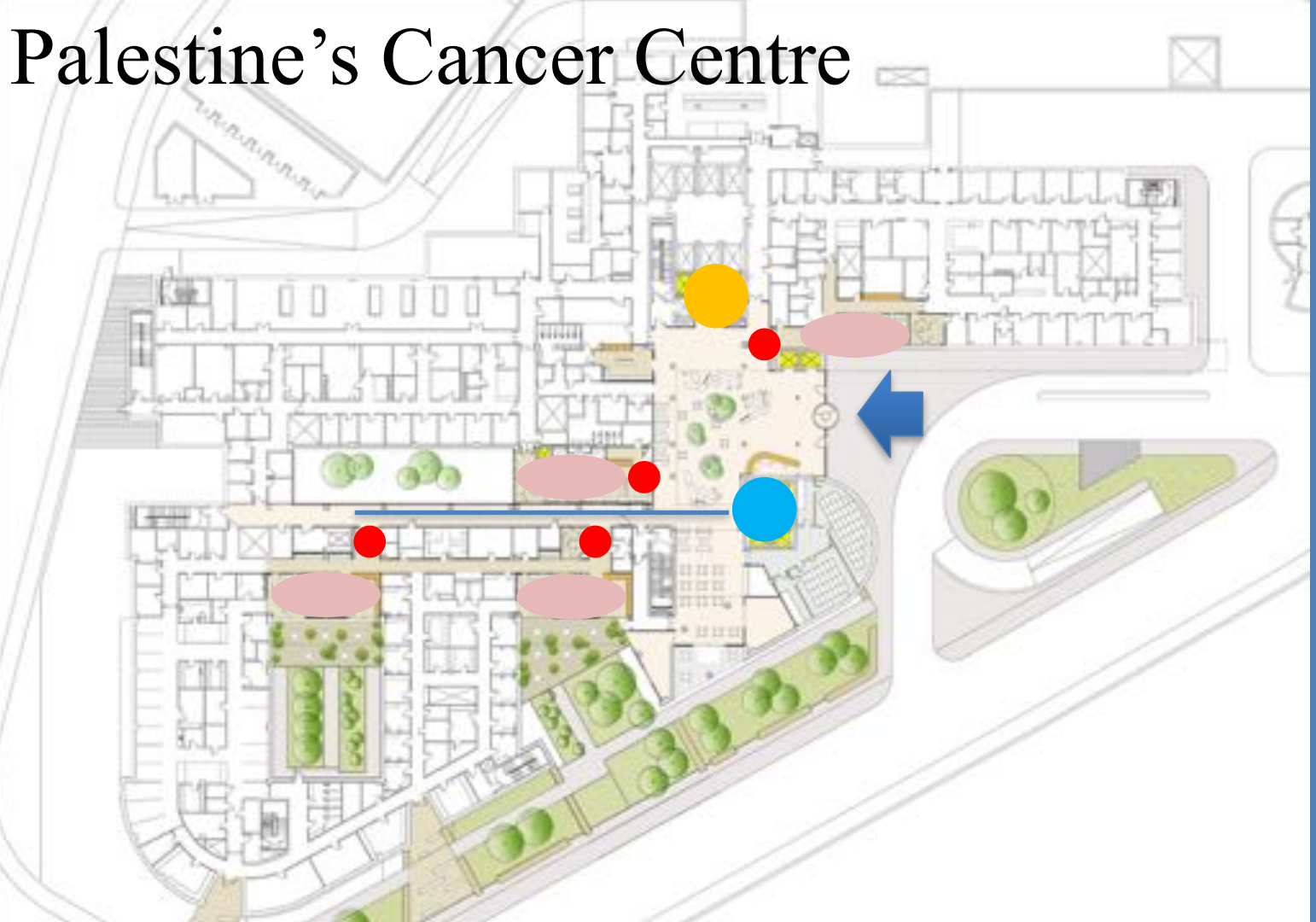


Eliminating hospital-land

failure

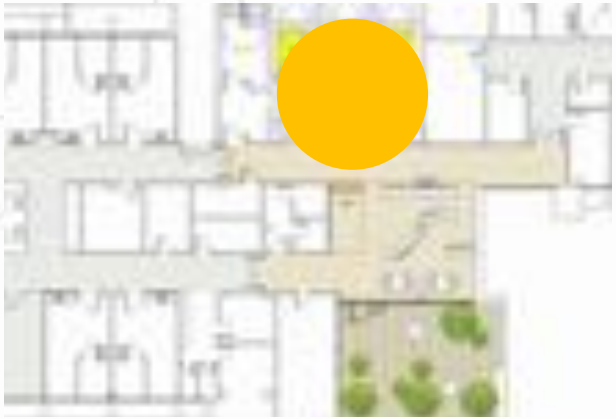
Palestine’s Cancer Centre

Palestine’s Cancer Centre

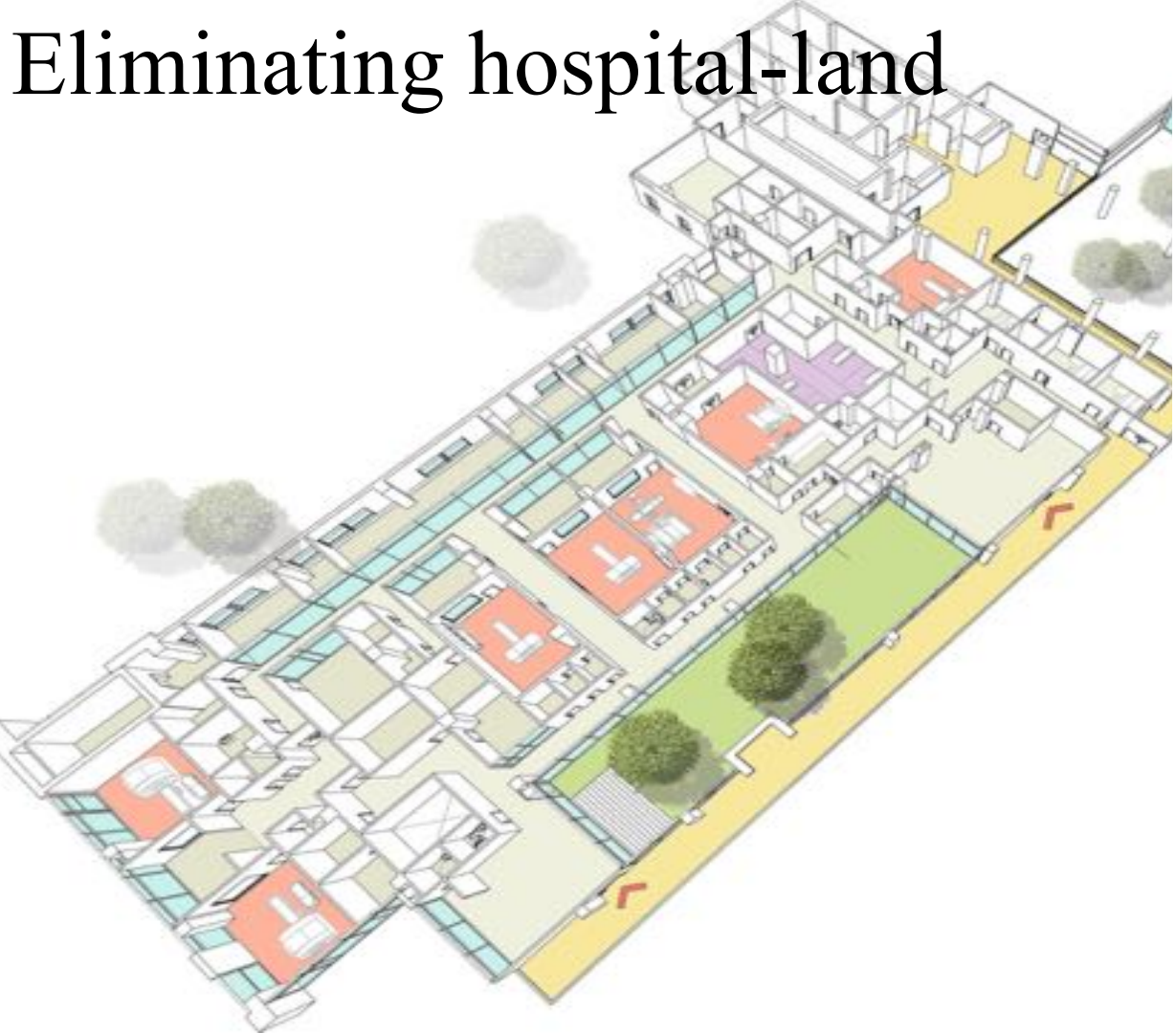


Palestine’s Cancer Centre

Palestine’s Cancer Centre



Eliminating hospital-land



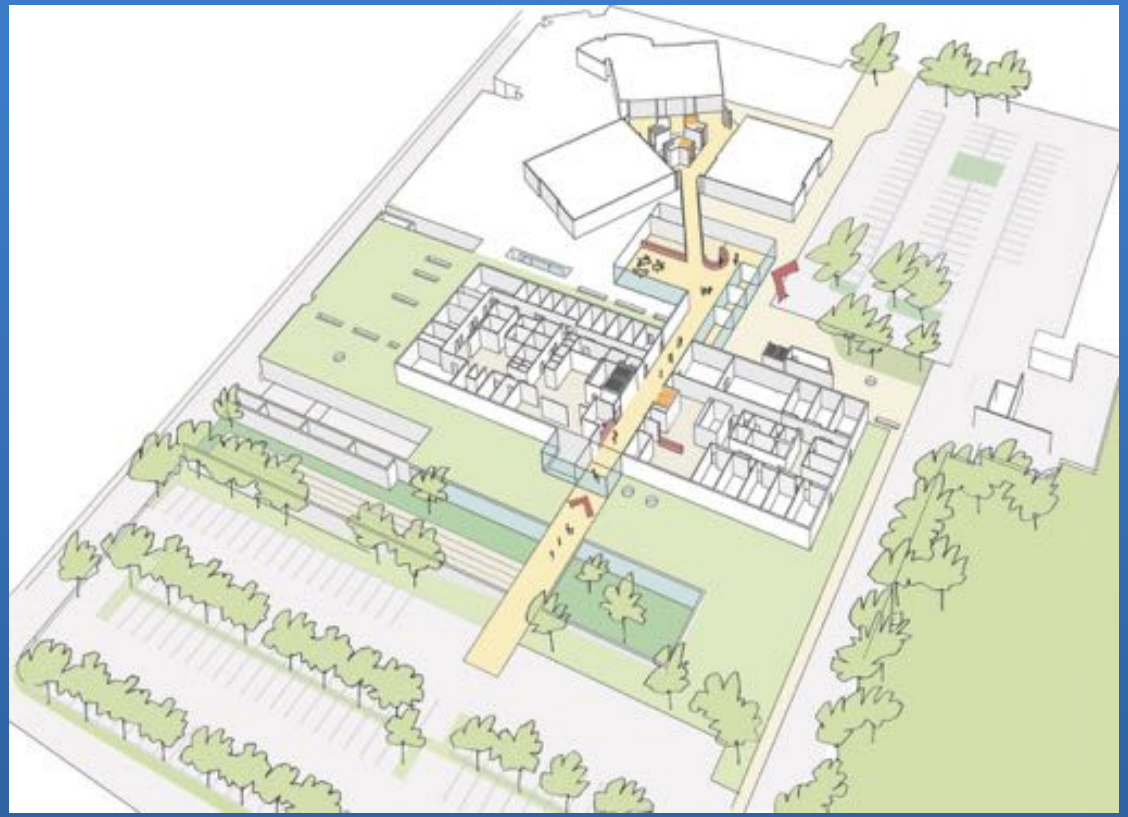
Eliminating hospitals like this

Eliminating hospital land

Re-using hospitals

Serviced office/medical offices/ start ups spaces

Mixed use hospitals: de la Tour Geneva

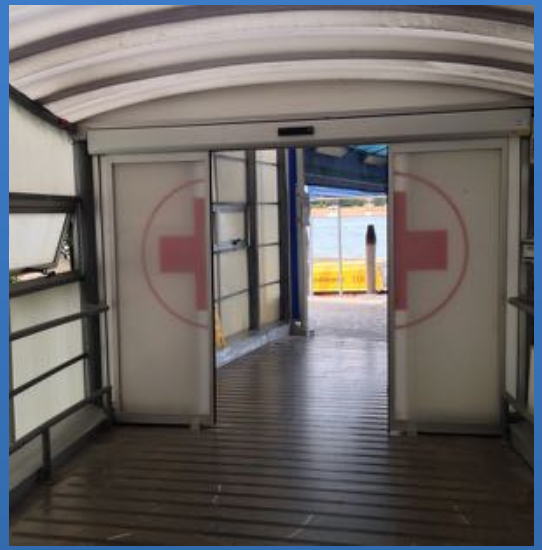


Mixed use hospitals: de la Tour Geneva

Thank you

Challenge: how to use old buildings and hospital estates



Model developments

A new community for 2500

A new 350 bed hospital

A community healthcare hub

90 step down bed facility

650-780 apartments

24 town houses

50 courtyard houses

60 sheltered apartments

Retail opportunities

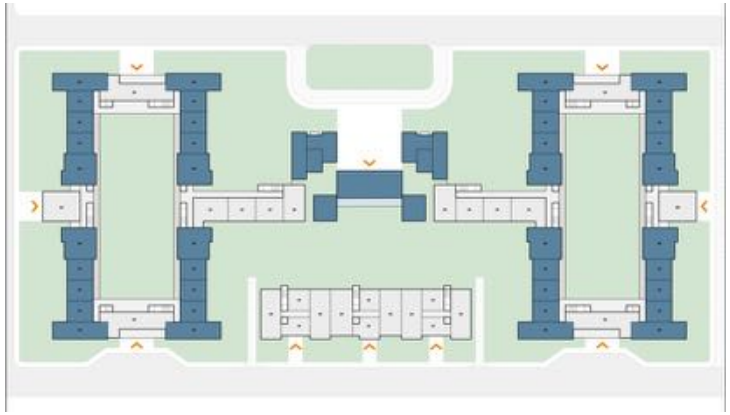
Healthplex gym

Workhouse conversion

These buildings have architectural qualities

Workhouse conversion

Coherent architectural form



Conversion of Victorian core