

RUNNING ORDER (all timings approximate)

13:00 – 13:10 Introduction & Journal Scanning Recommendations

13:10 – 13:45 Implementation Science and Behavioural Economics

13:45 – 14:00 Break

14:00 – 14:50 Behaviour Change Frameworks and Applications

14:50 – 15:10 Exercise on Behaviour Change Intervention

15:10 – 15:25 Discussion

15:30 – Wrap-up



Behaviour Change Interventions: Framework, Theory and Examples

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Outline of “Behaviour Change”

- What structures (frameworks) have been developed to guide practice?
- What theory underpins the practice of behaviour change?
- How has it been applied in the real-world – at both small and large scale?

= Designing systems
BCI (interventions)

A phrase you may hear...

“Behaviour change interventions (BCI)”

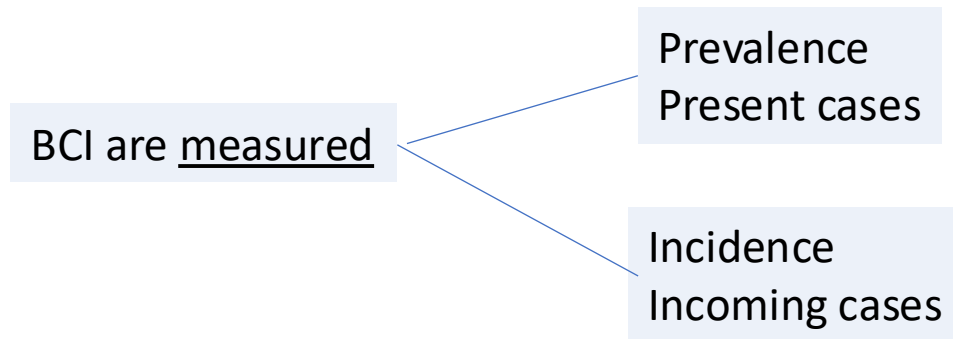
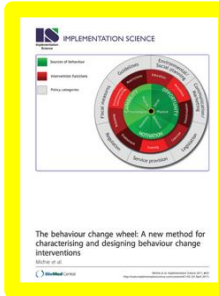
(Michie *et al.*, 2011, p. 1)

A package of things

“‘Behaviour change interventions’ are coordinated sets of activities designed to change specified behaviour patterns”

(Michie *et al.*, 2011, p. 1)

supplied



Present v Incoming

e.g. deliver smoking cessation advice by GPs

Improvement” = changing behaviour of GPs
managers...
commissioners...
others working within system...

Evaluation criteria for a good BCI framework

“a good intervention should travel well across problems”

Benefit

- Comprehensiveness

should be able to apply to any intervention

Highly applicable, not use case restricted

- Coherence

Internally logical and makes sense

e.g. can give people indicators of health e.g. carcinogen levels

- Link to a behaviour change model

An explanatory description of a complex entity or process

e.g. can help reinforce effectiveness through effective factor change

“a good model *explains* why the change happens its not a checklist”

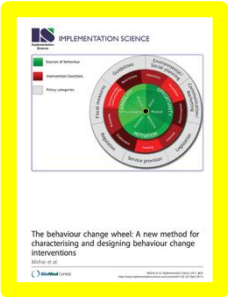
The "Behaviour Change Wheel" (BCW) to pick and combine your optimal BCI

Understand the key



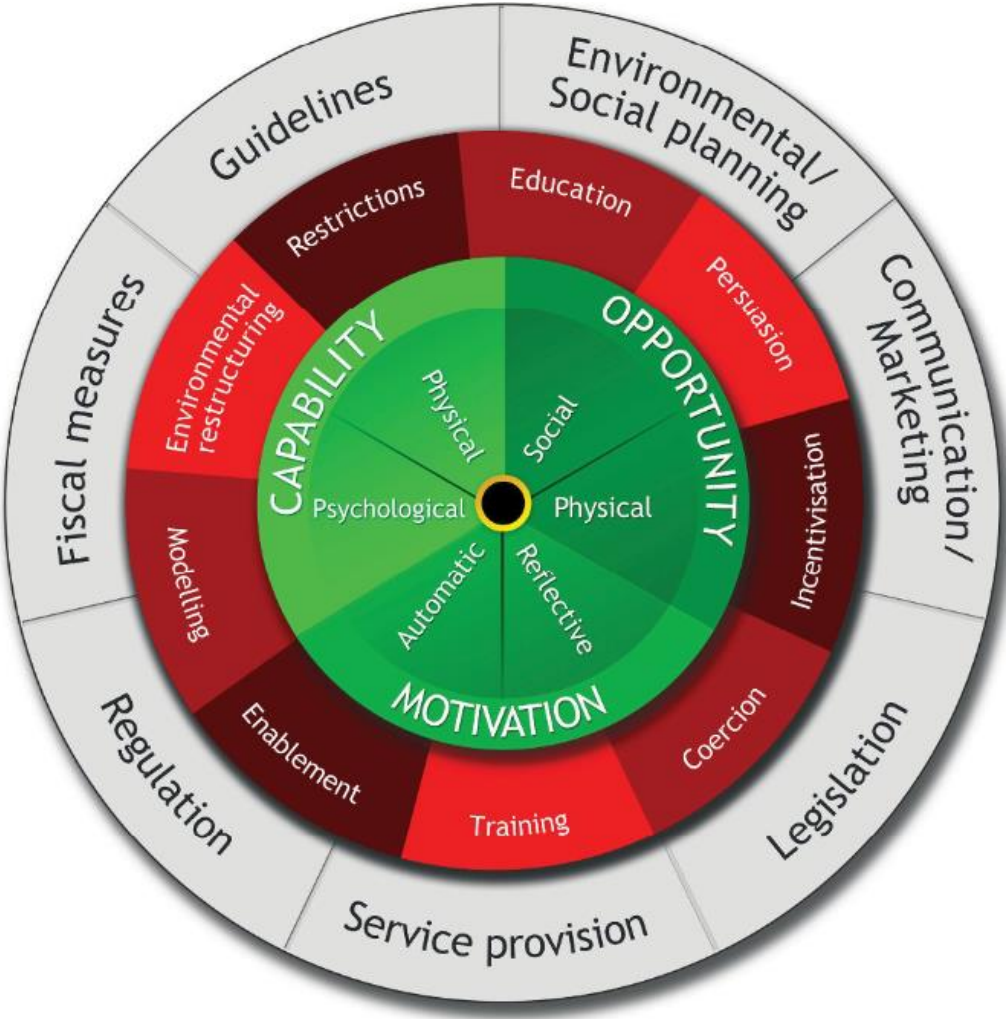
Mix & match

supplied



Incorporates multiple BCIs

Prevents guesswork



= "a framework tool for both developing and evaluating behaviour change interventions"
15 min UCL video at <https://is.gd/bcwheel>

"Synthesis of approx. 19 different Behaviour Change Frameworks"

Michie *et al.*, 2011

The behaviour change wheel: A new method for characterising and designing behaviour change interventions

Michie *et al.*



Michie *et al.* *Implementation Science* 2011, **6**:42
<http://www.implementationscience.com/content/6/1/42> (23 April 2011)

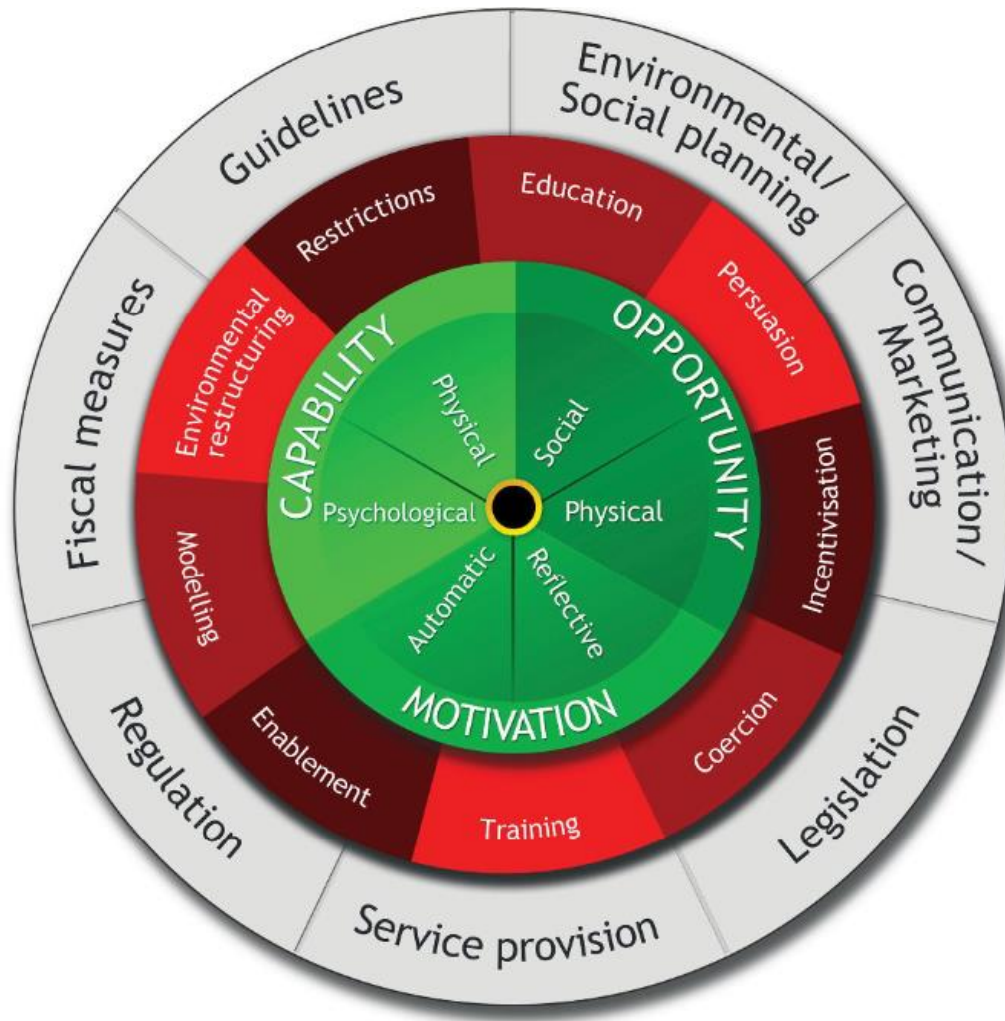
The owner's manual for
evidence-based design

Michie *et al.* 2011
On Moodle

Know this paper

Behaviour Change Wheel (BCW)

A walk- through



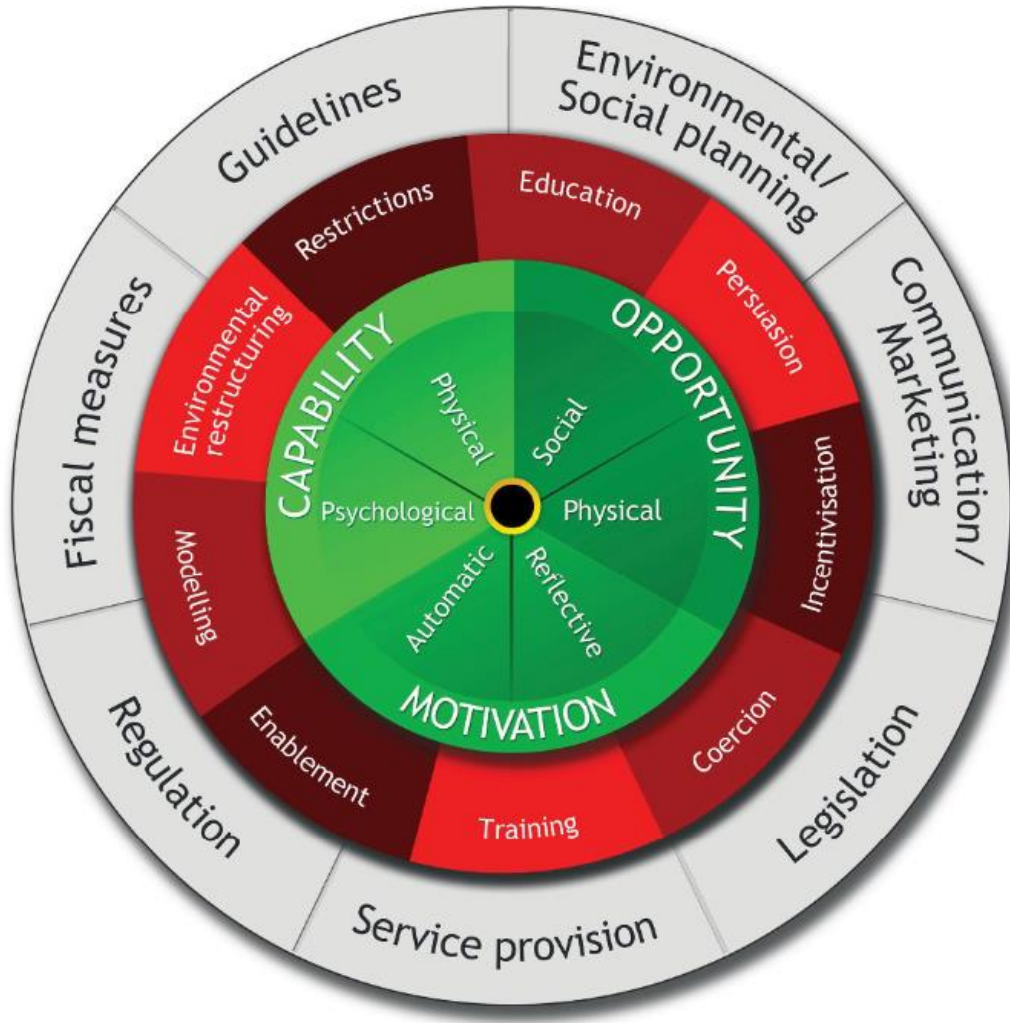
In Green – CORE ESSENTIAL CONDITIONS
also called the **COM-B Model**:
Capability, Opportunity, Motivation
Behaviour model

**THEY ARE THE SOURCES OF
MOTIVATIONAL BEHAVIOUR**
plus conditions that must be met in order
to work:
social, reflective, automatic,
psychological, physical

Must incorporate these before you can expect change

Behaviour Change Wheel (BCW)

9 Active ingredients for influencing behaviour



**In Red - these are the 9
INTERVENTION FUNCTIONS**

THEY ARE KNOWN WAYS TO CHANGE BEHAVIOUR

**Education, Persuasion,
Incentivisation, Coercion, Training,
Enablement, Modelling,
Environmental Restructuring,
Restrictions**

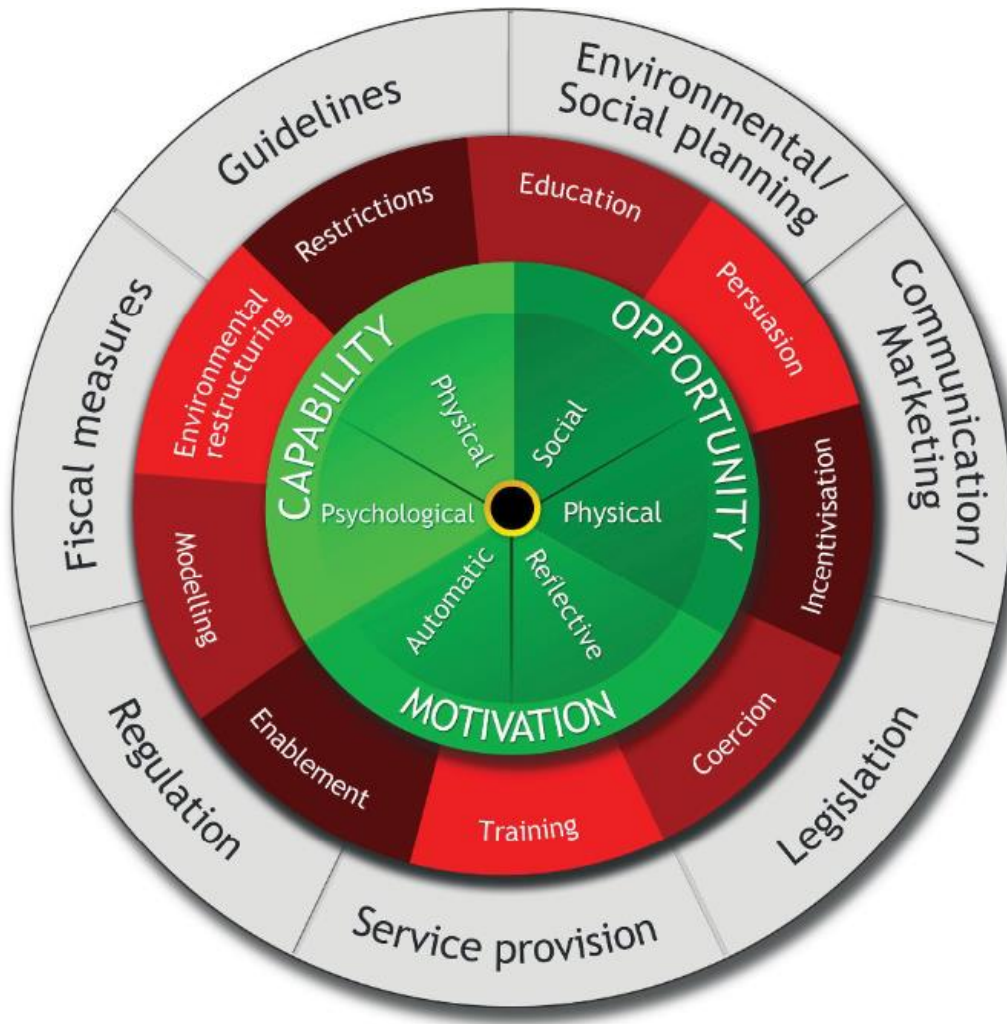
Design by using one or more of these

Michie *et al.*, 2011

Education...	Leaflets, courses
Persuasion...	Counselling, pep talks
Incentivisation...	Bonus payments, moral argument
Coercion...	Legislation, punishment, tags
Training...	Demonstrating practical applications
Enablement...	Delegating authority, permissions
Modelling...	Designing new process or service, SOPs
Environmental...	Restructuring ward or office layout
Restrictions...	Preventing, e.g. controlled drug rules

Behaviour Change Wheel (BCW)

Routes for making intervention a reality



In Grey - the 7 POLICY CATEGORIES or how the interventions can be delivered

Healthcare Guidelines & SOPs
Environmental-Social planning/Regs
Communication-Marketing messages
Legislation (enforceable)
Service provision – what is/not funded
Regulatory – professional or products
Fiscal measures

Could behaviour change considerations impact your CW?

How to develop an intervention from the 15 min UCL video

<https://is.gd/bcwheel>

video

Introducing The Behaviour Change Wheel

Robert West
Professor Emeritus of Health Psychology
University College London, UK

@RobertJWest



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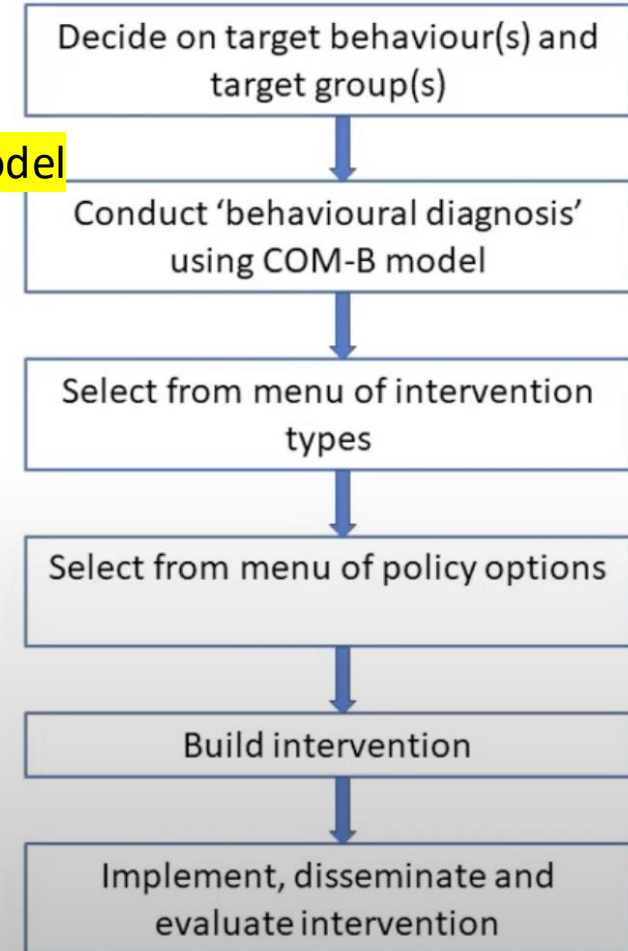
The Behaviour Change Wheel



The Behaviour Change Wheel Guide

Define problem

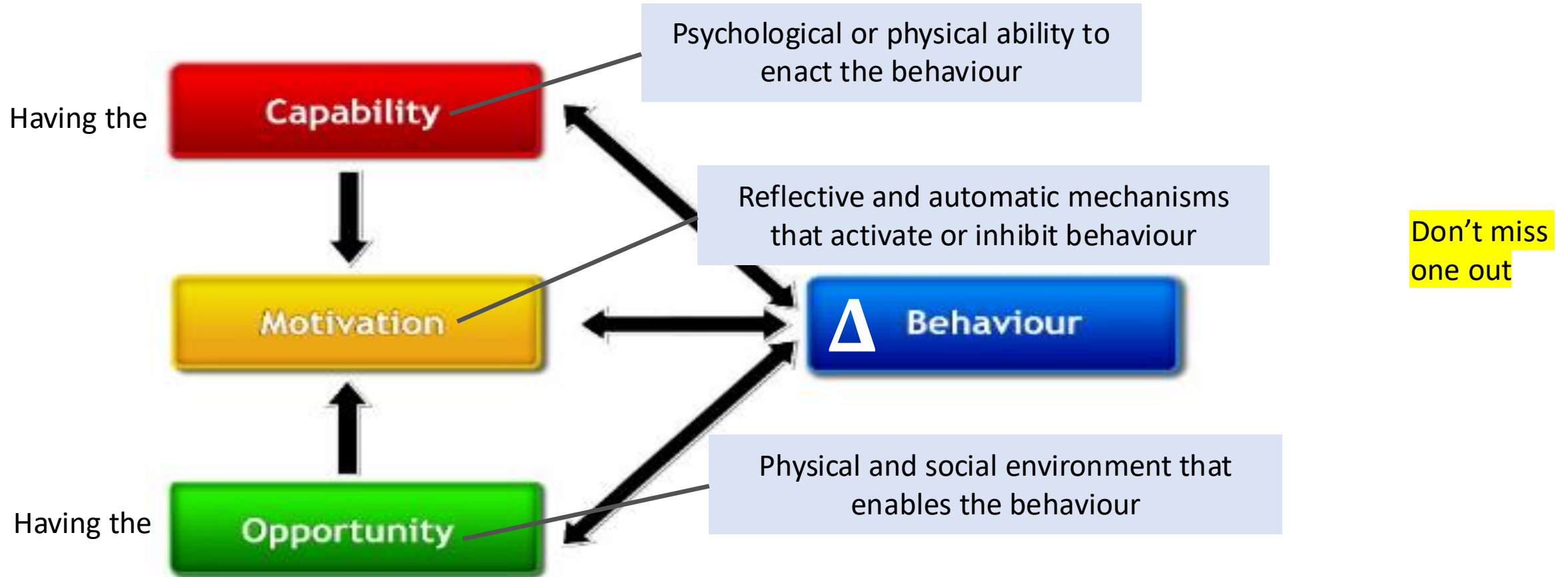
Map to model



Wales Institute of Digital Information
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Understanding what the COM-B system is about:

CHANGE **NEEDS ALL THREE** NECESSARY CONDITIONS TO WORK



Going through a COM-B example about the familiar handwashing intervention



2004-2011
led by Sheldon Stone

- **Opportunity** Access to sinks
 - Alcohol hand rub beside every bed
- **Motivation**
 - Persuasive posters
 - Encouraging patients to ask
- **Capability** Knowledge of the technique
 - No intervention



Still depends on
Timing
Habits
peer norms

Capability

Real barriers...

- Nurses have the capability to clean their hands
 - But not to
 - pay **attention** to this behaviour over other competing behaviours
 - develop **routines** for noticing when the behaviour does not occur, and **plans** for acting in future
- Train staff to set **goals**, observe their behaviour, develop **action plans** on the basis of **feedback**
 - *Developed at UCL, based on behavioural theory*

Leads to...



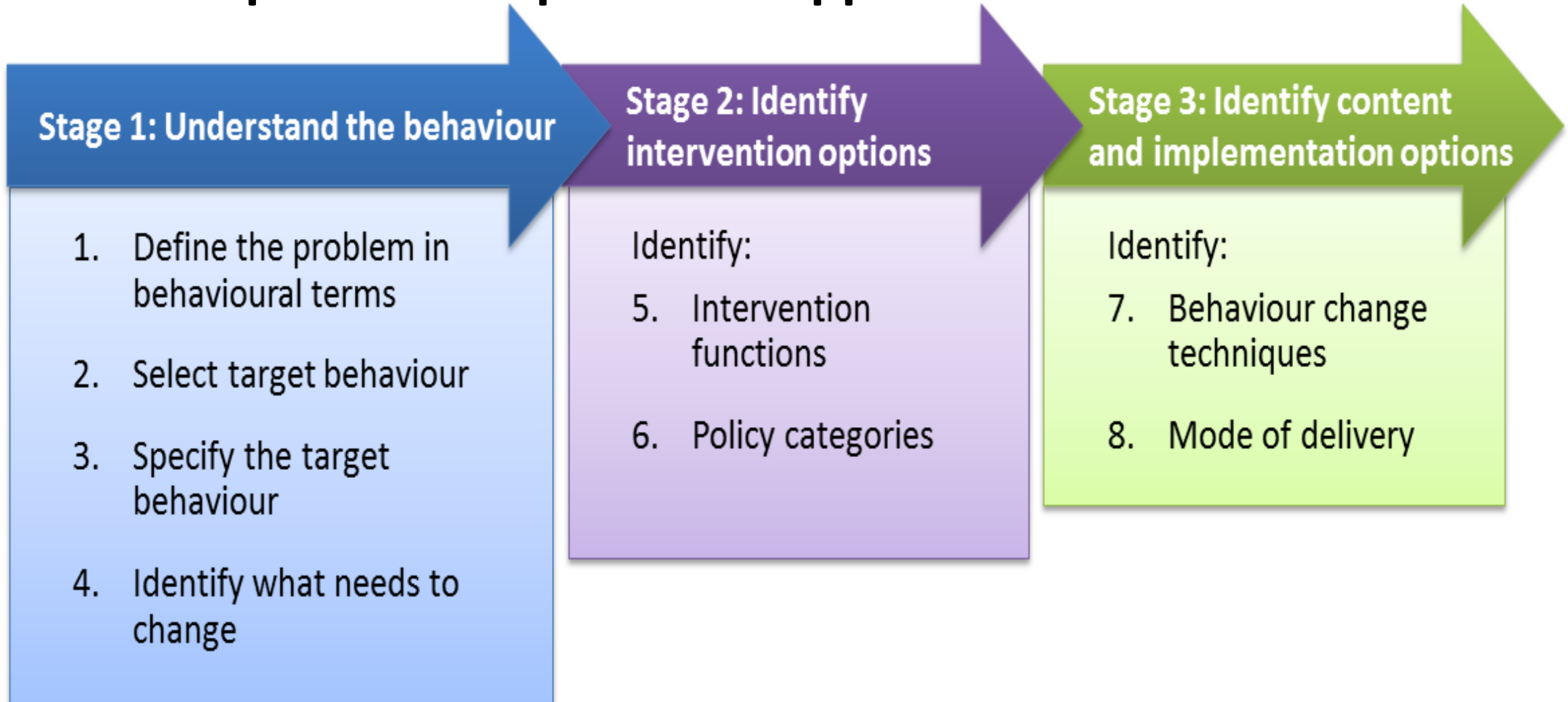
This will also be useful in the group work as structured...

The matching tool - what will not likely fix gaps in COM-B

BCW matrix – Selecting relevant intervention functions

		Intervention functions								
		Education	Persuasion	Incentivisation	Coercion	Training	Restriction	Environmental restructuring	Modelling	Enablement
Addressing	Methods									
	Barriers?									
	Readiness>?									
	Dispensers?									
	Team buy-in>?									
	How to get it to this>?									
	How to get it to this>?									

BCW example – ParticipACTION App



Step-by-Step Method for Designing Behaviour Change Interventions (Michie, 2015)

This paper is concerned with motivating a more active population (behaviour change) and sets out in detail what needs to occur to maximise the effectiveness of the app

- you can use as a template for populating your own COM-B components

Behavioural Analysis and Diagnosis – Step 4.

Target Behaviour:	Canadians to increase their physical activity levels (by taking more daily steps and engaging in more high-intensity movement).	
COM-B components	What needs to happen for the target behaviour to occur?	Is there a need for change?
<i>Physical capability</i>	Have the physical skills to be active.	Change is needed as not all Canadians may have the necessary skills (ParticipACTION, 2019).
<i>Psychological capability</i>	Know the correct technique to perform exercises and skills to be physically active.	Change is needed as not all Canadians may have the necessary knowledge (ParticipACTION, 2019).
<i>Physical opportunity</i>	Create the opportunity to be active in a variety of settings	Change is needed to create an environment which is supportive of physical activity (McCormack, 2017).
<i>Social opportunity</i>	See members in close social networks valuing physical activity and getting active.	Change is needed to create supportive social environments to be active (Yun et al., 2018).
<i>Reflective motivation</i>	Hold beliefs that being physically active impacts various facets of health.	Change is needed as not all individuals have these beliefs (ParticipACTION Pulse Report, 2018).
<i>Automatic motivation</i>	Create established routines and habits for physical activity.	Change is needed to establish routines and habit formation (ParticipACTION Pulse Report, 2018).
Behavioural diagnosis of the relevant COM-B components:	All COM-B components need to change for the target behaviour to improve.	

Note. COM-B = capability, opportunity, motivation, behaviour

Truelove *et al.*, 2020

Change of topic:

The Information Value Chain Theory

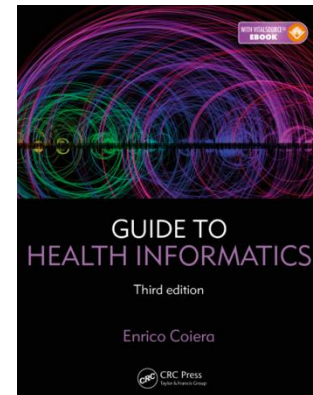
How information travels

*Relevant to understanding behaviour change outcomes
as digital systems need to work as they were
designed to work (as part of a transformative system).*

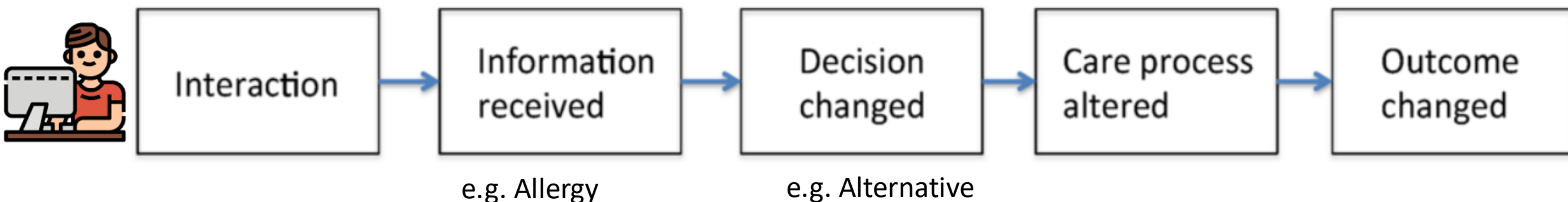
BCI fails as it never reaches the right person

Information Value Chain Theory

Think about gain or losing value



“Information does not directly impact, but is part of a chain of events”

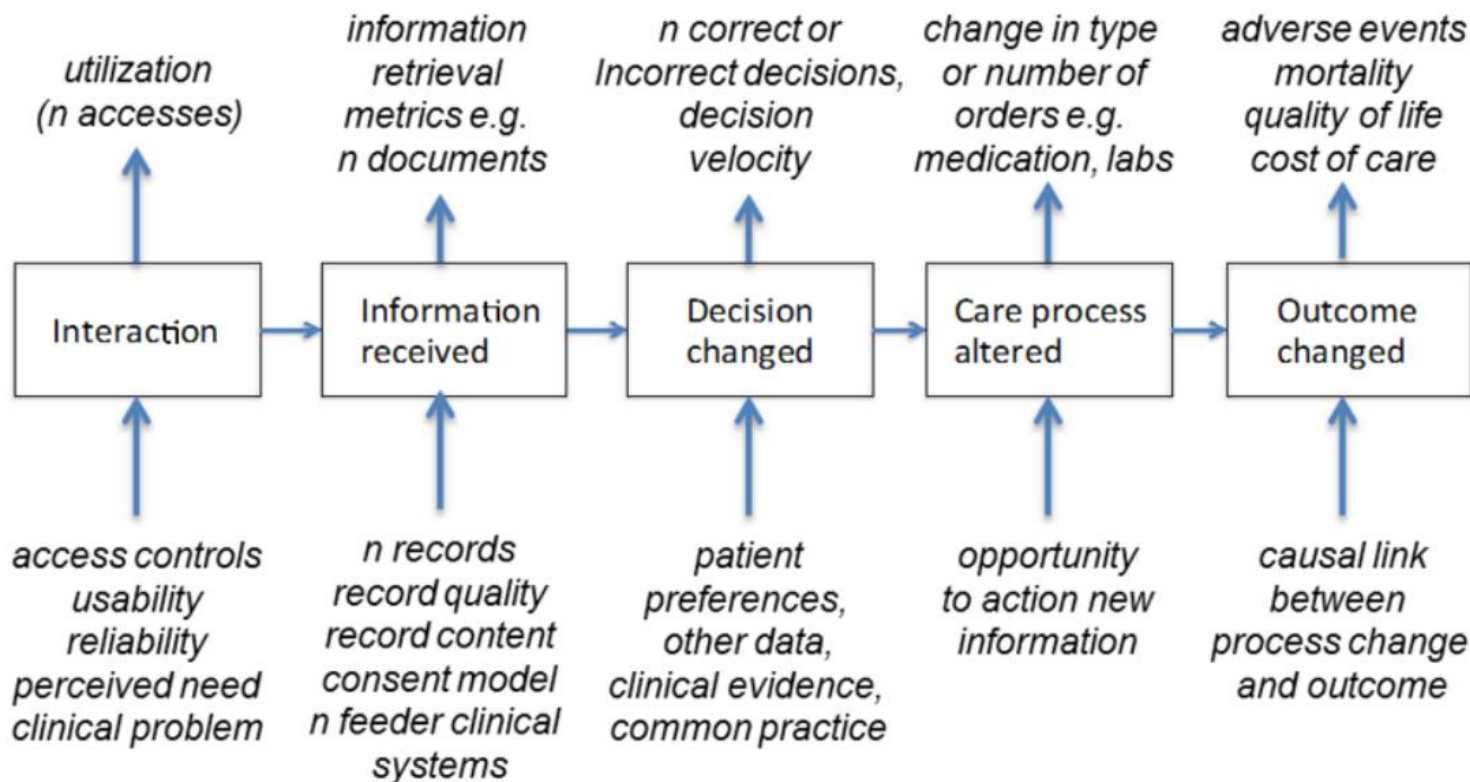


*The information value chain starts with a user interacting with an information system, **but must go through many steps** before changing clinical outcomes (from Coiera, 2015)*

“When evaluating an EHR, take measurements at all points on the value chain”

Achieving →
these
outcomes

Depends
on these →
being
in place



*This is a little bit
like Donabedian*

*The information value chain provides a **causal model** connecting EHR use and clinical outcomes. Think about how outcomes can be shaped by earlier events like input data quality*

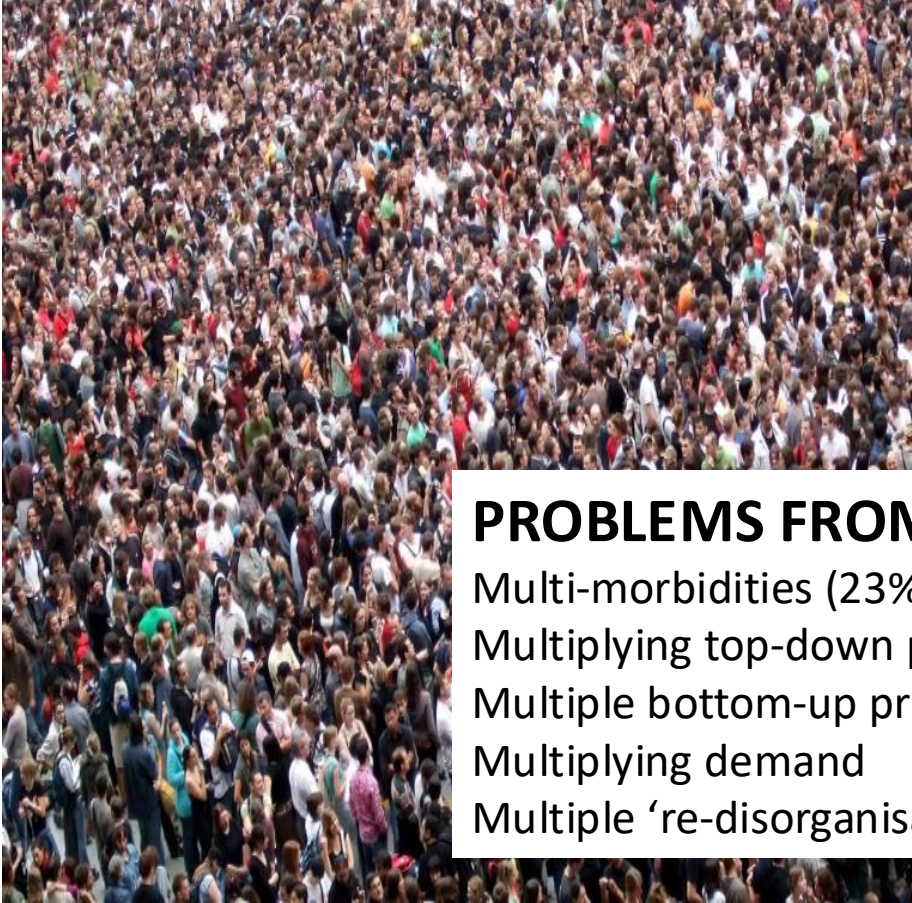
Behaviour change interventions:

A real-world implementation example



developed a set of evidence-based ‘high impact’ quality indicators (QIs) for primary care and examined variations in achievement of these indicators using routinely collected data in the United Kingdom (UK).

Willis TA, Collinson M, Glidewell L, Farrin AJ, Holland M, Meads D, et al. An adaptable implementation package targeting evidence-based indicators in primary care: A pragmatic cluster randomised evaluation. PLoS Med 2020; 17(2): e1003045.



PROBLEMS FROM THE GPs VIEWPOINT

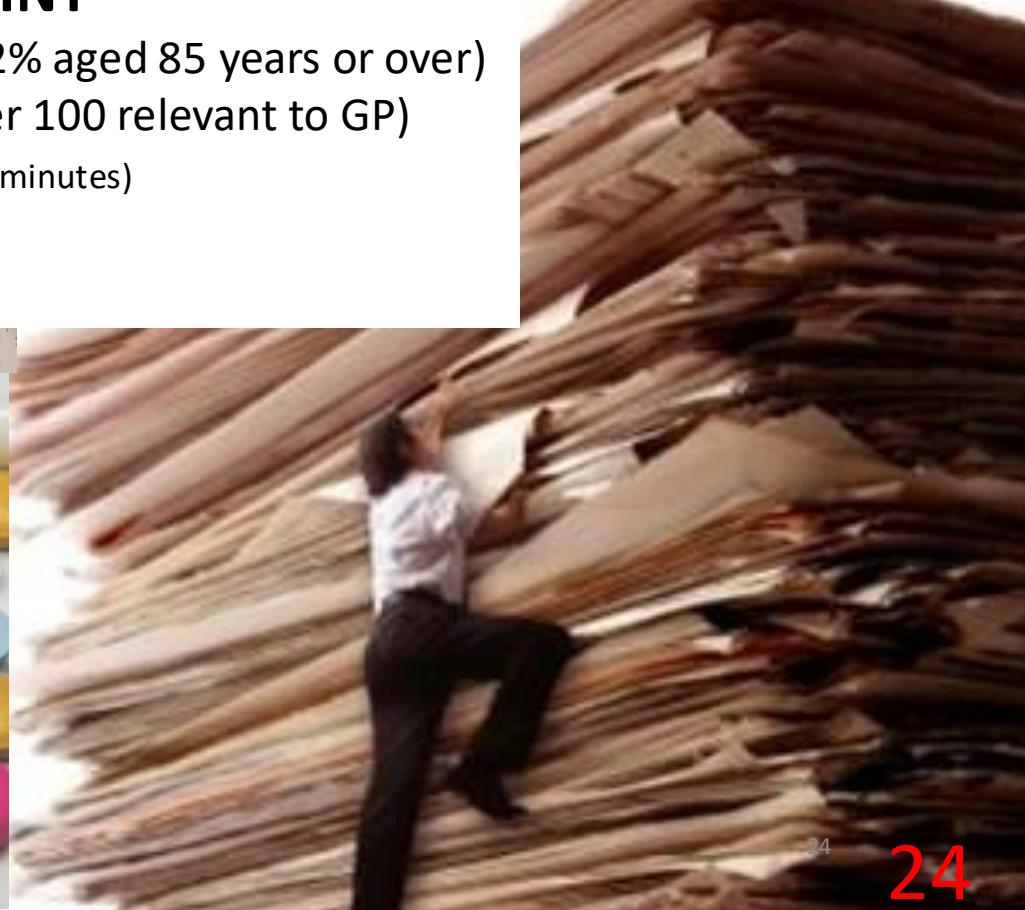
Multi-morbidities (23% primary care patients; 82% aged 85 years or over)

Multiplying top-down priorities / guidelines (over 100 relevant to GP)

Multiple bottom-up priorities (2.5 problems per 11.9 minutes)

Multiplying demand

Multiple 're-disorganisation'



Focused on 'High impact' quality evidence-based indicators like...



Diabetes control



Blood pressure control



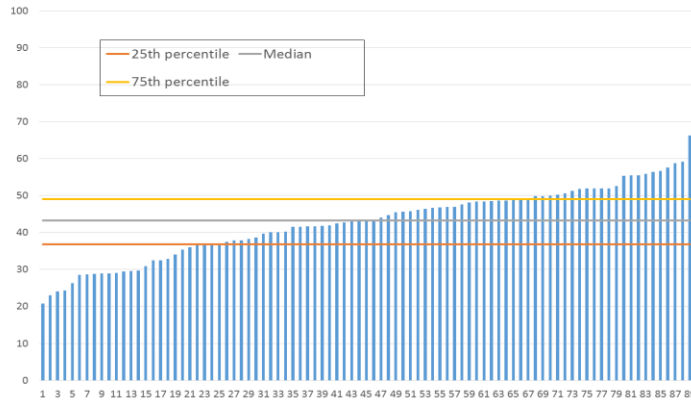
Anticoagulation in atrial fibrillation



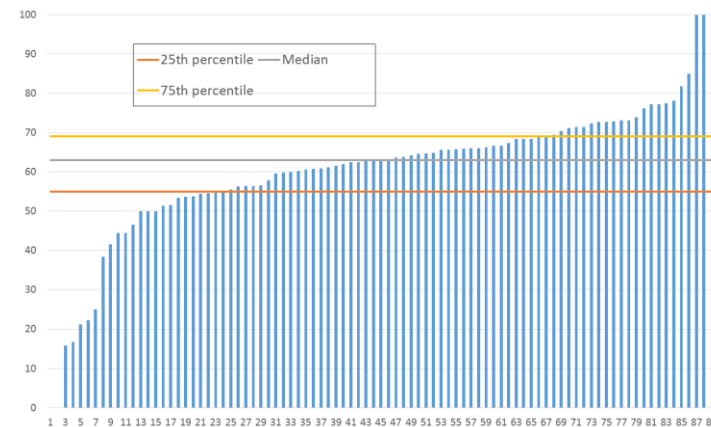
Risky prescribing

Rushforth et al. BMC Family Practice 2015; 16:156

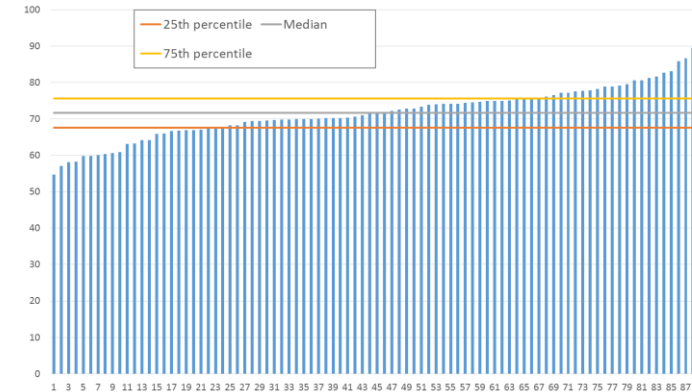
So what were the spread of these quality indicators across all 89 ASPIRE practices?



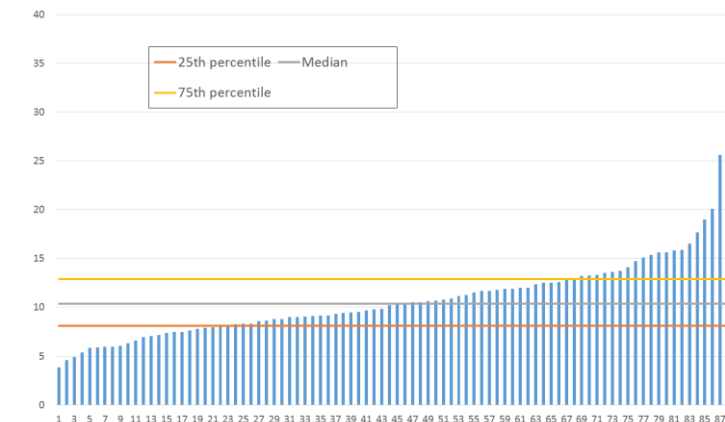
Diabetes control



Anticoagulation in atrial fibrillation



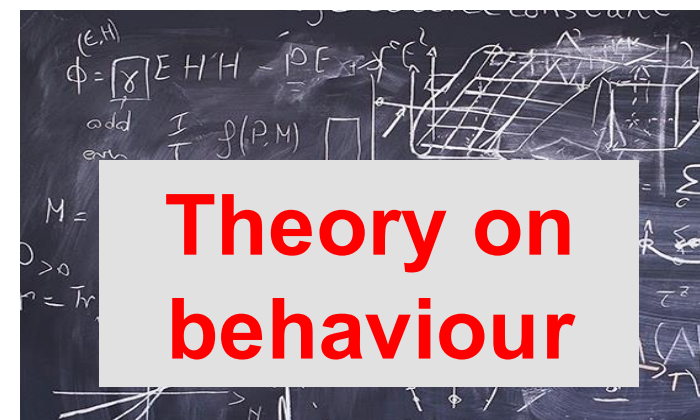
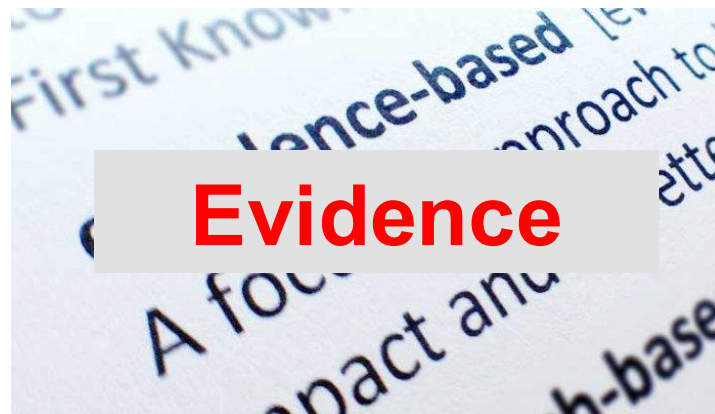
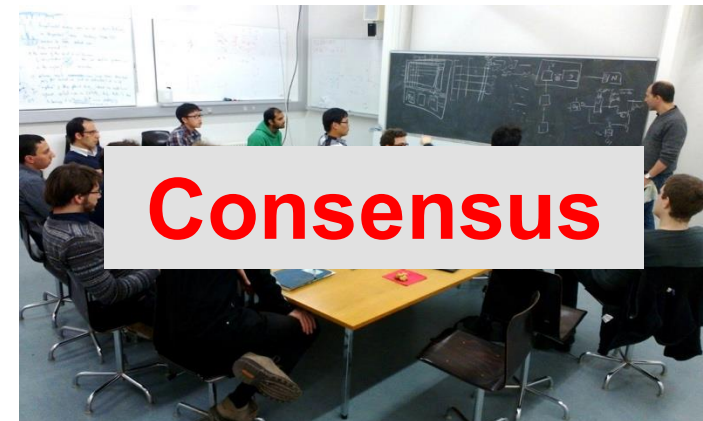
Blood pressure control



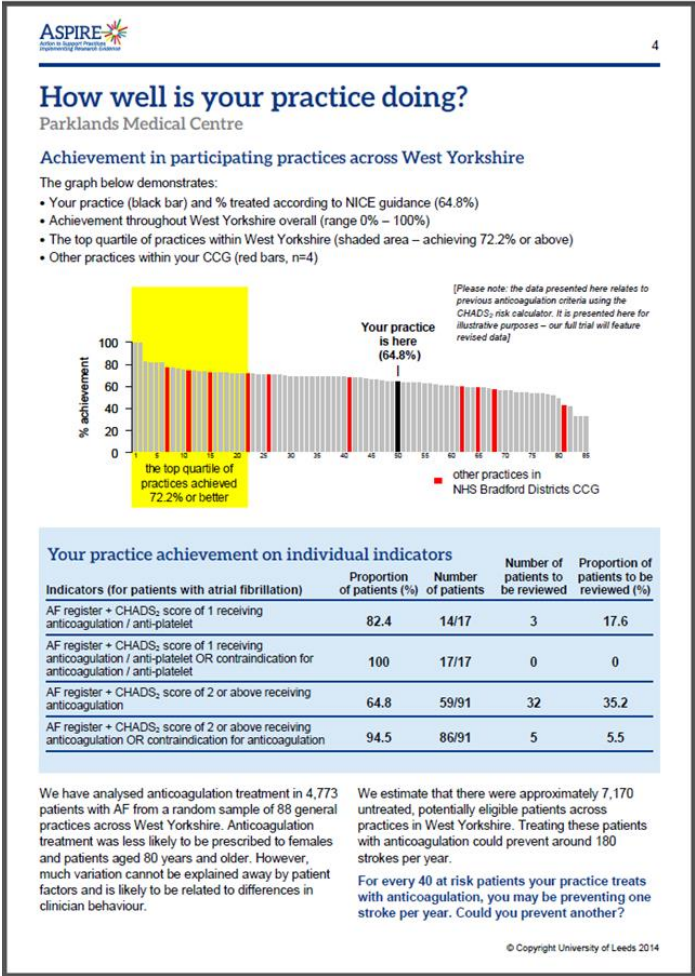
Risky prescribing

**“Astonishing
how much
variation
there was”**

So they set about making change by developing an implementation package...



Also surveys, how you perform feedback, persuasion...



Persuasive messaging

Peer comparison

Problem solving



Goal setting

Action planning

Patients to be reviewed

Data included up to 17 Jun 2015 14:24

Name	Count	%	Last Run	Flags
13N3. AF and CHADS VASc = 1 without Warfarin Rx (read code or Rx)	11	55.0 %	17 Jun 2015 14:24	
13N4. AF and CHADS VASc = 1 without Warfarin Rx (read code or Rx OR Contraindication)	9	45.0 %	16 Jun 2015 12:11	
13N5. AF and CHADS VASc >=2 without Warfarin Rx (read code or Rx)	44	25.9 %	17 Jun 2015 14:24	
13N6. AF and CHADS VASc >=2 without Warfarin Rx (read code or Rx OR Contraindication)	36	21.1 %	16 Jun 2015 12:11	

Reinforcement

They did a rigorous 'real world' RCT trial...



40x opt-in practices

40x opt-out practices

Looked at...

Adapted implementation package	40 practices	40 practices
Diabetes control 	Intervention	Control
Risky prescribing 	Control	Intervention

Adapted implementation package	32 practices	32 practices
Blood pressure control 	Intervention	Control
Anticoagulation in atrial fibrillation 	Control	Intervention

So what worked from these? (ChatGPT analysis)

Results of the Willis et al. (2020) trial



Diabetes control: 24.2% achieved treatment targets
With 23.7% in controls (no statistically significant improvement).



Blood pressure control: 53.6% achieved target blood pressure with
52.3% in controls (no statistically significant improvement).



Anticoagulation in atrial fibrillation: 73.2% received anticoagulation
with 75.2% in controls (no statistically significant improvement).



Risky prescribing: Reduced from 6.0% in controls to 4.9% in the
intervention group (a small but statistically significant improvement).

Risky prescribing:

Control 6.0%

Intervention 4.9%

Odds ratio 0.81 (97.5% CI 0.67 to 0.99)

- The intervention reduced risky prescribing from 6.0% to 4.9%. This was a statistically significant but small improvement, which may not have been clinically meaningful.
- The important distinction is that statistical significance does not necessarily mean clinical significance.



Lessons learned?



Even with rigorous evaluation no guarantees for massive performance shift

It did however establish very clear understanding on how to do things right!

Also, population impacts are cumulative - small changes can make a big difference

Summary

- “Frameworks” can be useful in supporting behaviour change interventions.
- Relevant theories can be applied to evaluate the success or failure of health and care IT implementations.
- Using implementation toolkits (involving frameworks, theories and evidence) does **not** guarantee success in real world contexts *but can help you understand what works and what does not and why.*
- Re-emphasise how hard it is to change behaviour! ← *The nature of individuals*

References (all supplied as PDFs)

Behaviour change in healthcare: six key readings

1. Michie et al. (2011) — The Behaviour Change Wheel.

Introduces COM-B to match interventions to capability, opportunity and motivation.

2. Bowie (n.d.) — Human Factors: Optimising Systems and Wellbeing.

Offers practical tools to redesign work so safer behaviour becomes easier.

3. Russ et al. (2013) — Human Factors: Fact and Fiction.

Explains why system redesign matters more than relying on staff training alone.

4. Sujan et al. (2022) — Eight Human Factors Principles for Healthcare AI.

Shows why AI adoption must account for workload, trust and clinical behaviour.

5. Willis et al. (2020) — ASPIRE: Changing Primary Care Practice.

Reduced risky prescribing, but other targets showed no clear improvement—context matters.

6. Truelove et al. (2020) — Designing the ParticipACTION App.

Demonstrates translating COM-B into app features; effectiveness remained to be tested.

Thinking Topics 1 – do these work in your experience?

Digital Health Interventions and Behaviour Change: How can digital tools such as mobile apps, wearables, and telemedicine platforms be used to promote behaviour change – what is the role of data-driven feedback in sustaining changes?

“Nudging” in Healthcare: Discussing how subtle environmental or policy changes (“nudges”) can influence patient behaviour, such as “default options” in treatment decisions or reminders for medication adherence.

Thinking Topics 2 – system considerations

Policy and Regulation to Drive Behaviour Change in Healthcare: How healthcare policy can encourage healthy behaviours, such as taxation on unhealthy products (e.g., sugary drinks), laws mandating seat belt use and smoking bans, alcohol-sensing ankle tags.

Ethical Considerations in Behaviour Change Interventions: What are the ethical implications of using behaviour change techniques? Think about autonomy, consent, and the potential for manipulation.

Thinking Topics 3 – there are many examples out there

- **Compare to advertisers** - influence behaviour change by using persuasive techniques to shape attitudes, beliefs, and actions toward desired outcomes.
- **Major impacts** – attitudes to smoking, vaccination, seatbelt use, recycling, environmental contamination, digital privacy awareness, drink-driving...healthy eating...
- **Some people are harder to change!** - due to deeply ingrained habits, beliefs, or resistance to new information or perspectives.

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Describe a **behaviour** that is associated with inefficiency, low productivity, patient harm or waste in the NHS or social care. As a team effort, outline a **behaviour change intervention** model using the Behaviour Change Wheel (see the matrix on slide 16). Summarise your suggestions within 30 min for group feedback.

Some tips

*e.g.. Re a **behaviour**, we saw the GP example the over-prescribing of antibiotics = waste plus potentially patient harm. For **Inefficiency and productivity** - things around process management, reliability of processes, so that may be communication, communication back to patients or communication within an organisation. Poor referrals, requesting tests or requesting diagnostic imaging? Handovers, intra- pr cross-organisation – examples you have seen... Then. what could you do to address that - **look at the matrix on Slide 16**. What **interventions** might you consider? How would you determine if they were feasible? You might have something that involves technology, an app, a training app, a reminder or something simple like hand washing, awareness things like incentives, posters or one to one training and observation? All the picks are up to you - be creative!*

+30 min then
Group feedback