

# **Searching for sustainable global health Innovation, technology and the built infrastructure**

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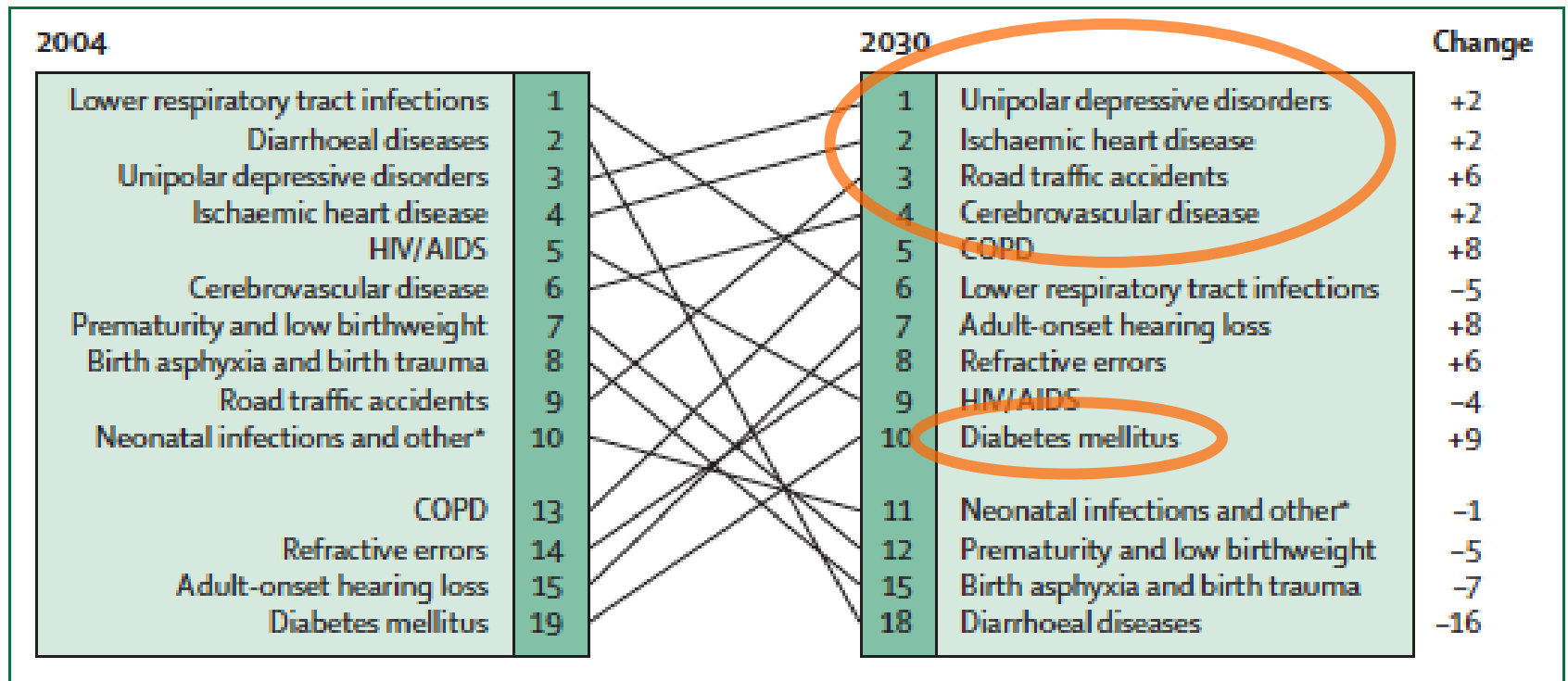
# Overview

- 1 Global health challenges
- 2 The innovation imperative ... in developed and developing health systems
- 3 Disruptive innovation and the implications for the built environment
- 4 Conclusions

# An epidemiological shift is taking place

Leading causes of disability-adjusted life years are changing

Howitt et al. (2012) 'Technologies for global health'. The Lancet Commissions.  
[http://dx.doi.org/10.1016/S0140-6736\(12\)61127-1](http://dx.doi.org/10.1016/S0140-6736(12)61127-1)





**Ageing** population  
around the world ...

1915

Calories are expensive, exercise is cheap



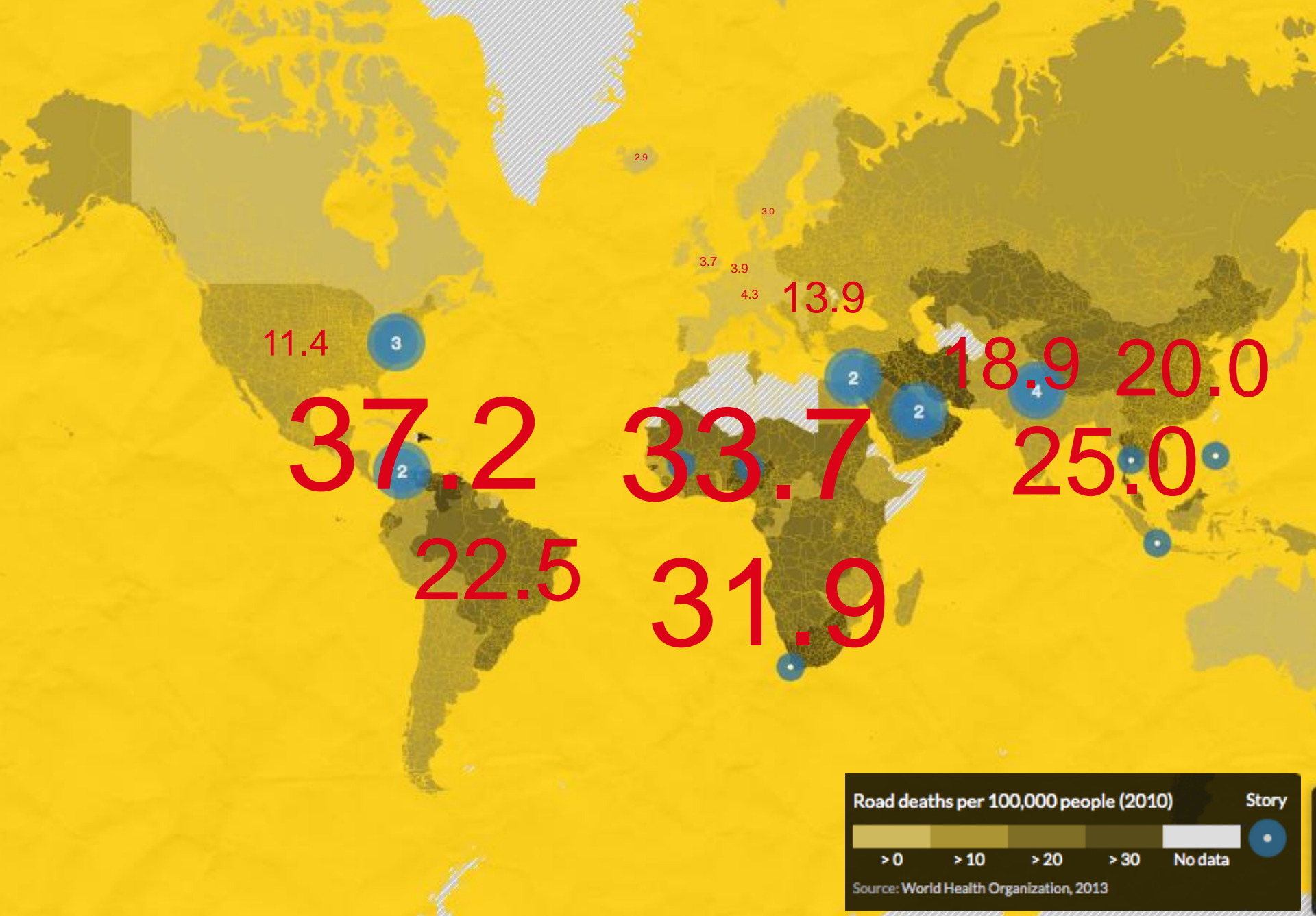
2015

Exercise is expensive, calories are cheap

And there are other major problems that are  
**global health** issues ...











Dengue fever response, Yoyogi Park, Tokyo, August 2014

[http://ajw.asahi.com/article/behind\\_news/social\\_affairs/AJ201408290036](http://ajw.asahi.com/article/behind_news/social_affairs/AJ201408290036)

Health systems therefore face  
an **innovation imperative**

... but this plays out in  
different ways around the  
world



<http://ic2030.org/2014/09/harnessing-innovation/>

#1

In the developed world innovation is needed to cope with **escalating costs, resource constraints, rising demand**

“If we do not fix our  
healthcare system the  
US may go the way of  
General Motors –  
paying more,  
getting less and going  
broke”



# The potential **funding gap** in the UK's NHS by the 2020s

£28bn

£60bn

£20bn



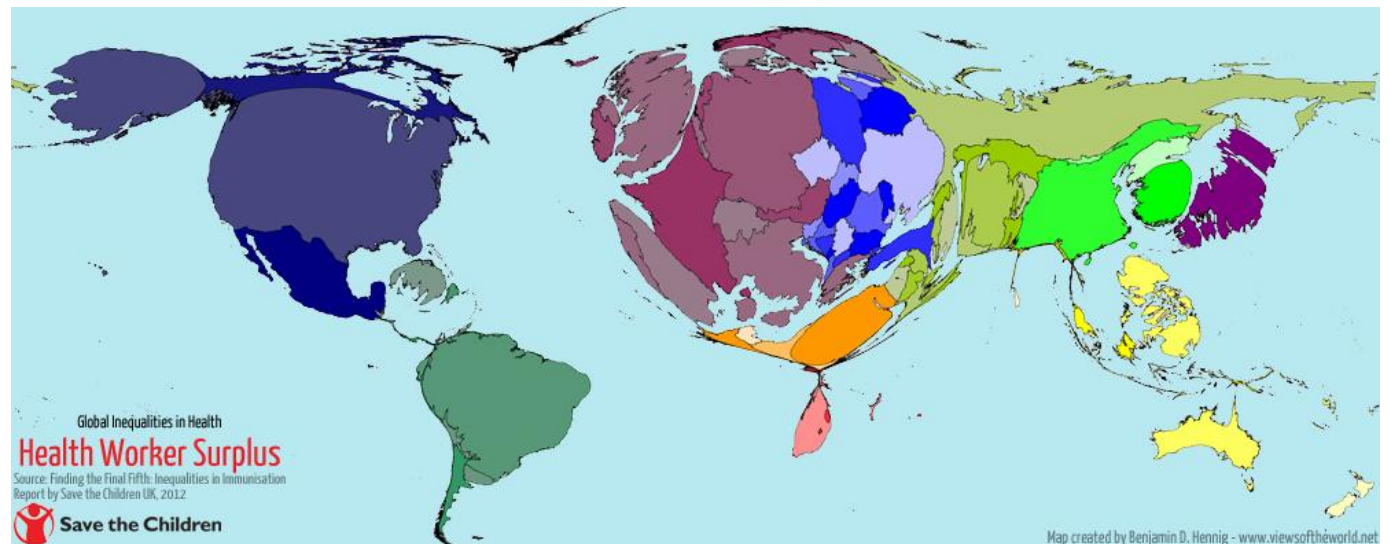
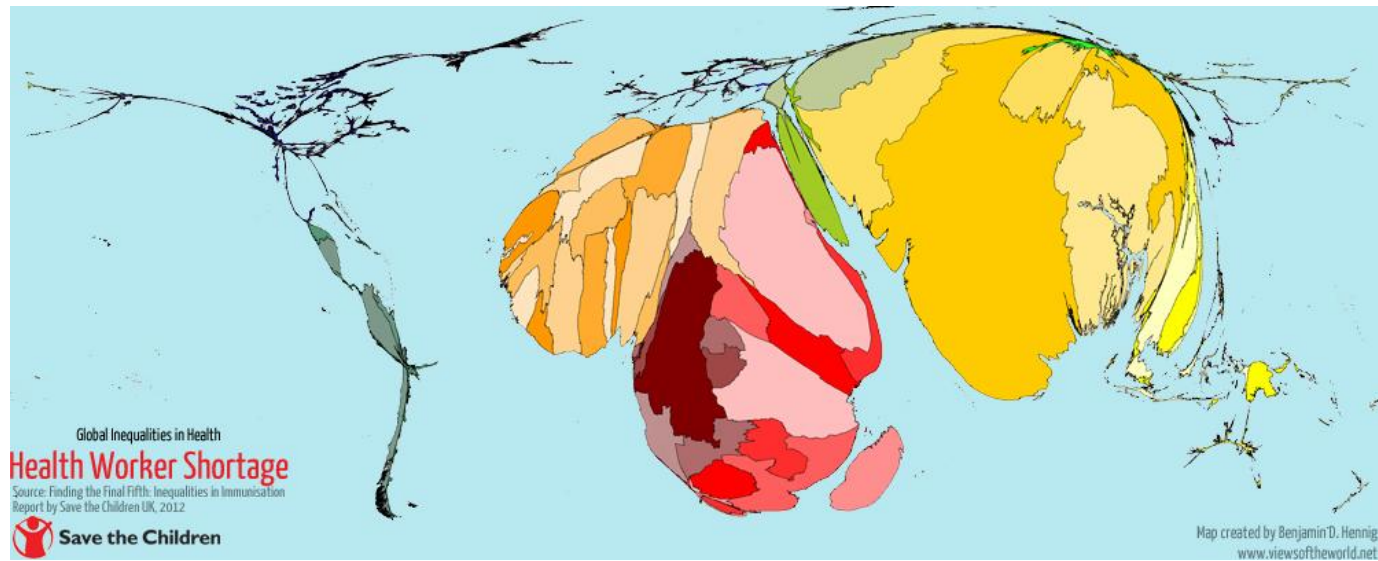
£44bn

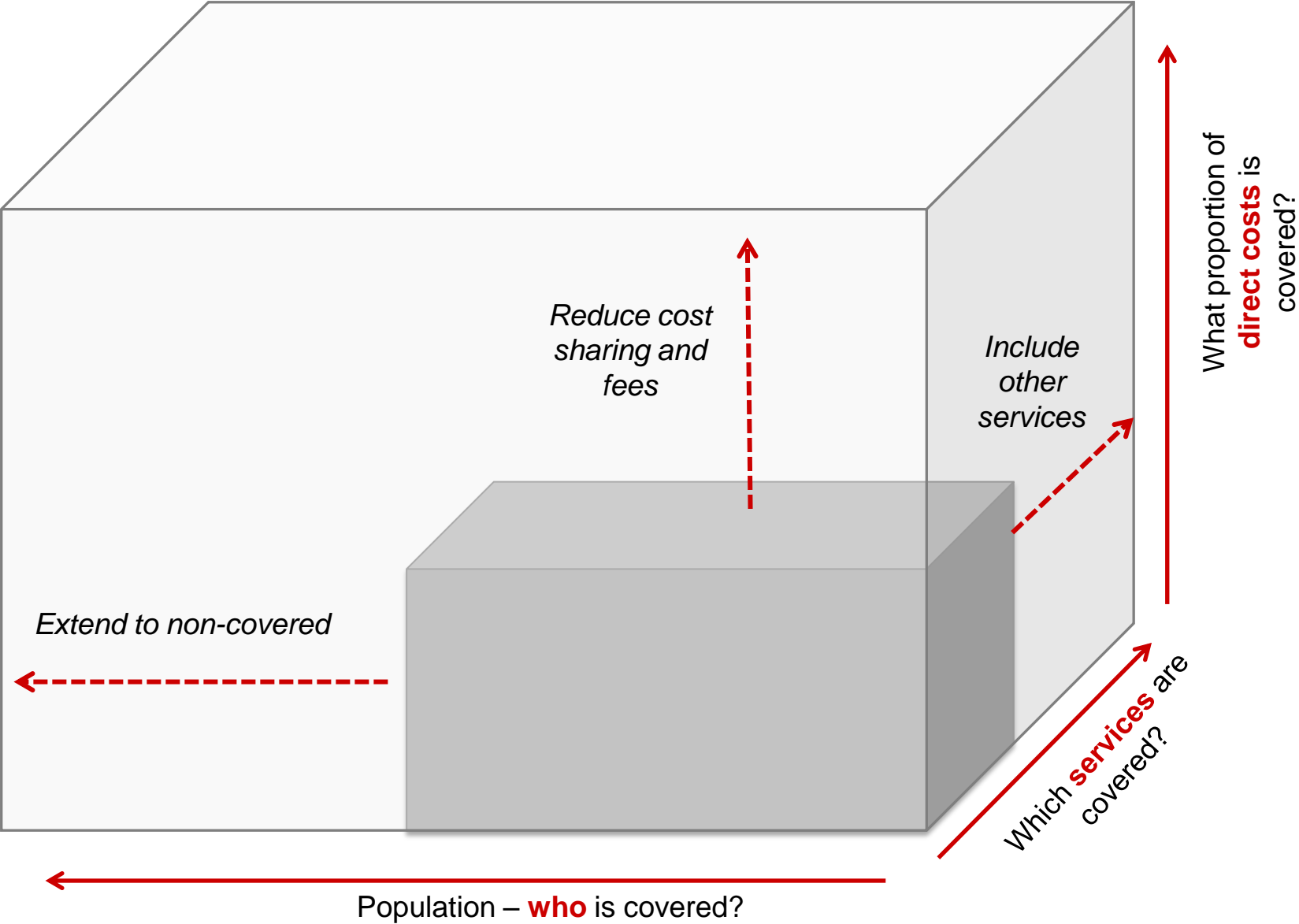


#2

In poorer countries innovation is needed to increase **access to healthcare**







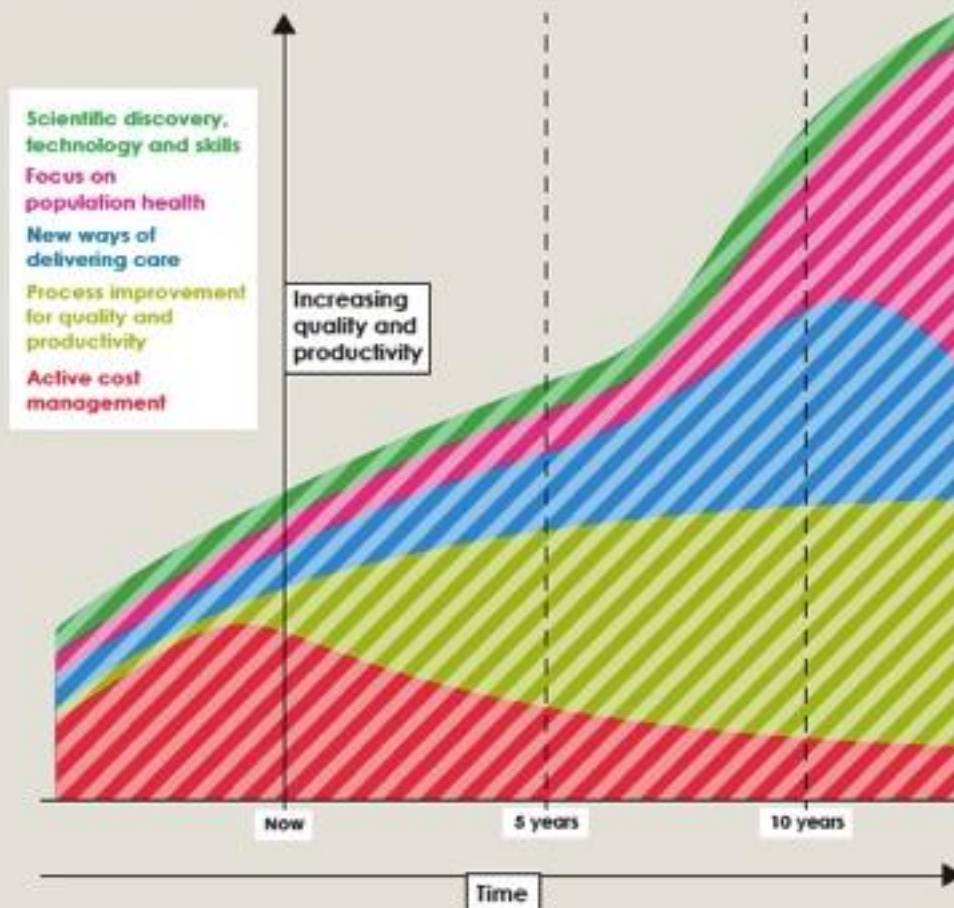
So what's the role of  
**innovation** and what's the  
role of the **built**  
**environment** in meeting  
these challenges?



*"Action is needed in each of the five layers to maximise the chances of success."*

Figure 1 gives an illustration of the potential contribution each layer might have on increasing quality and efficiency over time. For instance, it suggests that the benefits of changes to deliver care in new ways are not likely to be realised until after this parliament. In practice, it is hard to be certain about the scale and timing of the efforts needed and the impact that will be achieved. However, it is clear that action is needed in each of the five layers to maximise the chances of success.

Figure 1: Potential impact of the five layers of the strategic framework



Technology innovation is only a small part of the story

The Health Foundation  
(2015) *Shaping The Future*.  
A strategic framework for a  
successful NHS

# 80% service and financial innovation

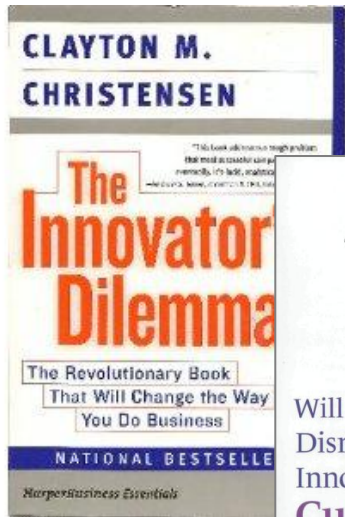
15% science and technology

5% **BUILT ENVIRONMENT**

What kind of innovative thinking do we need?



disruption



Over-  
specification?



Technology, disruptive innovation and the **built environment** for healthcare – three implications

#1

We need new physical infrastructure for acute healthcare ... but **expensive new hospitals** are not the solution

# In developed countries hospital-centred models are increasingly financially unsustainable

- High fixed costs and infrastructure depreciating faster than it can be replaced
- Increasing hospital deficits
- Clinical and economic evidence suggests benefits of a more devolved and integrated system





In countries with  
developing  
healthcare  
systems new  
hospitals are  
needed ...

but we are in danger of  
replicating **out-dated  
models** of care and  
facilities design



King Fahd Specialist Hospital & Research Centre Campus, Riyadh,  
Hauptquartier der King Fahd Specialist Hospital & Research Centre  
Medizinische Spezialität: 920.000 Quadratmeter

We spend about \$500bn a year on new healthcare infrastructure so we need to ensure it's **fit for purpose** in the future ...



2014 ...

2034



We need **leaner, functional, fit for purpose**  
models – disruptive or frugal innovation  
principles



- **CHALLENGE:** provision of affordable cardiac care for low income people
- **INNOVATION:**
  - specialisation plus **process and supply chain** innovation
  - cross **subsidy** from higher income patients
  - **outreach** to rural areas using telemedicine and mobile lab
  - **build costs \$6m** instead of \$60m (India average) or \$600m (US average)
- **IMPACT:** surgery **costs 1/30th** of comparable US providers
  - Heart surgery for \$800 (vs \$3000)





From mass-  
customised housing  
to **mass-customised  
hospitals?**

#2

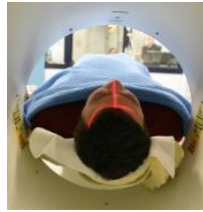
Rethinking the infrastructure for  
primary care



# We must embrace the emerging **faultline** in healthcare infrastructure



**Tertiary care**



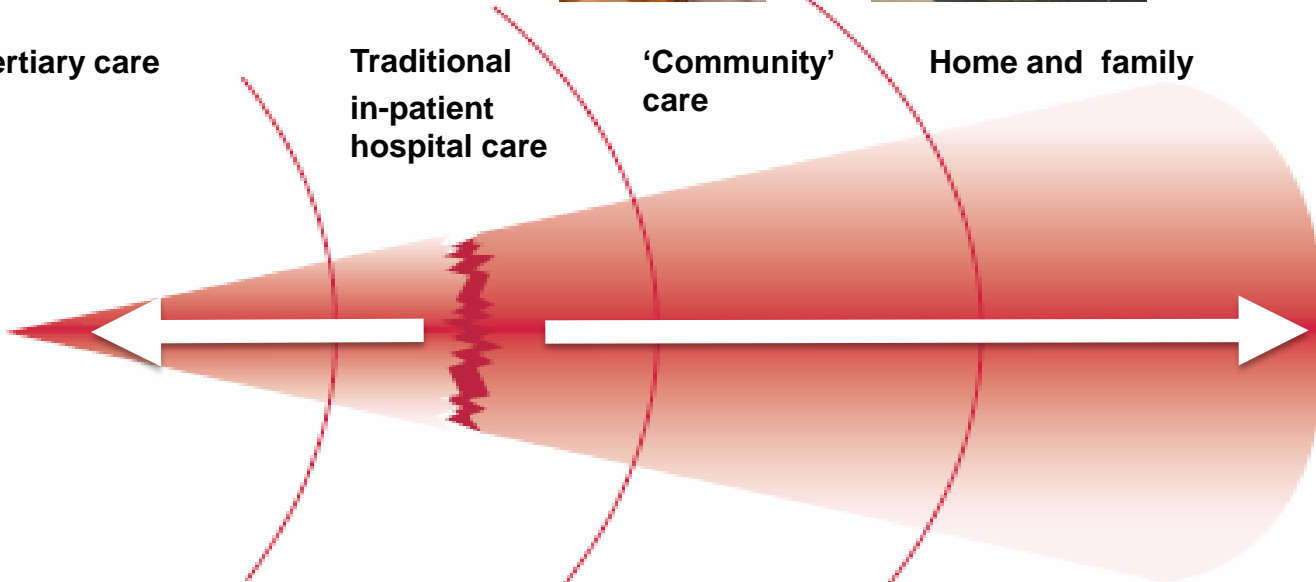
**Traditional  
in-patient  
hospital care**



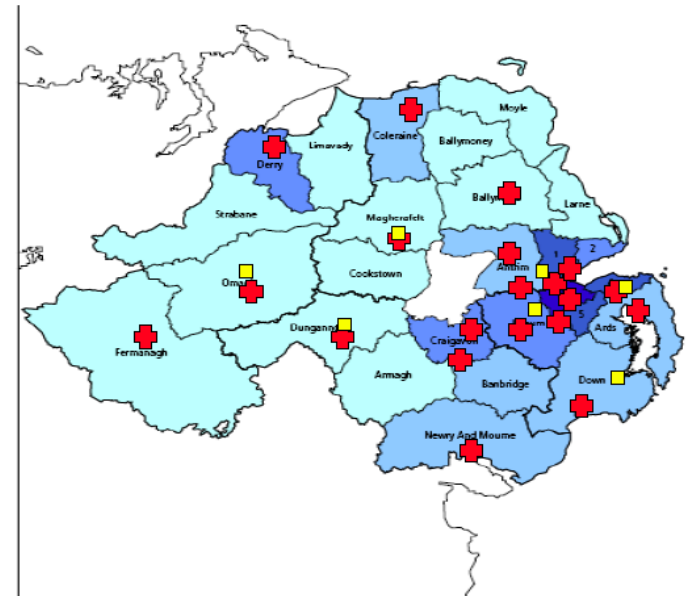
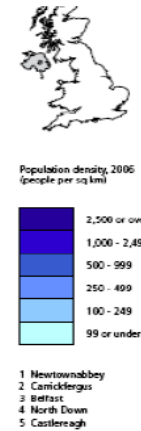
**'Community'  
care**



**Home and family  
care**



We are beginning to do this in developed countries, e.g. Northern Ireland: **integrated care + infrastructure reconfiguration**



**£3.3bn** for 1.8 million population ...

so what about developing health systems?

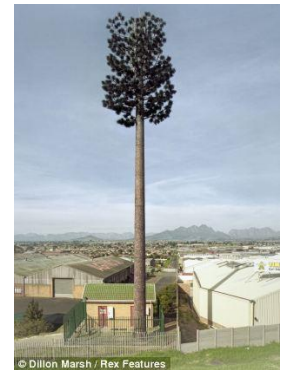
Using technological innovation and existing technical infrastructure to **leapfrog old models of care**

# Connectivity

90% of world population is within reach of a mobile phone mast

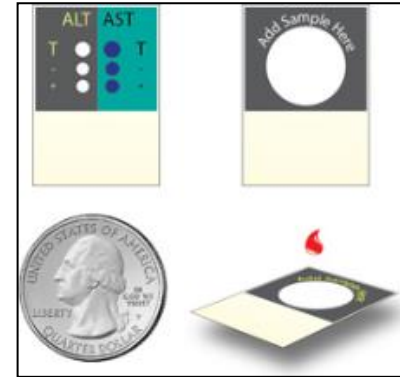
Use this to shift the **location** of treatment from hospital to the community ...

and shift **expertise** from doctors to individuals and C21 'barefoot doctors'



# Innovations in diagnostics

MobiSante



# New **business models** are just as important as technology and buildings

**eHealthpoint:** scalable, self-sustaining model for delivering water and healthcare to underserved rural communities

**Arogya Ghar:** defraying healthcare costs by making healthcare data available for population studies and research



harvesting innovations for people



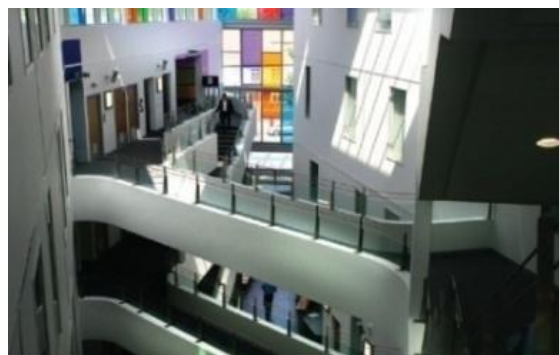


#3

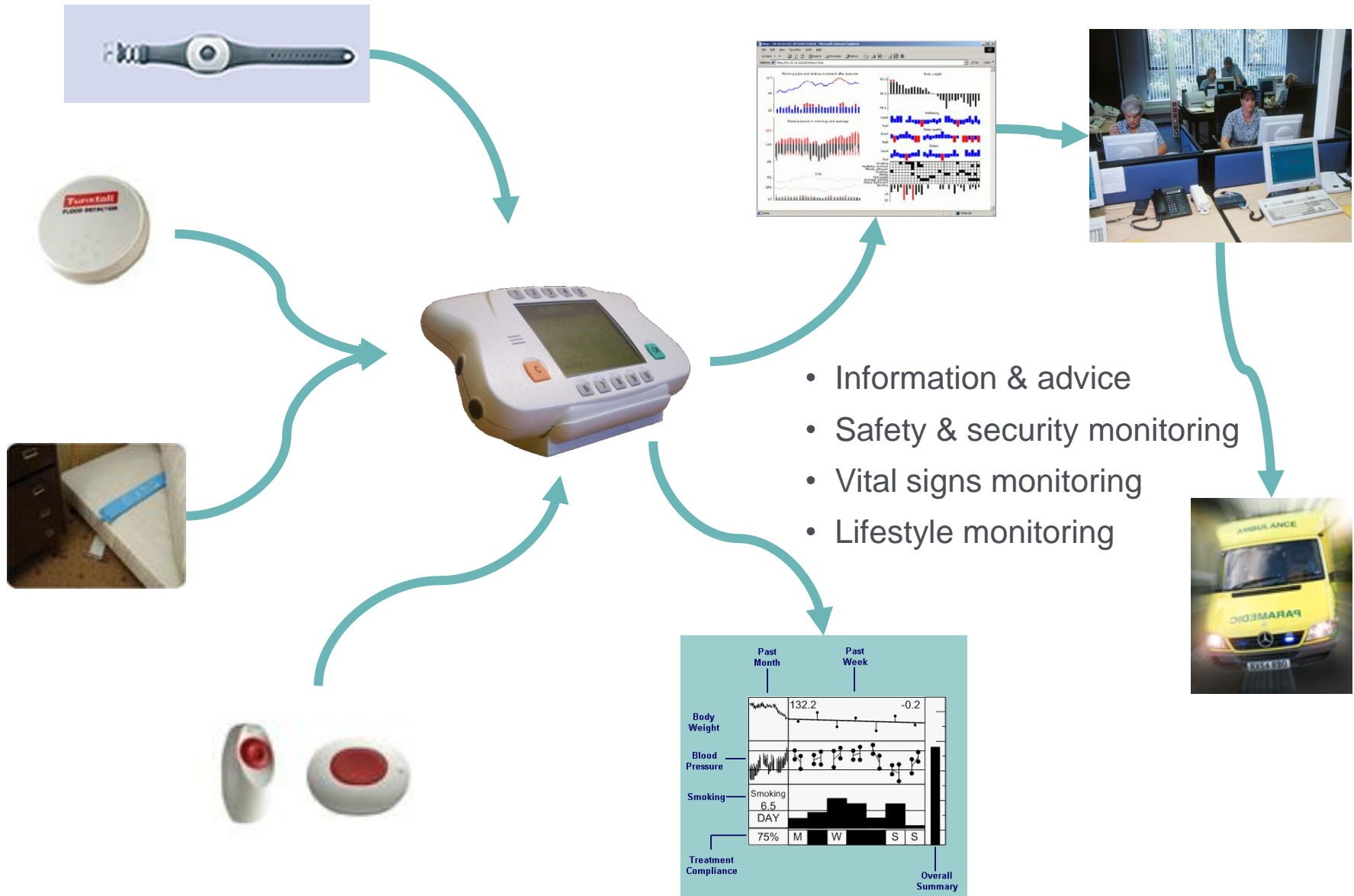
The next generation of healthcare infrastructure must include our homes



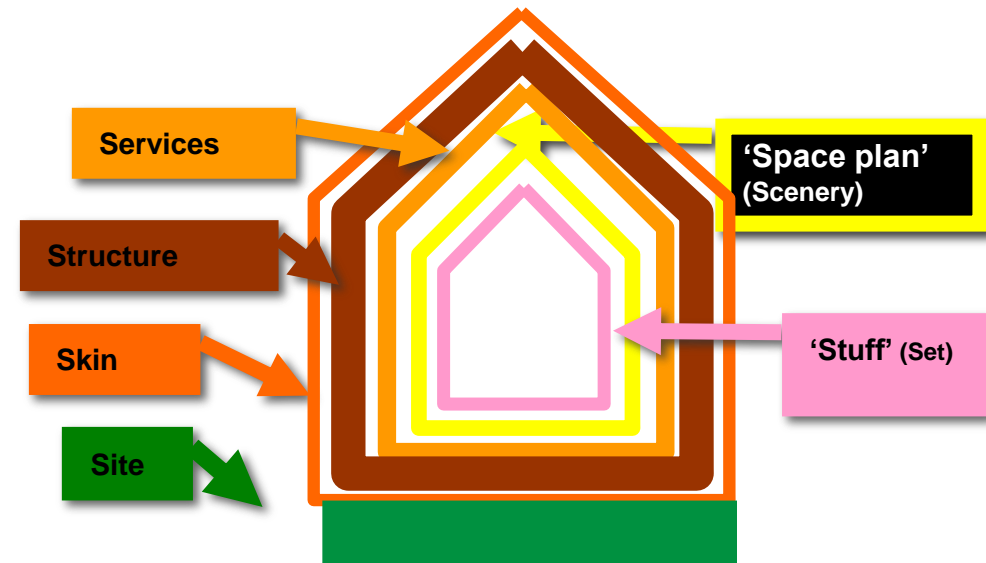
Wellcome Images



# Remote care – telehealth / telecare



# Our homes need to be **up to the task**



Addressing **housing needs**  
in many countries a global  
health challenge and an  
opportunity





## The challenge today ...



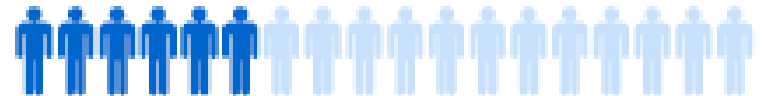
96 million  
urban households are  
financially overstretched



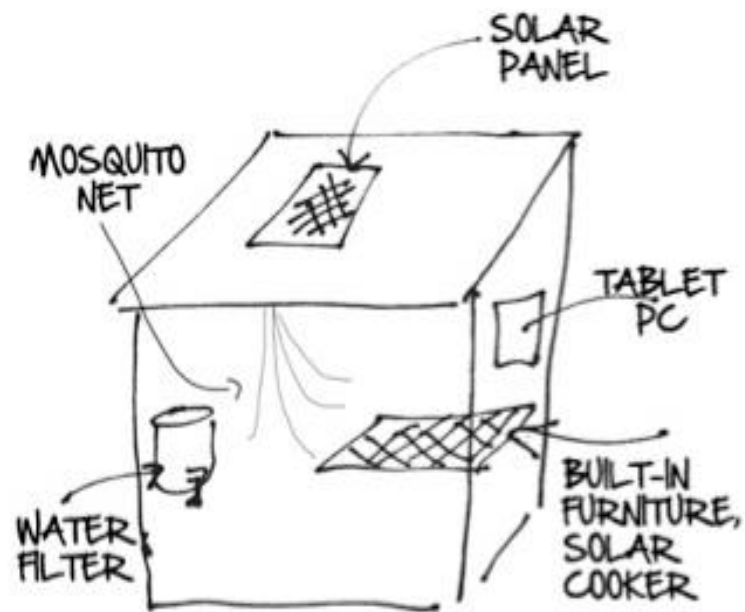
235 million  
urban households live in  
substandard housing

## ... and by 2025

106 million additional low-income households  
will face the affordability housing challenge



... affecting 1.6 billion people or  
one-third of urban population



THE \$300 HOUSE for the POOR

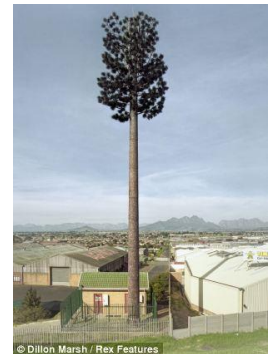


Concluding thoughts

# Concluding thoughts 1

Creating future sustainable health systems is going to need built infrastructure that supports to new models of care ...

but our **definition of 'healthcare infrastructure'** must evolve



## Concluding thoughts 2

New hospitals and other built facilities are clearly still needed ...

but we mustn't replicate  
**outdated models** of  
healthcare and healthcare  
facilities design



Thank you

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