Intelligence-driven healthcare: What should the future look like?

Design Summit

Tuesday 15th May 2018

The Strategy Unit.

NHS

Midlands and Lancashire
Commissioning Support Unit

Context

Peter Spilsbury

The Strategy Unit.

"If I had an hour to solve a problem I'd spend 55 minutes thinking about the problem and five minutes thinking about solutions."
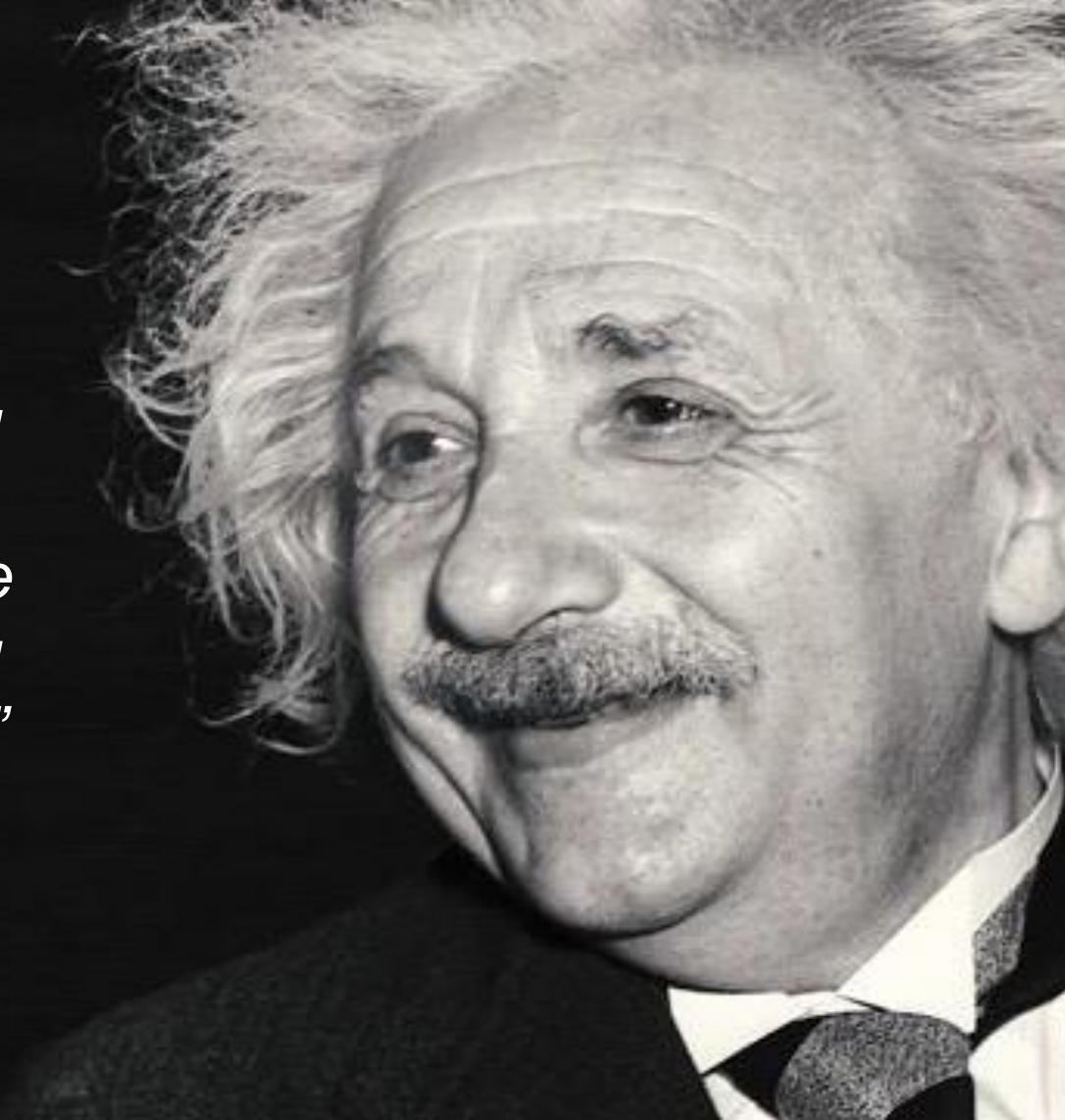
Macro strategic challenges for health services?

- People living longer, but in UK in poorer health

- The rise of long term conditions and 'lifestyle' illness

- Ability to do more

- Expectations, consumerism and societal appetite for risk/rescue

- Suboptimal patterns of utilisation

- Workforce availability

- Willingness to spend; interest in caring?

Strategy of strategies – a summary

Desired end-point (why?)	Common approaches to achieve these ends (what?)	Common mechanisms within these approaches (how?)
Optimise health/ care within a budget by: Best identifying need (individuals : groups) Prioritise (invest in 'health') Target Ensure effective intervention	Empower people for self-care and shared decision making Prediction and prevention Early intervention / de-escalation to lower cost setting when problems occur (assumed reduction in hospital demand) Evidence based care and standardisation Lean operation across systems Co-ordinate and integrate care at local place (primary/secondary; Mental Health/Physical Health; beyond health) Removal of ineffective clinical activity Experiment with new care models based around achievement of outcomes Reduce workforce demarcation Greater use of digital technologies	Lead and think across systems, not single organisations Get systems to think about expenditure and cost across a broader range of areas (invest better), with sense of single overall budget Rethink incentives/payments around populations and outcomes Organisational and contractual arrangements (form) Use technology and data more effectively to organise care and take out costs (deliver better) Rationing criteria Defining pathways and standards Education and training Deliberate cultural change Design to support continuous improvement

A typical NHS strategy…

"The decision was made to provide individuals, their families, and neighbourhoods with a team of practitioners that would both coordinate medical care and lead health promotion efforts based on evidence gathered about the specific health problems faced by the population in their geographically determined catchment area.

In effect, the principles of public health and clinical medicine were combined into a single professional duo emphasizing prevention and epidemiologic analysis with improvement of individual and population health outcomes as the central purpose."

1980

NHS

Cuba

(National Health System)

http://ajph.aphapublications.org/doi/full/10.2105/AJPH.2012.300822

Rationale for this 'intelligence needs project'

Current situation:

Focus on performance and contract management

Financial transactions rather than clinical decisions

Data is gathered from questions asked from particular perspectives

Result - useful data for some parts of the system but no data for others

Future direction:

Integrated care systems…

Joined up, better coordinated care that is preventative and proactive

Multiple interventions required across the system

Shared risks and responsibilities for delivering outcomes

Achieve system wide benefits and savings

ICS's therefore need to fundamentally rethink the purposes of their information/data/intelligence needs
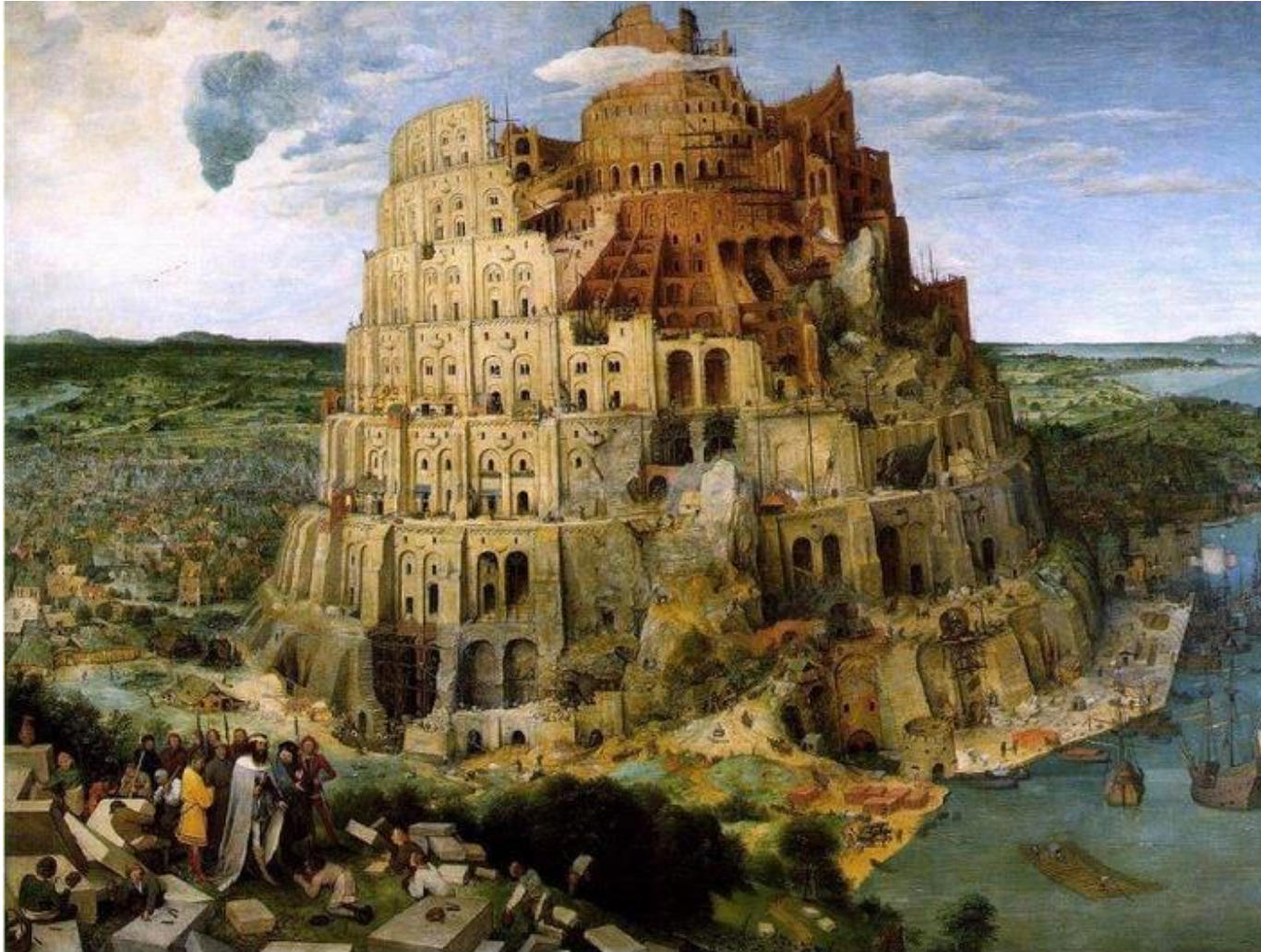
> It's not information overload. It's filter failure.

CLAY SHIRKEY

The Strategy Unit.

"Technology is so much fun but we can drown in our technology. The fog of information can drive out knowledge."

Daniel J. Boorstin

Data 'Tower of Babel'

"Ultimately, as Jorge Luis Borges illustrated so vividly in his short story "The Library of Babel," massive repositories of information offer both all possible truths and many falsehoods. Distinguishing between the two as health care systems venture further into the realm of big data will require discipline, as well as an understanding of both the strengths and limitations of the new systems."

Fihn et al, 2014

What is it we most need to know?

The most significant deficit holding back the successful deployment of risk prediction tools is the availability of well-tested interventions to reduce risk.

Having identified patients at high risk, healthcare systems commonly seek to reduce patients' risk by delivering specific interventions such as care coordination or care management. However, programmes that systematically deploy these interventions to high risk patients often fail to produce net savings. i.e. the cost of case management is greater than the cost of the avoided adverse events.

'The challenge then is not getting ever more data and information but what to do afterward'

Ezekiel J. Emanuel, 'Prescription for the Future' 2017

Woodrow Wilson (died in 1924) was asked by a member of his cabinet about the amount of time he spent preparing speeches :

"It depends. If I am to speak ten minutes, I need a week for preparation; if fifteen minutes, three days; if half an hour, two days; if an hour, I am ready now."

Defining our territory

How a 'system' or an 'integrated provider organisation' - thinking about the population it serves, the services it provides and the overall budget it needs to manage within - uses data and analysis to address key questions for itself , its constituents, its workforce and its patients/public..
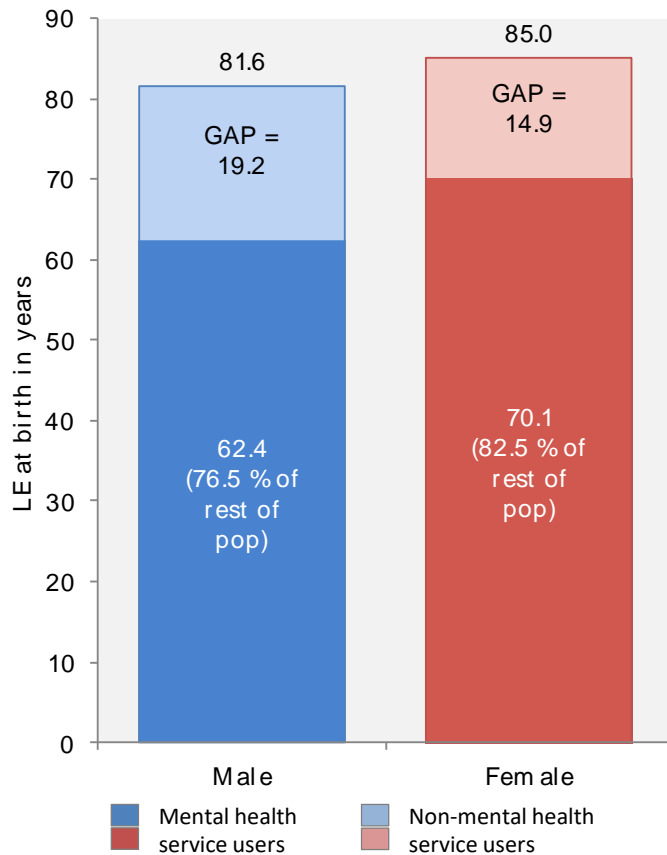
I.e. not how it uses data in clinical or other day to day operational systems; not about integrated care records (accepting that increasingly, in a well designed system, the boundaries will blur)
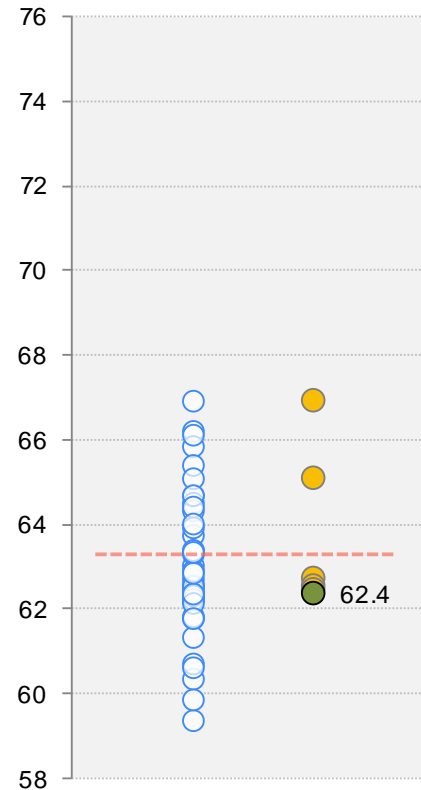
Chapter 1

The life expectancy of mental health service users

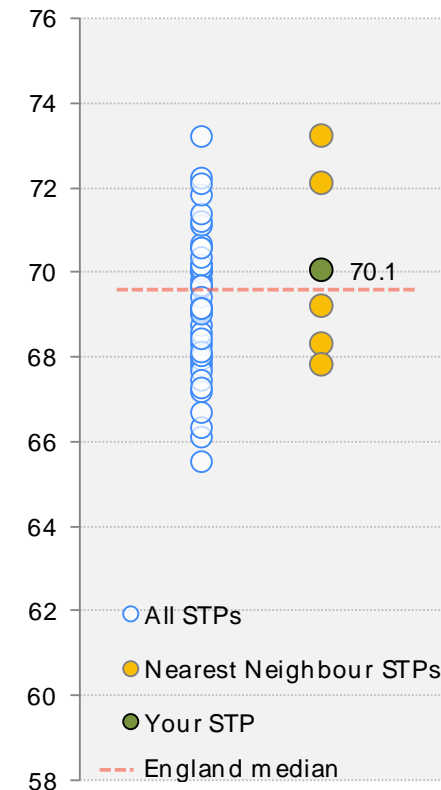# Life expectancies for the STP area [1]

Life expectancy at birth in years | mental health and non-mental health populations | 2012/13 to 2014/15 pooled

- 81.6
- GAP = 19.2
- 62.4 (76.5 % of rest of pop)
- 85.0
- GAP = 14.9
- 70.1 (82.5 % of rest of pop)

Male / Female

LE at birth in years

Mental health service users / Non-mental health service users

Life expectancy at birth | **MALES** | All mental health service users

62.4

Life expectancy at birth | **FEMALES** | All mental health service users

70.1

- All STPs
- Nearest Neighbour STPs
- Your STP
- England median

On average, men and women in contact with mental health services have a life expectancy 19.2 and 14.9 years less than the rest of the STP population respectively. Figures for men are the lowest compared to similar STP areas.

Life expectancies for the STP area [2]

Life expectancy at age 65 in years | mental health and non-mental health populations | 2012/13 to 2014/15 pooled
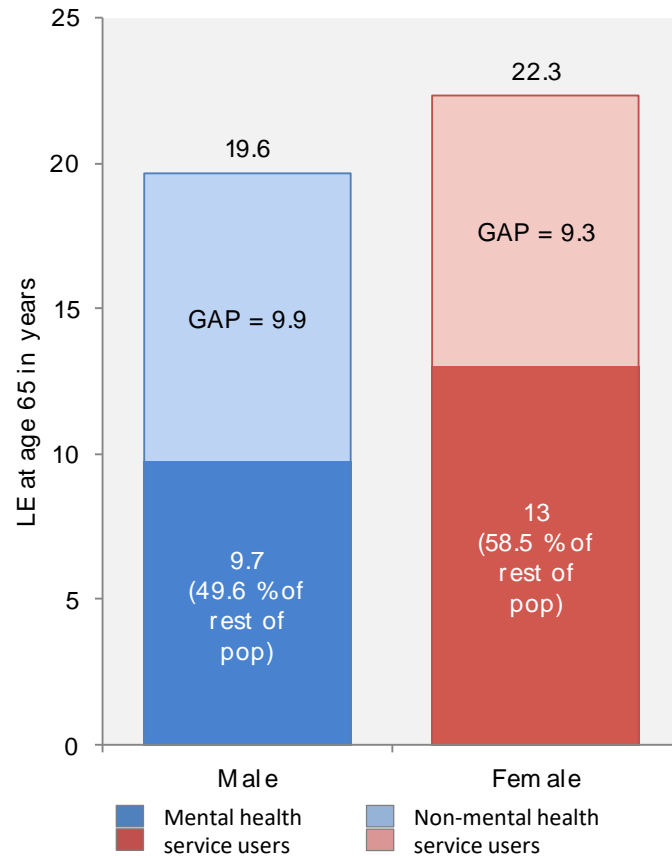
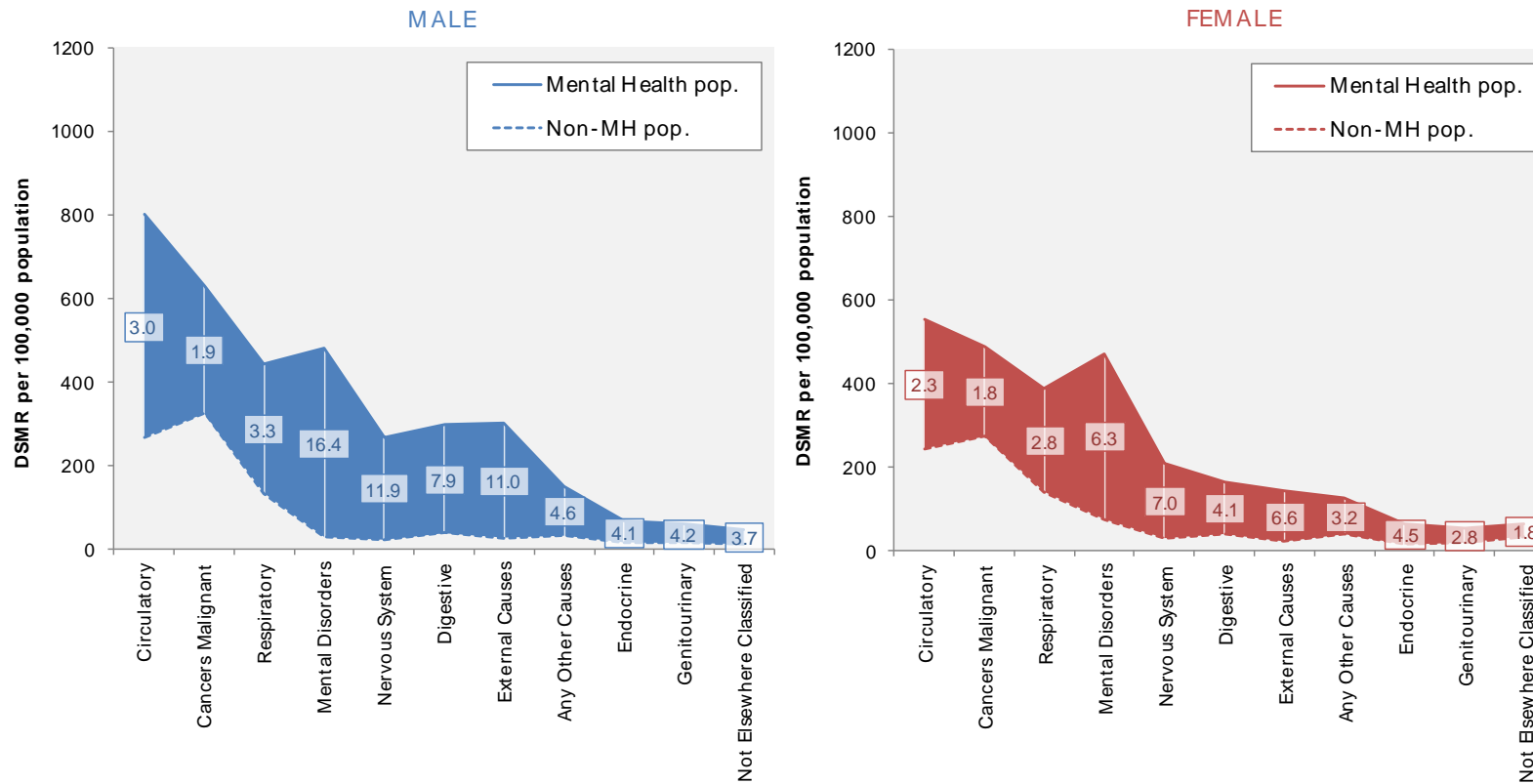The inequality gap persists and indeed widens as people age.

At 65 years of age, given current mortality patterns, men in contact with mental health services are likely to live on average another 9.7 years –just under half that of the rest of the population.

For females of that age in contact with services the life expectancy on average would be 13 years – around 60% that of the rest of the population.

NB. For presentational purposes, life expectancies have been rounded to 1 decimal place, however % calculations use unrounded figures so may not reconcile.

Prepared in support of the Mental Health system strategy board – Birmingham and Solihull

Causes of death for the STP area [1]

Directly Standardised Mortality Rate* per 100,000 population over 15yrs | mental health and non-mental health cohorts | by gender and cause of death | 2012/13 to 2014/15 pooled

NB. The values across the middle of the chart indicate the rate ratio of mortality rates between mental health service users and the rest of the population e.g. DSMR for circulatory disease is **3.0** times higher in the male mental health service user population.

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Explaining the gap in mortality experience: Males (England)
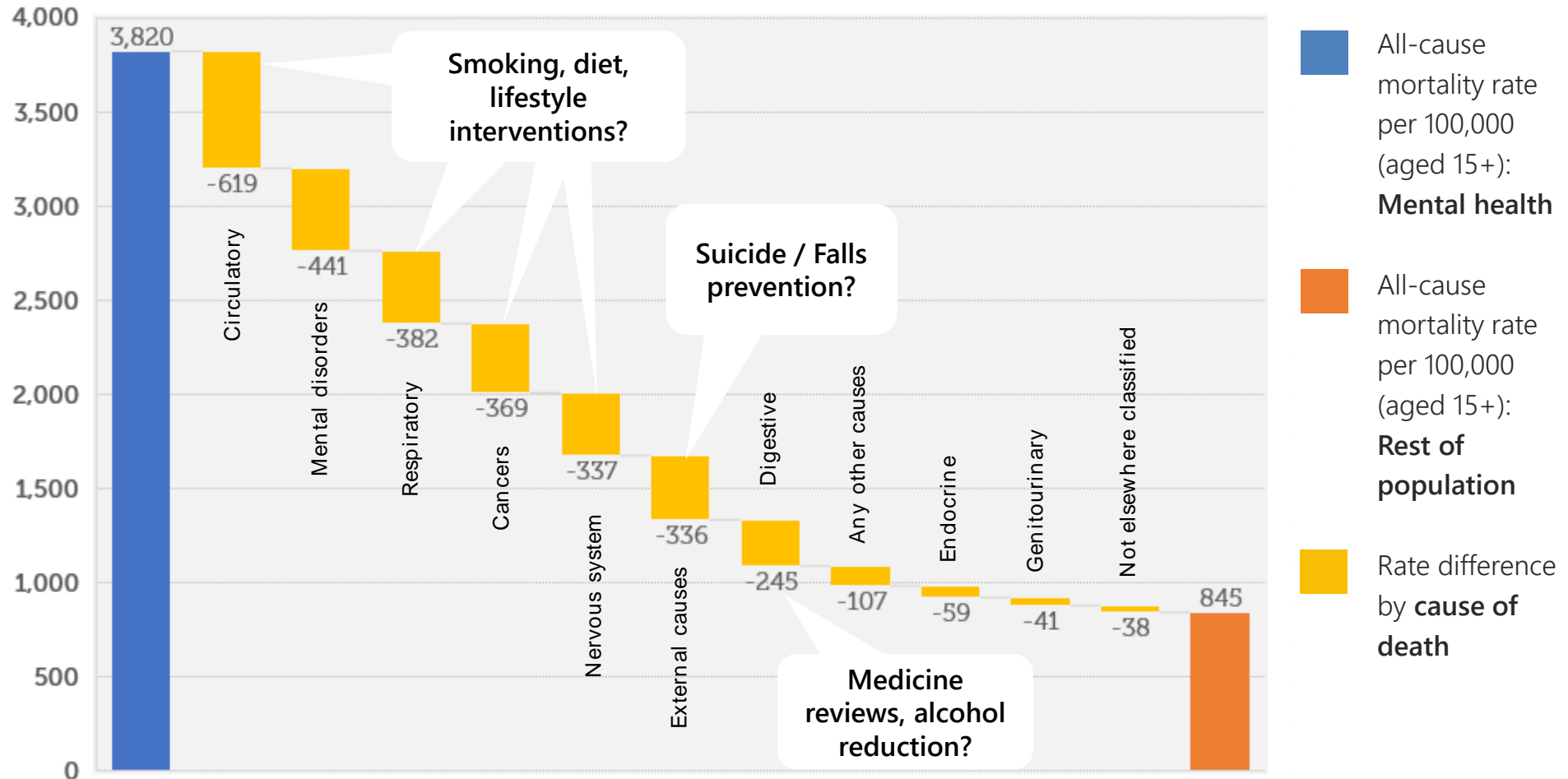
Chapter 2

Acute hospital utilisation by mental health service users

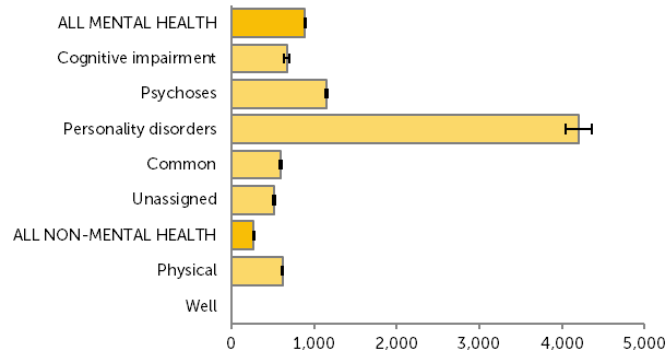# Acute health care utilisation [1]
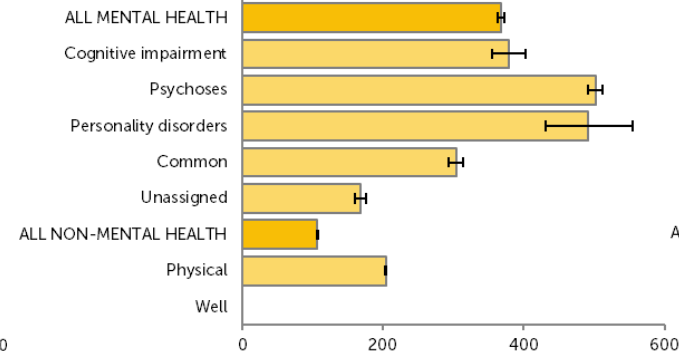
The Strategy Unit.

Accident & Emergency (18%)

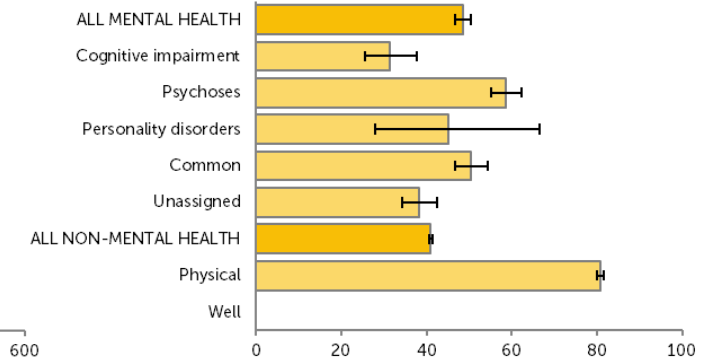Age-Gender Standardised Rate per 1,000 Population

Emergency admissions (22%)
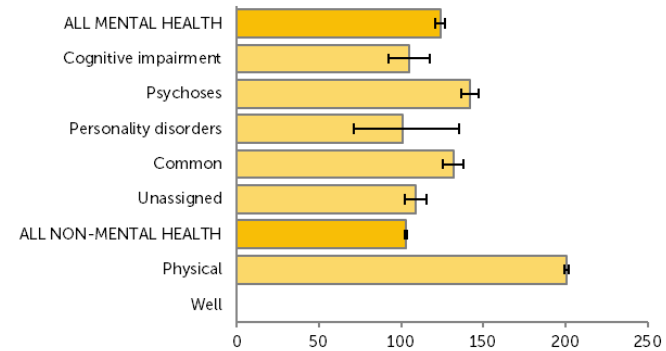
Age-Gender Standardised Rate per 1,000 Population

Elective admissions (7%)

Age-Gender Standardised Rate per 1,000 Population

Day case admissions (8%)

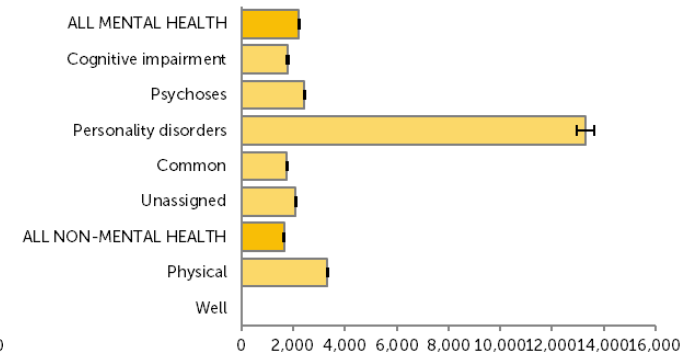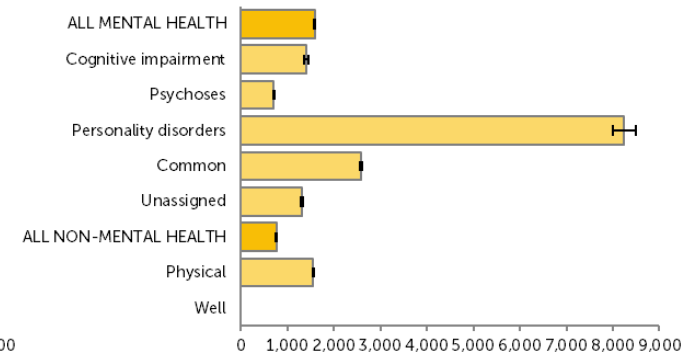Age-Gender Standardised Rate per 1,000 Population

Outpatient appointments (9%)

Age-Gender Standardised Rate per 1,000 Population

Diagnostic imaging (14%)

Age-Gender Standardised Rate per 1,000 Population

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Chapter 3

Saving or reinvestment opportunities from reducing acute hospital utilisation

List of sub-sets of activity considered in this chapter

The sub-sets of activity defined here are taken from extensive previous work on QIPP programmes that represent groups of patients/activity that are amenable to interventions (primary/secondary/tertiary) to improve outcomes or efficiency. We have selected the ones from a large basket of sub-groups that are most relevant to Mental Health. The focus is exclusively on A&E and inpatients.

These potentially avoidable activity represent an opportunity cost. Targeted investment in evidence-based interventions could release acute hospital costs for saving or reinvestment whilst improving the physical health of mental health service users.

In practice, reducing acute healthcare utilisation of mental health service users to that of the rest of the population may not be wholly attainable.

A&E	
Low cost attendances – referred to GP or discharged	Conveyed by ambulance, no investigation, no treatment, discharged
Patients who leave before being seen	Frequent attenders
Acute Inpatient Spells	
Ambulatory care sensitive (Chronic, acute or vaccine preventable conditions)	Medically unexplained symptoms
Medicines related (Explicit or Implicit; NSAIDs, Anti-Diabetics, Benzodiazepines, Diuretics)	Frail Elderly patients that could be managed in non-acute settings (Usually or occasionally managed elsewhere)
Smoking related (Largely or somewhat attributable)	Self Harm
Obesity related (Largely, somewhat or marginally attributable)	Admissions via A&E with primary mental health diagnosis

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Potential savings/reinvestment opportunities

Birmingham & Solihull STP could potentially save up to **£1.6m** in A&E attendances and up to **£35.2m** in inpatient care, by reducing mental health service users hospital activity to the same current levels of the rest of the population, in subgroups which may be amenable to change.

For the NHS as a whole......

Activity sub-group summary

The summary below represents, for England, the **difference** in activity between mental health service users and the rest of the population for each defined sub-set of activity after adjustment for age and gender and provides the associated costs of that activity.

Activity sub-group	Activity	Cost (£000's)	Unit cost
A&E Opportunity Groups	**679,110**	**£65,475**	**£96**
Conveyed by ambulance, no investigation, no treatment, discharged	18,640	£1,136	£61
Frequent attenders	402,810	£44,353	£110
Patients who leave before being seen	95,830	£7,527	£79
Low cost attendances – referred to GP or discharged	290,650	£21,976	£76
Correction for sub group overlap	-128,820	-9,518	-
Acute Inpatient Opportunity Groups	**689,975**	**£1,450,498**	**£2,102**
Ambulatory care sensitive	151,520	£331,954	£2,191
Medicines related	32,050	£102,946	£3,212
Smoking related	5,420	£11,988	£2,212
Obesity related	35,970	£56,958	£1,583
Medically unexplained symptoms	29,110	£35,537	£1,221
Frail Elderly patients that could be managed in non-acute settings	68,145	£233,954	£3,433
Self Harm	82,220	£55,677	£677
Admissions via A&E with primary mental health diagnosis	659,460	£1,425,603	£2,162
Correction for sub group overlap	-373,920	-804,118	-
Grand Total	**1,369,085**	**£1,515,973**	

Project Aims

Produce a set of design principles that are able to describe:

- What are the fundamental questions that need answering in order to deliver the best outcomes for the population served?

- What information/data/intelligence is needed?

- How should it be made accessible?

Focus on what really matters to clinicians, front line staff, as well as system leaders.

This is to be fully informed by evidence, best practice and cutting edge technology – nationally and internationally.

The CSU can then use these principles to inform the design of its BI services and systems

Methodology

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| Nov 17 | Dec 17 | Jan 18 | Feb 18 | Mar 18 | Apr 18 | May 18 |

Discover

Literature Scan

Market Analysis

Stakeholder Interviews

Insights from ACOs in the US

System Information Exchange – NZ, Buurtzorg, Nuka

Design Summit

Shape of today

Morning...clarifying current deficiencies, opportunities and the types of questions that need to be answered

Afternoon...what are the key design principles for intelligence systems (NB not just BI systems) in the light of that

After today...further work to bring together all of the components into a suite of outputs ; finding and working with health systems that want to move forward and start building the kind of intelligence systems we will describe