

# Understanding and changing healthcare professional behaviour

## What do we know from Implementation Science?

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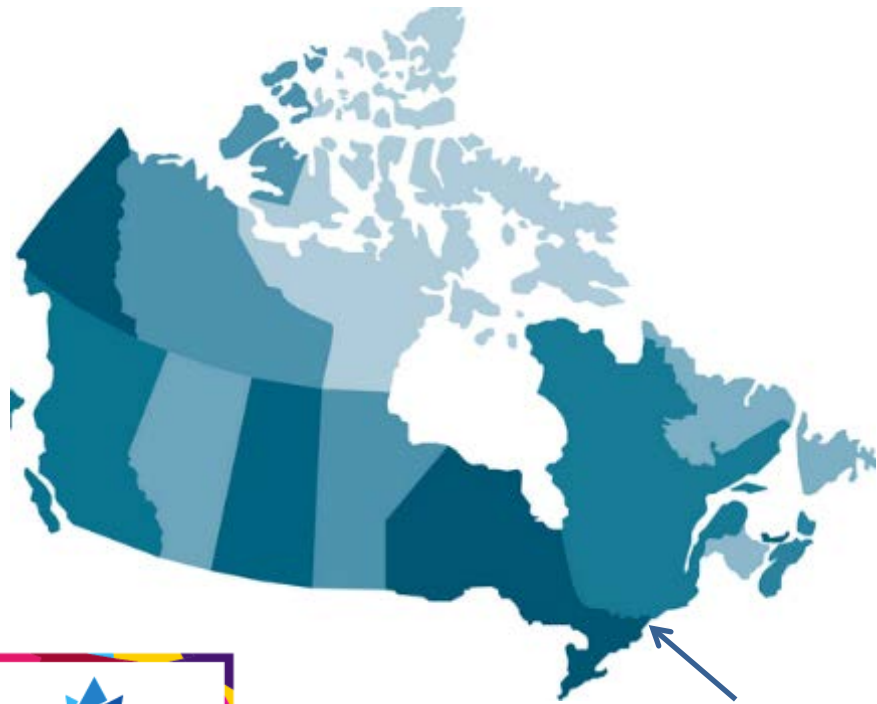


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# Overview

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- ▶ The implementation problem and the importance of a science of implementation
- ▶ Approaches to understanding healthcare professional behaviour
- ▶ Approaches to changing healthcare professional behaviour

## Why do we need to think about implementation?

- ▶ Much of the US \$100 billion/year worldwide investment in biomedical and health research is wasted because of dissemination and implementation failures

“All breakthrough, no follow through” Woolf (2006)

- ▶ 30-40% of people do not receive care according to current scientific evidence<sup>1</sup>
- ▶ 20-25% of healthcare provided is not needed and potentially harmful<sup>2</sup>
- ▶ Diabetes: 46%<sup>3</sup> of people with type 2 diabetes are not provided with 9 key aspects of care

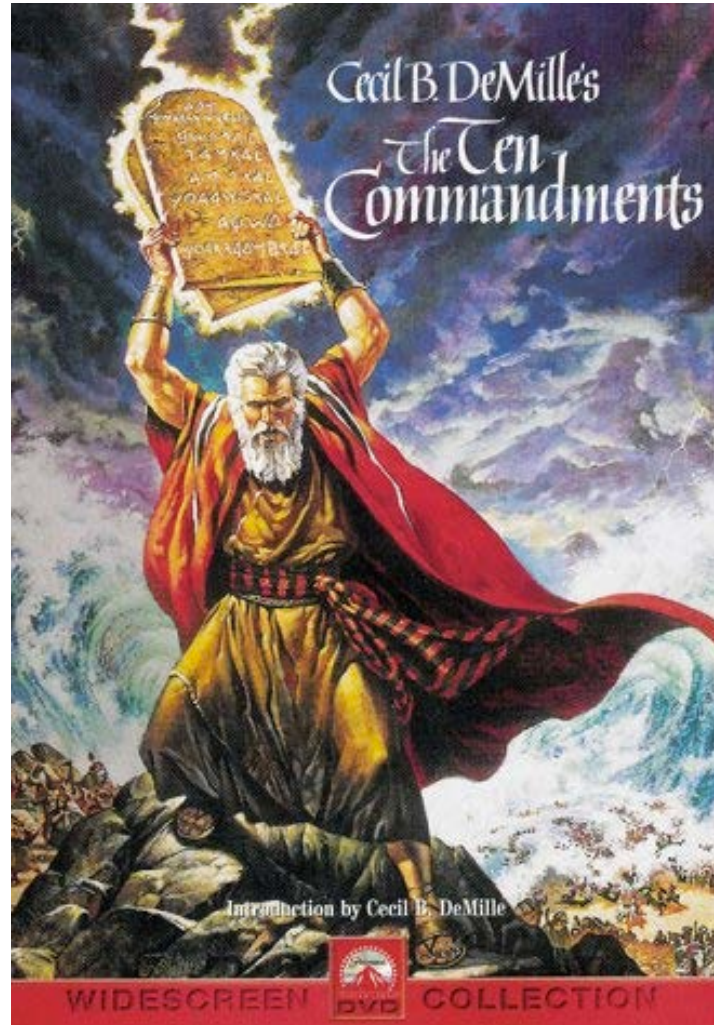
### Bottom line

- People not receiving best possible care
- Implementation of research findings is a fundamental challenge for healthcare systems

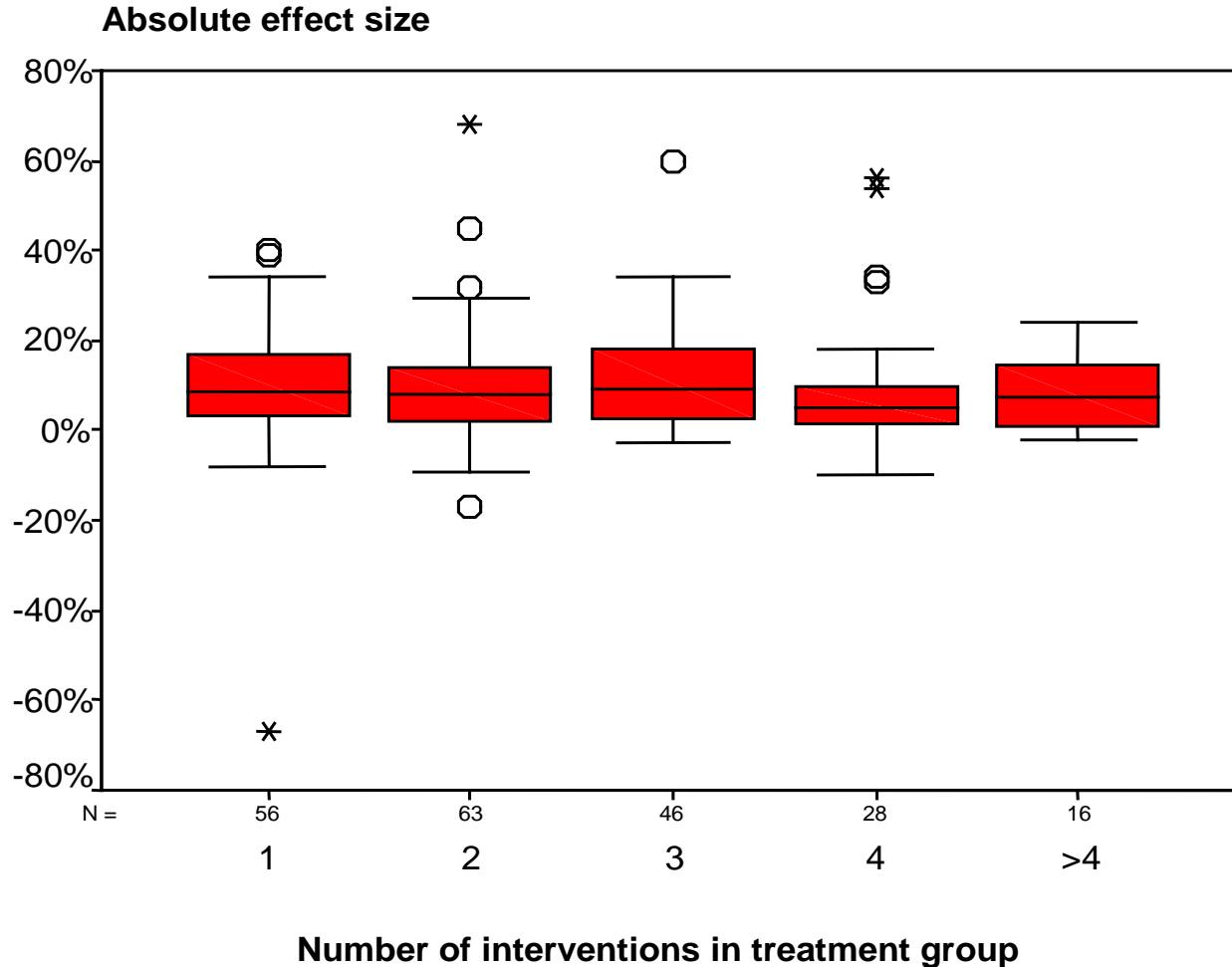
<sup>1</sup>Schuster, McGlynn, & Brook (1998) *Milbank Quarterly*; <sup>2</sup>Grol (2001) *Med Care*; <sup>3</sup>HSCIC (2012)

# How do healthcare organizations address this issue?

- ▶ Clinical practice guidelines



# Thrown everything at the problem and see what sticks



## Internal solutions

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Martin Eccles  
(retired) Prof of Clinical Effectiveness  
Newcastle University (UK)

Most frequently used model of  
change in the literature:  
***ISLAGIATT*** model

(It Seemed Like A Good  
Idea At The Time)

# Some potential problems with ISLAGIATT...

## Inefficient

Does not build on what we already know

- Can lead to re-inventing the round wheel (waste of resources)
- Can lead to re-inventing the square wheel (repeating what does not work)

## Insufficient

- May miss important factors

## Unscientific

- Based on implicit idea of what drives change (may or may not be supported by evidence)
- Implicit ideas undermine replication and knowledge accumulation





## How do healthcare organizations address this issue?

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- ▶ Many organizational responses have not achieved optimal care despite considerable investments
- ▶ Most approaches to changing clinical practice are more often based on 'hunches' than on scientific evidence

*Evidence based practice should be complemented  
by evidence based implementation*

Richard Grol (1997, BMJ)

**We owe it to patients and the public to do better:  
Implementation Science**

# What is Implementation Science?

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- ▶ The interdisciplinary **scientific study** of :
  - **Determinants, processes** and **outcomes** of implementation in healthcare
  - **Methods** for promoting the uptake of research evidence into routine practice in clinical, community and policy contexts<sup>1</sup>
  - Broad range of disciplines and forms of enquiry needed
- ▶ **Goal:** develop a **generalizable empirical** and **theoretical** basis to optimize implementation activities to improve the healthcare provided to patients and the public



**IMPLEMENTATION SCIENCE**

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**A case for behaviour change approaches in  
implementation science**

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# Behaviour change approaches to implementation science

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Guideline  
Technique  
Medicine  
Intervention  
Innovation  
Technology



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Health professionals' **behaviour(s)** need(s) to change

**Implementation** can be unpacked into the **behaviours** of those who need to change

- ✓ draw on insights from decades of research in behavioural science about **determinants** of behaviour and effective ways of **changing** behaviour

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**What do we know about *understanding* healthcare professional behaviour?**

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## Case study 1

# Identifying determinants of high quality care for type 2 diabetes

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Example of *quantitative* theoretical *model*-based approach





Three dominant theories and approaches in implementation science:

**“If you build it they will come”**: the structural approach to behaviour change

**“There is no ‘I’ in team”**: change involves exchanges and shared processes between individuals working in teams within organisations

**“It’s all between the ears”** : individuals’ perceptions, cognitions, beliefs, schemas, cognitive associations about their behaviour

Rarely ever considered **alongside each other**

**Need for empirical comparison of theory**

# Theory development need #1: Test different theories against each other

Organisational  
structures

Organisational Justice

Organisational Citizenship

Team Climate

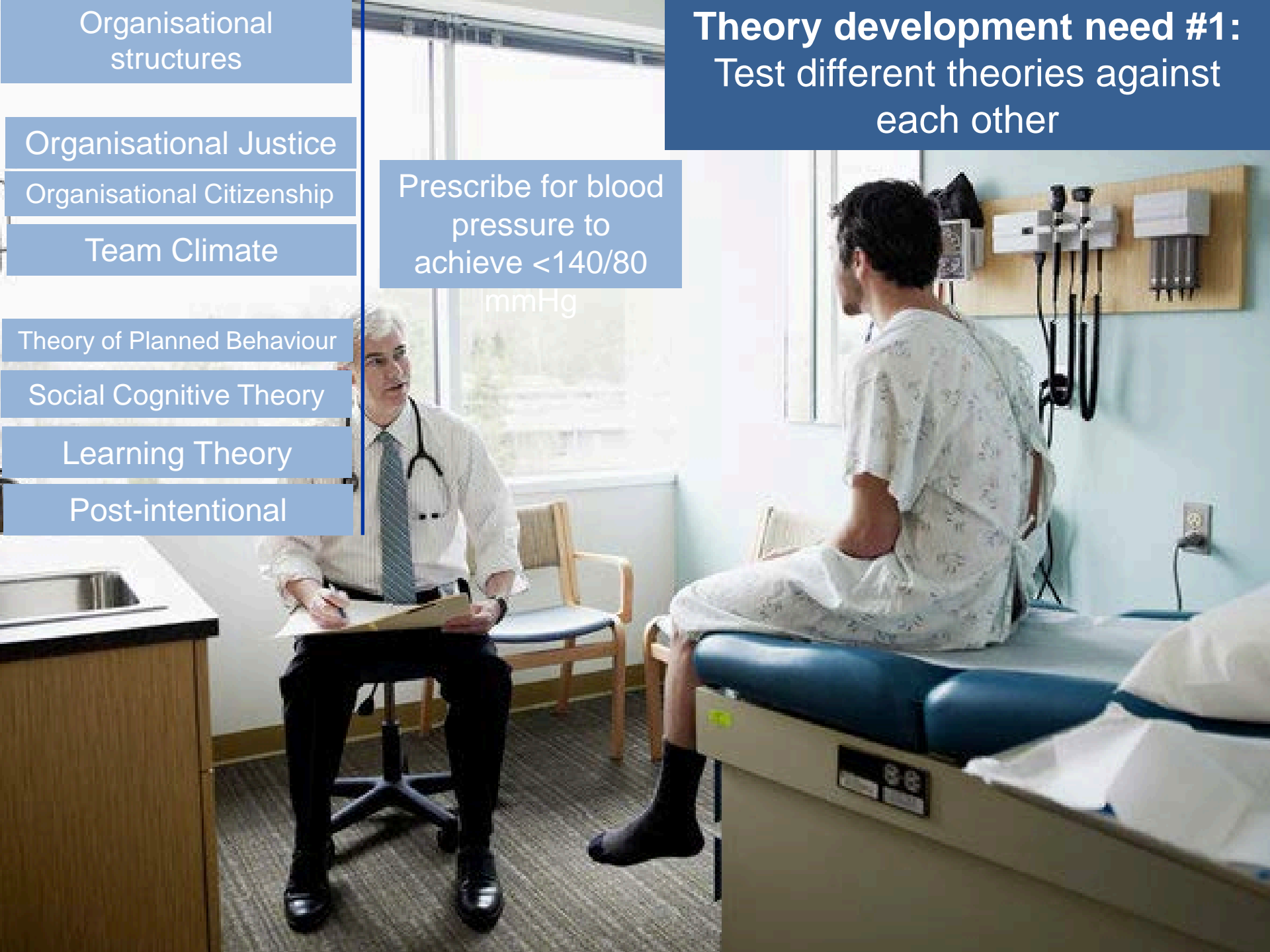
Prescribe for blood  
pressure to  
achieve <140/80  
mmHg

Theory of Planned Behaviour

Social Cognitive Theory

Learning Theory

Post-intentional





# Theory development need #2: Test across multiple behaviours

Organisational structures

Organisational Justice

Organisational Citizenship

Team Climate

Theory of Planned Behaviour

Social Cognitive Theory

Learning Theory

Post-intentional

Prescribe for blood pressure to achieve  $<140/80$  mmHg

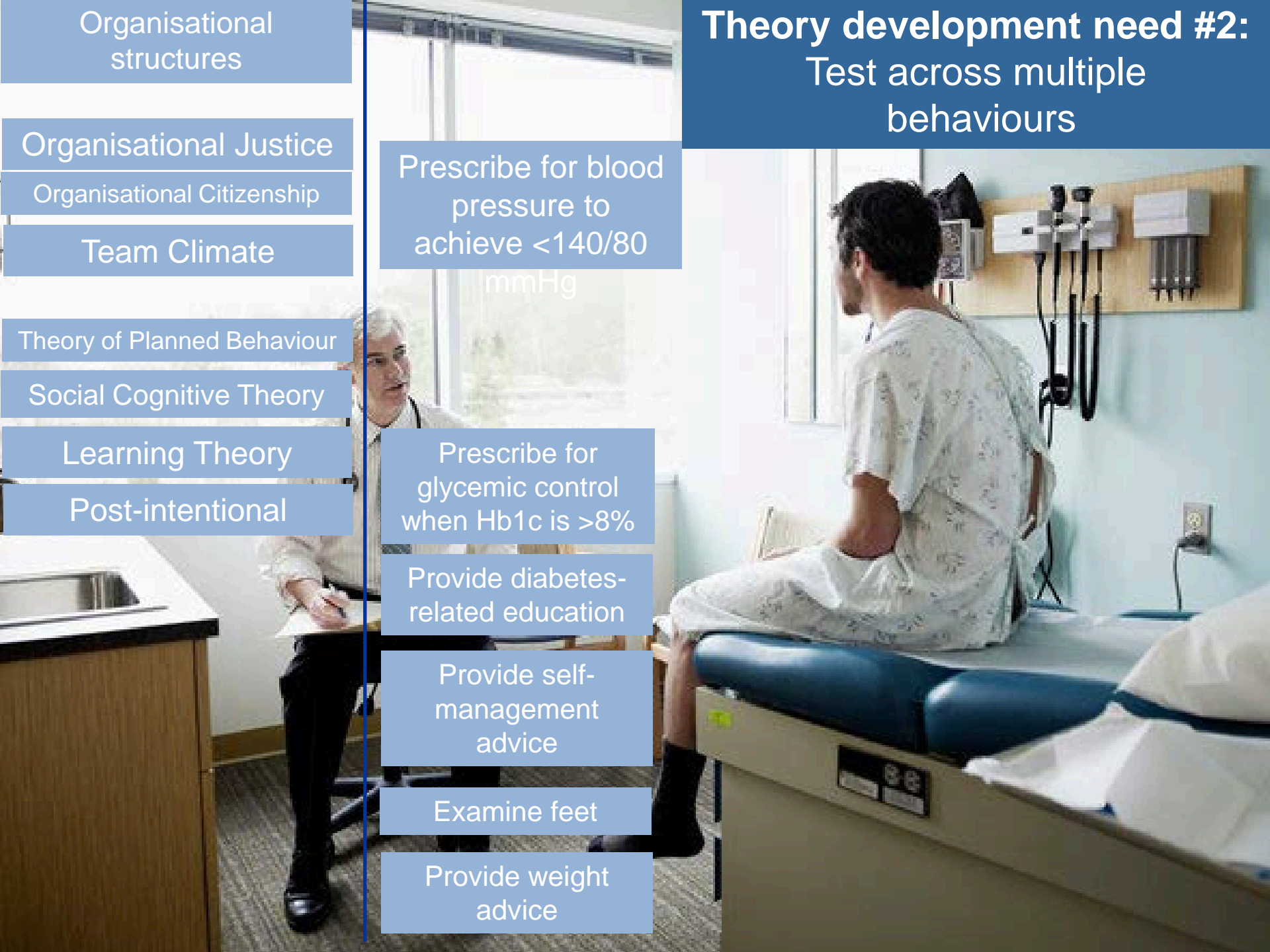
Prescribe for glycemic control when Hb1c is  $>8\%$

Provide diabetes-related education

Provide self-management advice

Examine feet

Provide weight advice



# The improving Quality in Diabetes care (iQuaD) study <sup>1,2,3,4,5,6</sup>

## National UK study of primary care diabetes care

AIMS: To investigate how effectively and consistency factors from predominant organizational and individual theories predict:

- multiple evidence-based clinical behaviours promoted in guidelines
- in the same sample of clinicians



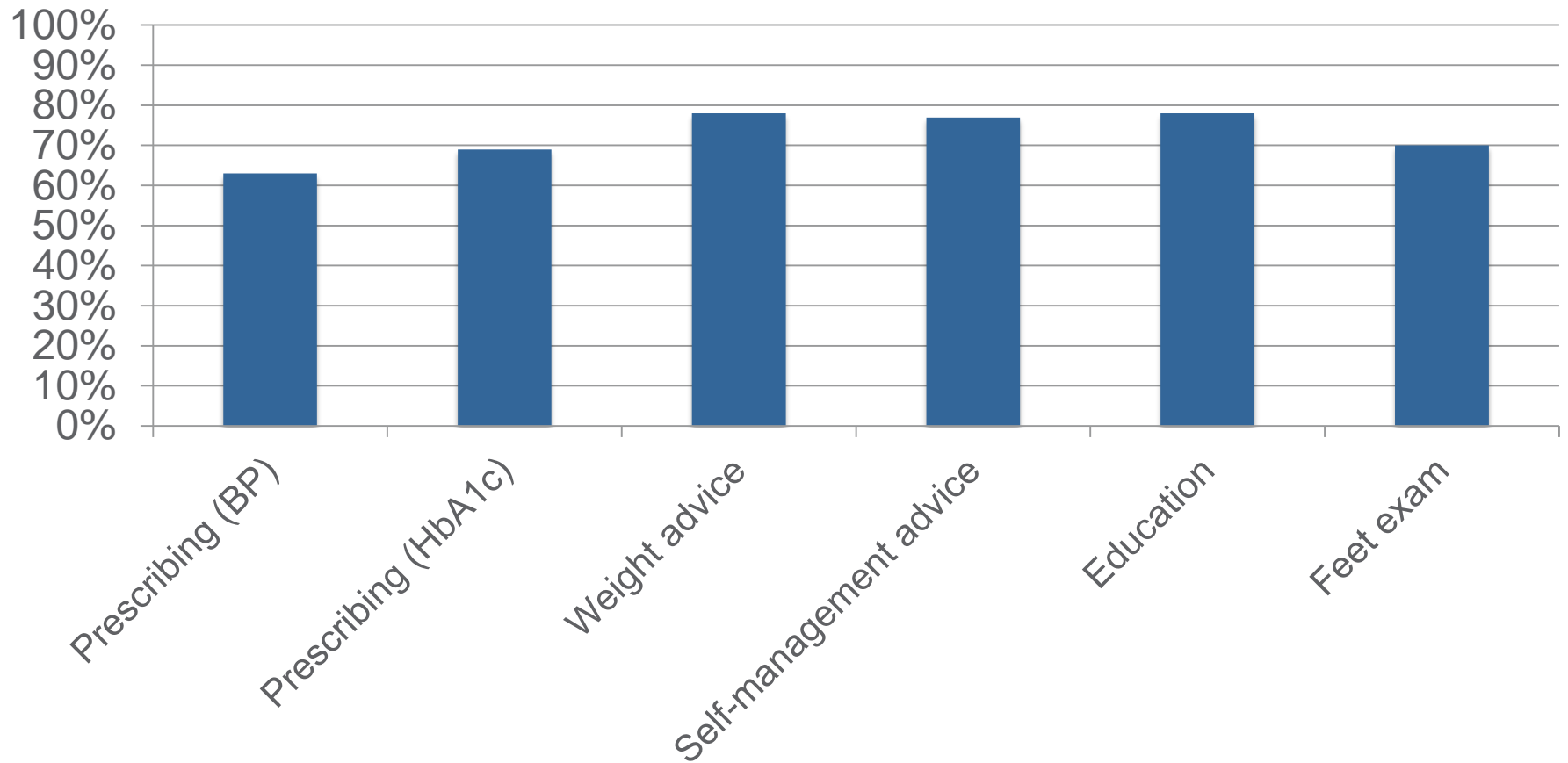
©2006 Mark Hammet All Rights Reserved

## iQuaD methods

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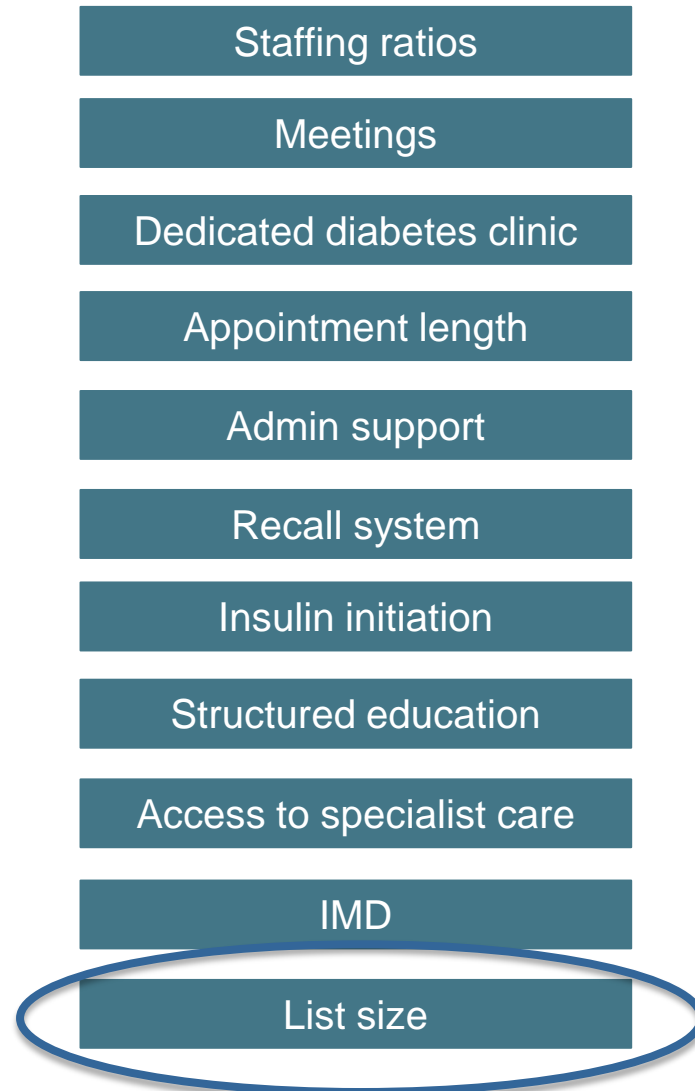
- ▶ **Design:** Prospective predictive study. Postal questionnaire sent at baseline and 12 months later.
- ▶ **Sample:** GPs and nurses in 99 UK primary care practices
- ▶ **Main outcomes:** Clinicians' self-reported behaviour at 12 months follow-up for 6 different behaviours
- ▶ **Recruitment and response rates**
  - **Baseline:** 843 questionnaires sent at baseline to GPs and nurses in 99 practices; 489 (326 GPs, 163 nurses) returned completed (58% baseline response)
  - **12 months follow-up:** 427 (289 GPs, 138 nurses) returned follow-up questionnaire (51% response rate)

## Results: Gaps in quality of care (12m self-report)



# National Study: Testing structural (organization of care) correlates

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Providing foot examination ( $r=-0.26$ )

# National study: Testing organizational theories

## Organizational Justice (Greenberg 1990)

Procedural Justice

Relational Justice

Provider Behaviour

Predicting 12m self-report (median, range):

$$R^2_{adj} = 0.00 (0.00, 0.03)$$

## Team Climate (Anderson & West, 1994)

Participative Safety

Support for Innovation

Vision

Task Orientation

Provider Behaviour

$$R^2_{adj} = 0.01 (0.00, 0.03)$$

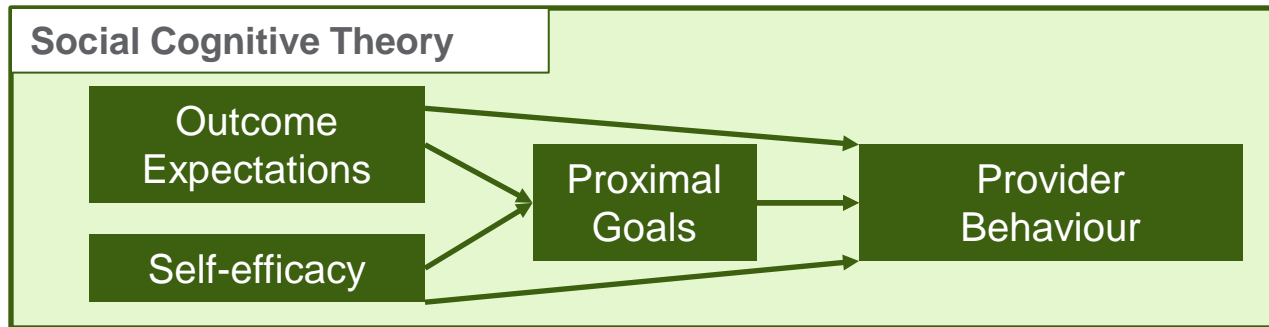
## Organizational Citizenship Behaviours (Moorman, 1991)

Altruism, Courtesy,  
Sportsmanship,  
Conscientiousness,  
Civic Virtue

Provider Behaviour

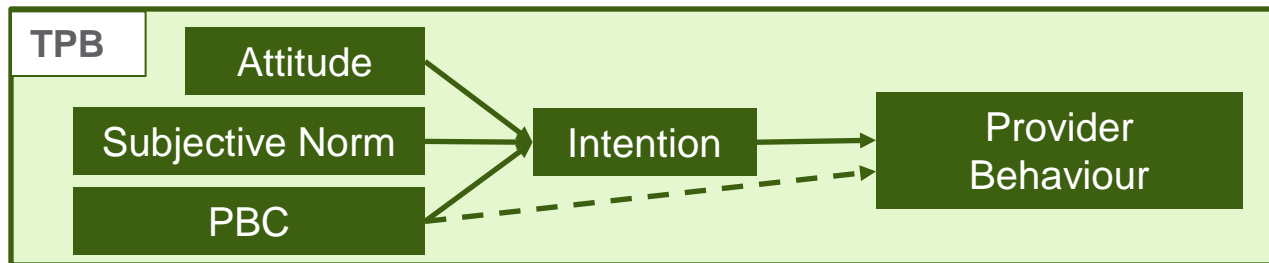
$$R^2_{adj} = 0.00 (0.00, 0.00)$$

# National study: Testing behaviour theories

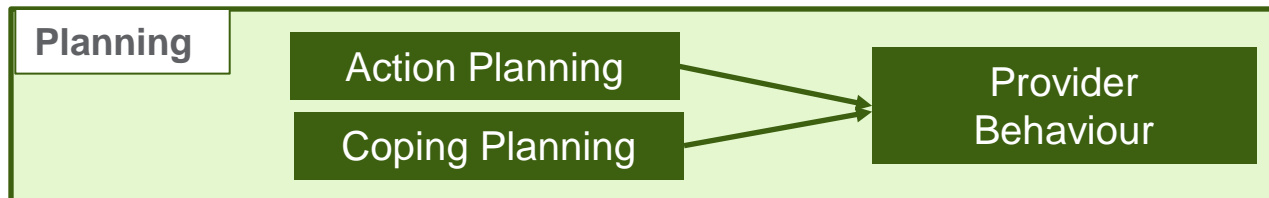


Predicting 12m self-report (median, range):

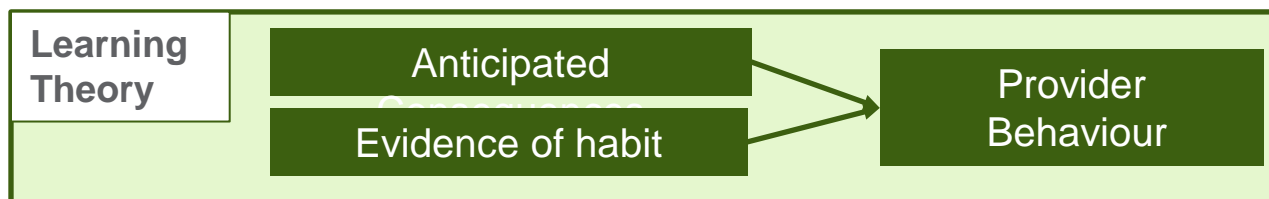
$$R^2_{adj} = 0.14 (0.09, 0.48)$$



$$R^2_{adj} = 0.15 (0.09, 0.50)$$



$$R^2_{adj} = 0.15 (0.09, 0.50)$$



$$R^2_{adj} = 0.15 (0.07, 0.43)$$

# Summary

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- ▶ **Room for improvement** in behaviour
- ▶ Constructs from **Organizational Theories** *did not* predict healthcare professional behaviours
- ▶ Constructs from **Behaviour Theories** consistently predicted multiple behaviors
- ▶ Theories used to predict health behaviours are applicable to predicting healthcare professional behaviours
  - Can inform intervention design to improve care by targeting modifiable factors shown to consistently predict clinicians' behaviour



## Case study 2

### Implementing new treatment in a clinical trial

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Example of *qualitative* theoretical framework-based approach



# Behaviour change as part of generating research evidence: Clinical trials

## Clinical trial:

Two arm cluster trial of  
new treatment vs.  
usual care

## Outcomes

- Cardiac events
- Hospitalization
- Side effects
- Well being
- Mortality

Effectiveness depends upon a  
change in standard practice



# Dialysis

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- 2 million+ worldwide receive hemodialysis for end-stage kidney disease; most receive dialysis treatment 3x week<sup>1</sup>
- Up to 40% die within 1 yr of starting treatment<sup>2</sup>
- Cardiovascular disease = leading cause of death and statins and anti-platelets largely ineffective<sup>3</sup>
- Hemodialysis damages vital organs through repeated subclinical ischemia and intradialytic hypotension; over time can lead to heart attack and stroke<sup>4</sup>

## A solution?

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- **Review** (22 studies): using cooler dialysate temperature reduces intradialytic hypotension
- **Small randomized trial** (73 patients): reducing temp by 0.5 C below core temperature = reduced brain and cardiac injury.

**Next step:** we are running a large scale cluster trial of individualized reduced dialysis temperature randomizing all 75 dialysis centres in Ontario, Canada

**Before roll-out:** any **barriers** to using temperature-reduced dialysis that we should address when implementing the treatment?

# Case Study 1: Identifying theory-based barriers and facilitators to uptake of temperature reduced hemodialysis within a clinical trial

Presseau, Mutsears, Al-Jaishi, Squires, McIntyre, Garg, Sood, Grimshaw, on behalf of MYTEMP investigators (in prep)

**Aim:** conduct behaviour change diagnostics prior to trial roll-out to inform trial implementation strategy

**Design:** semi-structured interviews

- Clarify who needs to do what differently
- Identify potential barriers and facilitators using topic guide informed by the Theoretical Domains Framework<sup>1,2</sup>

**Behaviour:** setting dialysate temperature to 0.5 degrees below core body temperature at the start of the session

**Sample:** 18 nephrologists and nurses



# Theoretical Domains Framework (TDF)

- Addresses theoretical model overload
- Mapped 128 constructs from 33 theories of behaviour change
- Summarized into 12 domains covering key factors related to behaviour change

Making psychological theory useful for implementing evidence based practice: a consensus approach

S Michie, M Johnston, C Abraham, R Lawton, D Parker, A Walker, on behalf of the "Psychological Theory" Group

Qual Saf Health Care 2005;14:26-33. doi: 10.1136/qshc.2004.011155

Cane et al. *Implementation Science* 2012, 7:37  
<http://www.implementationscience.com/content/7/1/37>



**RESEARCH**

**Open Access**

Validation of the theoretical domains framework for use in behaviour change and implementation research

James Cane<sup>1</sup>, Denise O'Connor<sup>2</sup> and Susan Michie<sup>3\*</sup>

# TDF Domains

Knowledge

Skills

Social/professional role and identity

Beliefs about capabilities

Optimism

Beliefs about consequences

Reinforcement

Intention

Goals

Memory, attention and decision  
processes

Environmental context and  
resources

Social Influences

Emotion

Behavioural Regulation

Nature of the behaviour

## Key findings

# TDF Domains

## Knowledge

Skills

Social/professional role and identity

Beliefs about capabilities

Optimism

Beliefs about consequences

Reinforcement

Intention

Goals

Memory, attention and decision processes

Environmental context and resources

Social Influences

Emotion

Behavioural Regulation

Nature of the behaviour

## Evidence

- Aware of evidence re: cooler dialysate temperature (5N, 5P)
- Not aware of evidence (4N, 2P)
- Need for better evidence (5N, 4P)
- Unsure of evidence for patient tolerability (4P)

## Procedural knowledge

- Steps need to be clear (8N, 7P)



# TDF Domains

Knowledge

Skills

Social/professional role and identity

Beliefs about capabilities

Optimism

**Beliefs about consequences**

Reinforcement

Intention

Goals

Memory, attention and decision processes

Environmental context and resources

Social Influences

Emotion

Behavioural Regulation

Nature of the behaviour

**Consequence for patient comfort**  
Might make patients uncomfortably cold (8N, 4P)

**Hypotension**  
Helps manage hypotension (7N, 7P)

**Cardiac issues**  
Worry that may lead to arrhythmia, chest pain, hypertension (3N, 1P)

# TDF Domains

Knowledge

Skills

Social/professional role and identity

Beliefs about capabilities

Optimism

Beliefs about consequences

Reinforcement

**Intention**

Goals

Memory, attention and decision processes

Environmental context and resources

Social Influences

Emotion

Behavioural Regulation

Nature of the behaviour

## **Strong intention**

- For patients with hypotension (4N, 2P)

## **Weaker intention**

- For patients with hypertension (2P)
- For patients doing well on current temp (3N, 3P)
- When patients already cold (3N, 1P)

## **Conflict with local policies**

- May be conflict, need to change (2N, 1P)
- Will not conflict (2N, 5P)

# TDF Domains

Knowledge

Skills

Social/professional role and identity

Beliefs about capabilities

Optimism

Beliefs about consequences

Reinforcement

Intention

Goals

**Memory, attention and decision processes**

Environmental context and resources

Social Influences

Emotion

Behavioural Regulation

Nature of the behaviour

**Forgetting**  
- May forget if busy (5N, 3P)

# TDF Domains

Knowledge

Skills

Social/professional role and identity

Beliefs about capabilities

Optimism

Beliefs about consequences

Reinforcement

Intention

Goals

Memory, attention and decision processes

Environmental context and resources

Social Influences

Emotion

Behavioural Regulation

Nature of the behaviour

- Temperature reading for individualizing**
  - Season (winter/summer) (2N, 1P)
  - Ice chips/coffee (4N)
  - Unit temp and vents make patients cold already (6N)
- Thermometer availability (2N)**

# TDF Domains

Knowledge

Skills

Social/professional role and identity

Beliefs about capabilities

Optimism

Beliefs about consequences

Reinforcement

Intention

Goals

Memory, attention and decision processes

Environmental context and resources

Social Influences

Emotion

**Behavioural Regulation**

Nature of the behaviour

**Problem solving**

- When patients are cold (8N, 4P)

## Case Study 2 - Summary

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Even 'simple' actions can have unanticipated barriers than may impede trial implementation and therefore effectiveness

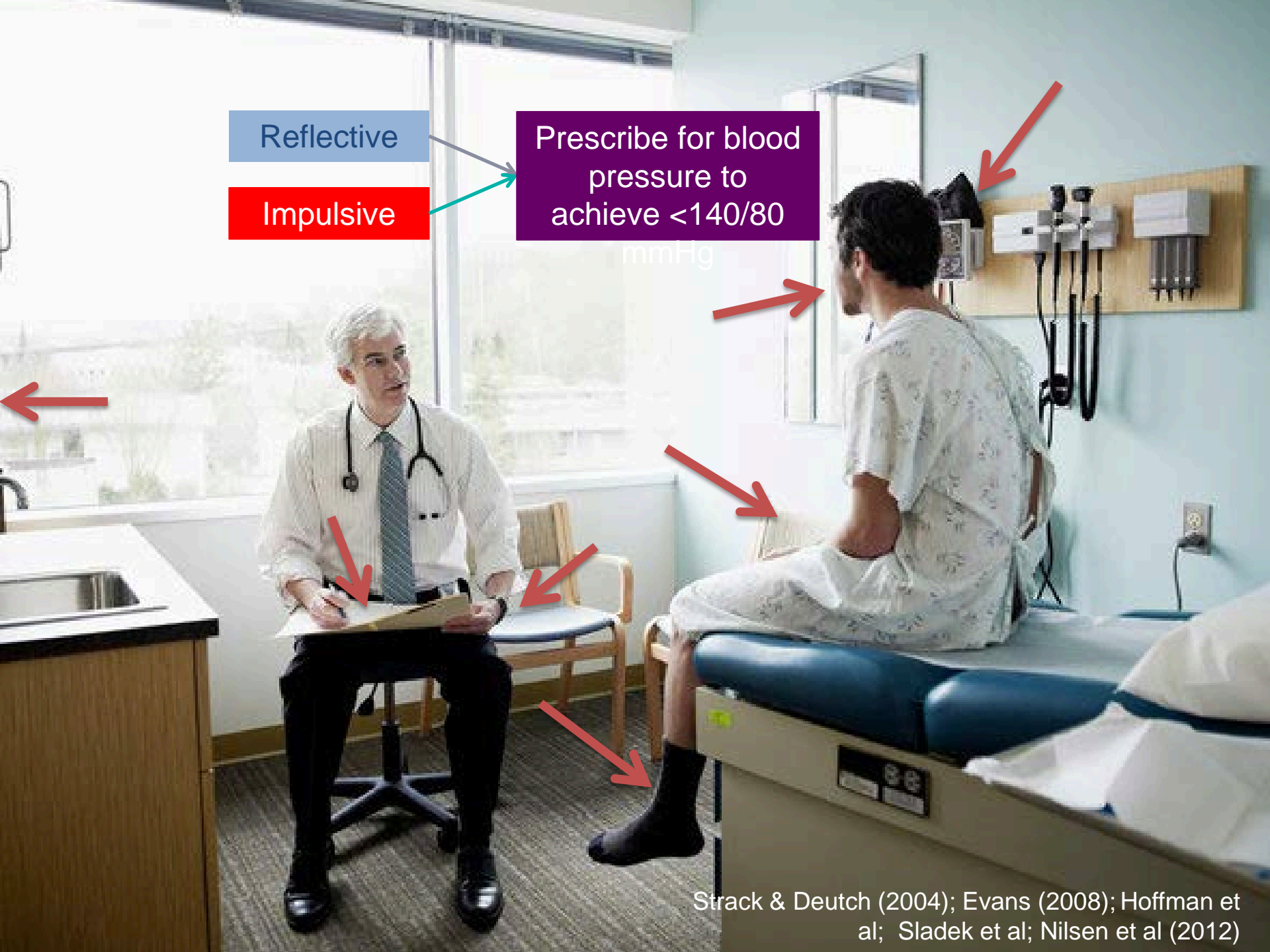
## **Case study 3**

### **What about routines and habits?**

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Systematic review of the association between habit and healthcare professional behaviour

Towards a dual process model of healthcare professional behaviour



Reflective

Impulsive

Prescribe for blood pressure to achieve <140/80

mmHg



# Systematic review of relationship between habit and healthcare professional behaviour

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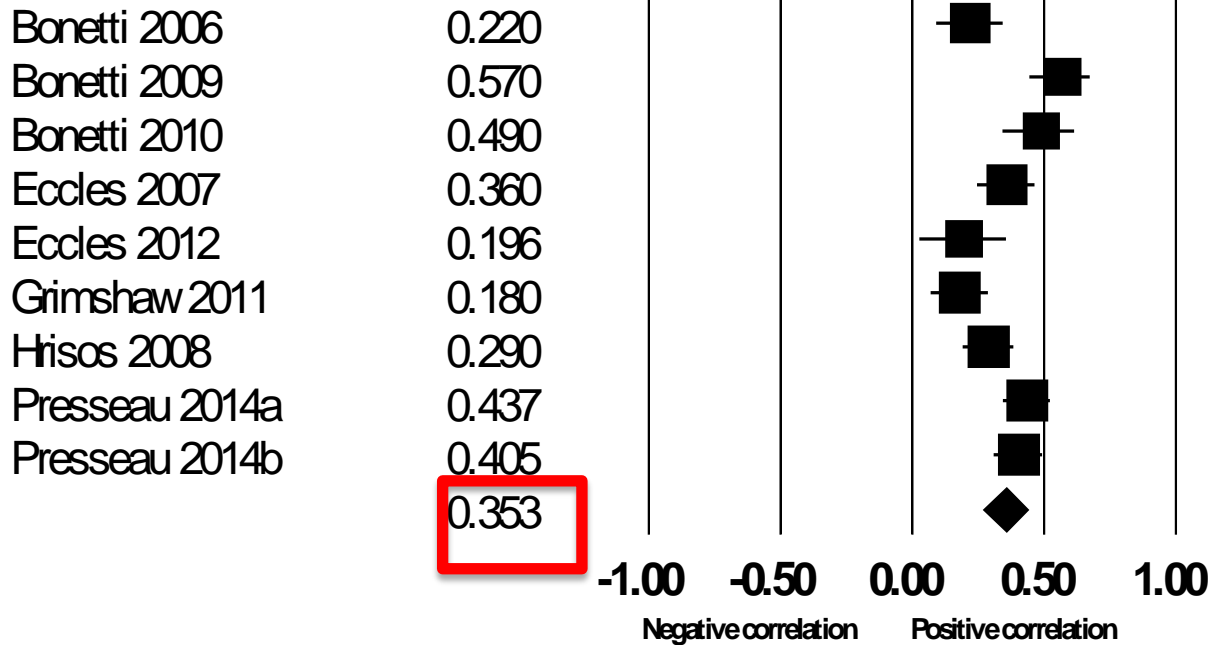
**Aims:** Identify studies assessing clinicians' habit and behaviour separately and determine the overall strength of association between habit and healthcare professional behaviour

- ▶ **9 Included studies**
- ▶ **Designs:** 8 correlational (6 cross-sectional, 2 prospective), 1 RCT
- ▶ **Total sample size:** 2,392 clinicians
- ▶ All conducted in UK
- ▶ Mixed-gender samples of primary care GPs, GDPs, and nurses

# Association between habit and healthcare professional behaviour

Study name

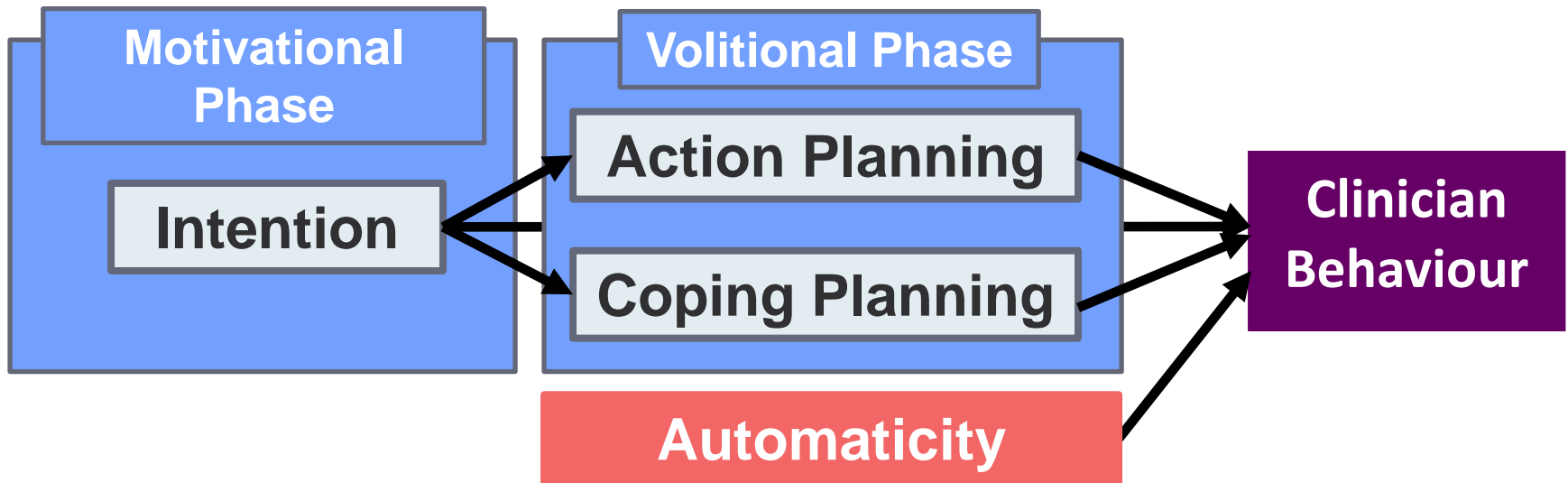
**Correlation**



Open question: how does habit fit within existing theory?

# A dual process model of healthcare professional behaviour

Tested a dual process model predicting six clinical behaviours in iQuaD sample



## Results

- **Motivational process** **direct** and **indirect** predictor of clinician behaviour
- **Volitional process** explain how intentions are translated into behaviour for **advising** but not **examining** behaviours (unclear for prescribing)
- **Automatic processes** are involved in **prescribing**, **examining** and **advising** behaviours, though not without the input of the reflective process

## Summary: dual processes for clinician behaviour change

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Habit and automaticity are important yet understudied aspect of healthcare professional behaviour

- May be particularly important in thinking about **implementation maintenance**, and **de-implementation**

Opportunities for developing novel interventions targeting **reflective** and **impulsive** processes to promote implementation of high quality care

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**What do we know about *changing* healthcare  
professional behaviour?**

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## What do we know from Cochrane reviews?

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- ▶ Cochrane Effective Practice and Organisation of Care (EPOC) undertakes systematic reviews to improve healthcare systems and healthcare delivery
  - ▶ Currently 205 reviews/protocols
    - We know quite a bit!



**THE COCHRANE  
COLLABORATION®**

<http://epoc.cochrane.org/>

## What do we know from Cochrane reviews?

Implementation intervention strategy	# of trials	Median improved performance	Interquartile range
Automatically-generated reminders on paper (Arditi 2012)	32	Reminders alone: 11% Reminders +: 4%	7-20% 3-6%
Printed educational materials (Giguere 2012)	7	2%	0-11%
On-screen point of care reminders (Shojania 2009)	28	4%	1-19%
Audit and Feedback (Ivers 2012)	140	4%	1-16%
Meetings and workshops (Forsetlund 2009)	81	6%	2-16%
Educational outreach visits (O'Brien 2007)	69	6%	3-9%

- Small effects at population level may be important
- Wide variability of effect
- What explains variability?

## **Not all audit and feedback created equal**

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**Ivers *et al.* Audit and feedback: effects on professional practice and health care outcomes. *Cochrane Library* 2012**

- Larger effects seen when:
  - baseline compliance was low
  - source was a supervisor or colleague
  - feedback provided more than once
  - delivered in both verbal and written formats
  - included both explicit targets and an action plan



## Case study 4: Review of interventions to improve the quality of diabetes care

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Systematic review of QI interventions Type 2 diabetes care identified 142 trials of interventions<sup>1</sup>

### Intervention effectiveness on clinical outcomes

- ✓ mean  $\Delta$  0.37% HbA1c (120 trials)
- ✓ mean  $\Delta$  0.10mmol/L (47 trials)
- ✓ mean  $\Delta$  3.13mmHg systolic BP (65 trials)
- ✓ mean  $\Delta$  1.55mmHg diastolic BP (61 trials)

*What is the **content**?*  
*What **content** is associated with greater effectiveness?*

# Lancet review: intervention content coded using EPOC

- ▶ Content coded using EPOC taxonomy of change strategies
  - ✓ All strategies except ‘continuous QI’ and ‘financial incentives’ associated with improved HbA1c

- Combine **content** with method of delivery, recipient, and/or deliverer
- Unclear ‘active ingredients’
- Replication and optimization = challenging

## EPOC Taxonomy

### Strategies targeting **system-level**

- Case management
- Team changes
- Electronic patient registry
- Facilitated relay of information to clinicians
- Continuous QI

### Strategies targeting **healthcare providers**

- Audit and Feedback
- Clinician Education
- Clinician Reminders
- Financial Incentives

### Strategies targeting **patients**

- Education of patients
- Promoting self-management
- Reminder systems

# Using a behaviour change techniques taxonomy

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BCTTv1: 93 techniques within 16 categories focusing on  
**behaviour change**

ann. behav. med.

DOI 10.1007/s12160-013-9486-6

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ORIGINAL ARTICLE

## **The Behavior Change Technique Taxonomy (v1) of 93 Hierarchically Clustered Techniques: Building an International Consensus for the Reporting of Behavior Change Interventions**

**Susan Michie, DPhil, CPsychol · Michelle Richardson, PhD · Marie Johnston, PhD,  
CPsychol · Charles Abraham, DPhil, CPsychol · Jill Francis, PhD, CPsychol ·  
Wendy Hardeman, PhD · Martin P. Eccles, MD · James Cane, PhD ·  
Caroline E. Wood, PhD**

# Behaviour change techniques taxonomy v1 (Michie et al 2013)

## Feedback and monitoring

Monitoring of behaviour by others without feedback  
Feedback on behaviour/outcomes of behaviour  
Feedback on outcomes of behaviour  
Self-monitoring of behaviour  
Self-monitoring of outcomes of behaviour  
Monitoring of outcome(s) of behaviour without feedback

Biofeedback

## Regulation

Conserving mental resources  
Pharmacological support  
Reduce negative emotions

Paradoxical instructions

## Goals and Planning

Goal setting (behavior) OR Goal setting (outcome)  
Problem solving  
Action planning  
Review behavior goal(s) OR Review outcome goal(s)  
Discrepancy between current behavior and goal  
Behavioral contract  
Commitment

## Repetition and substitution

Behavioural practice/rehearsal  
Behaviour substitution  
Habit formation  
Habit reversal  
Overcorrection  
Generalisation of target behaviour  
Graded tasks

## Comparison of outcomes

Credible source  
Pros and cons  
Comparative imagining of future

## Covert learning

Imaginary punishment  
Imaginary reward  
Vicarious consequences

## Reward and threat

Incentive (outcome)  
Material incentive (behaviour)  
Social incentive  
Non-specific incentive  
Self-incentive  
Self-reward  
Reward (outcome)  
Material reward (behaviour)  
Non-specific reward  
Social reward  
Future punishment

## Shaping Knowledge

Instruction on how to perform behaviour  
Information about Antecedents  
Re-attribution  
Behavioural experiments

## Social Support

Social support (unspecified)  
Social support (practical)  
Social support (emotional)

## Natural Consequences

Info about health consequences  
Info about emotional consequences  
Info re social and environment consequences  
Salience of consequences  
Monitoring of emotional consequences  
Anticipated regret

## Identity

Identification of self as role model  
Framing/reframing  
Incompatible beliefs  
Valued self-identify  
Identity linked with changed behaviour

## Scheduled consequences

Behaviour cost  
Punishment  
Remove reward  
Reward approximation  
Rewarding completion  
Situation-specific reward  
Reward incompatible behaviour  
Reward alternative behaviour  
Reduce reward frequency  
Remove punishment

## Antecedents

Adding objects to the environment  
Restructuring the physical environment  
Restructuring the social environment  
Avoidance/reducing exposure to cues  
Distraction  
Body changes

## Self-belief

Verbal persuasion about capability  
Mental rehearsal of successful performance  
Focus on past success  
Self-talk

## Associations

Prompts/cues  
Cue signalling reward  
Reduce prompts/cues  
Remove access to the reward  
Remove aversive stimulus  
Satiating  
Exposure  
Associative learning

## Comparison of behaviour

Demonstration of the behaviour  
Social comparison  
Information about others' approval

## Research Questions

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1. Can BCTs be coded in QI interventions?
  - Pilot study<sup>1</sup> (23 trials): yes
2. Which BCTs and groups of BCTs are being used?
  1. Which are associated with greater effectiveness?<sup>2</sup>

# Methods

- Secondary analysis of **142 trials** of interventions in *Lancet* review of diabetes QI interventions<sup>1</sup>
- Two health psychologists independently coded reports of 142 trials using the BCTTv1
  - Distinguished BCTs targeting behaviour change in **patients** from those targeting **healthcare professionals**



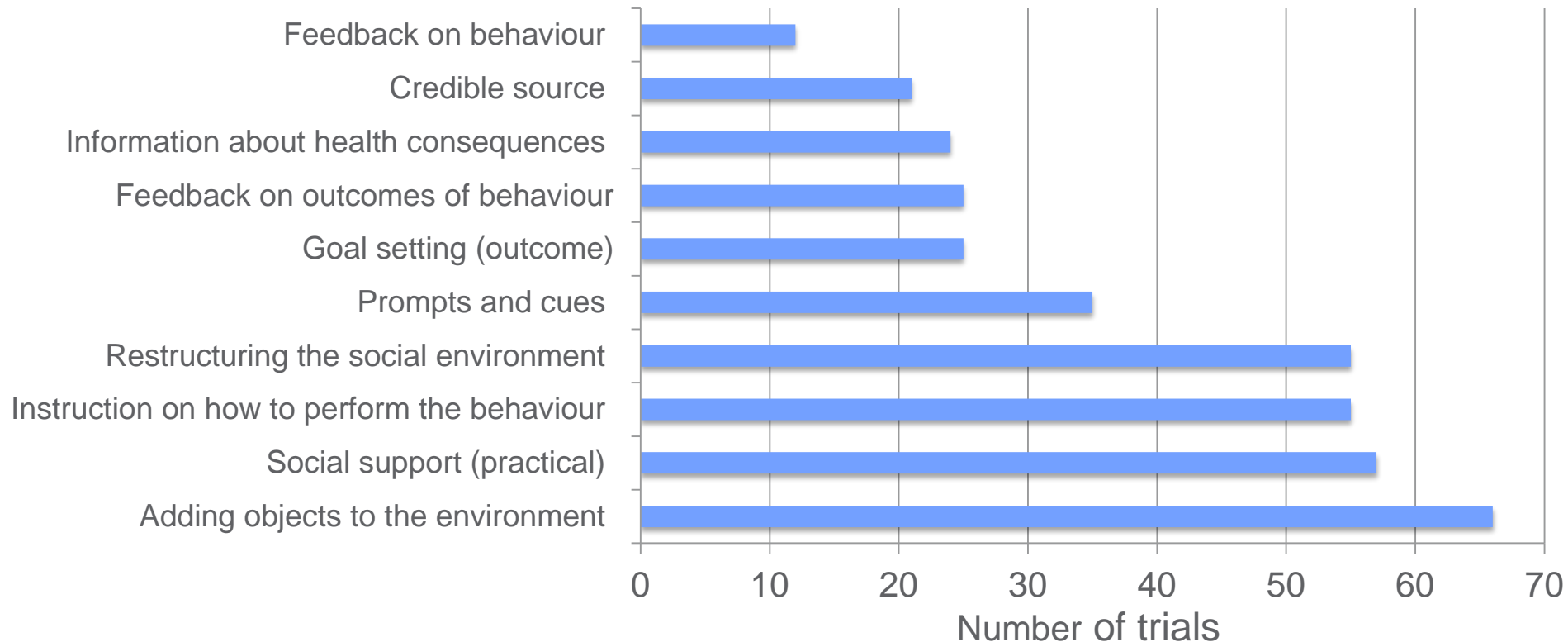
<sup>1</sup>Tricco et al (2012)

## Results: BCTs targeting healthcare professionals



- ▶ **26** of 93 possible BCTs identified in intervention arms

### Top 10 reported BCTs targeting professional behaviour change

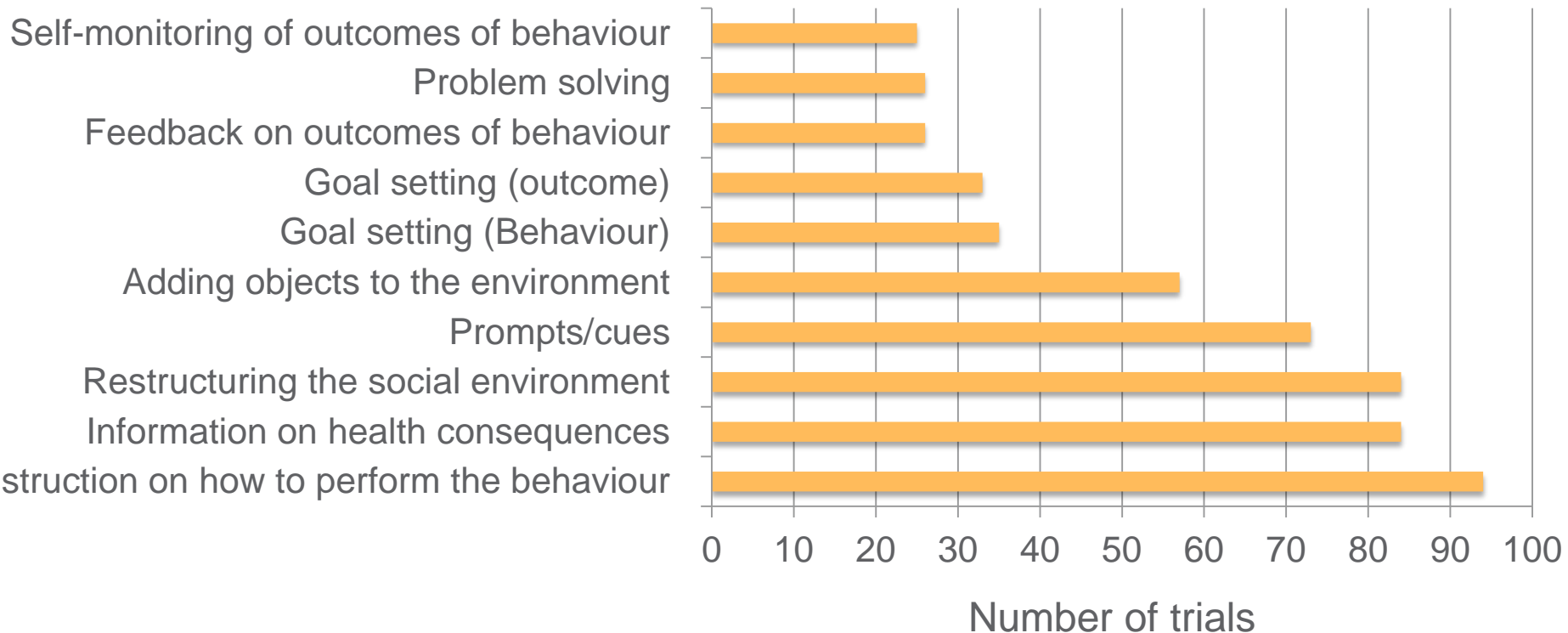


## Results: BCTs targeting patients



- ▶ **38** of 93 possible BCTs identified in intervention arms

### Top 10 reported BCTs targeting patient behaviour change





## Results: Hierarchical meta-regression BCT categories targeting health professionals



BCT categories	Median point estimate in reduced HbA1c (95% CrI)
<b>Antecedents</b>	
Restructuring the physical environment	0.74 (-2.75 to 3.90)
Restructuring the social environment	-0.15 (-0.45 to 0.13)
<b>Adding objects to the environment</b>	<b>-0.51 (-0.75 to -0.27)</b>
Shaping knowledge	-0.18 (-0.60 to 0.26)
Social support	-0.21 (-0.47 to 0.03)
Goals and planning	-0.09 (-0.56 to 0.33)
Feedback and monitoring	-0.03 (-0.65 to 0.62)
Natural consequences	-0.35 (-1.62 to 0.96)
Associations	0.07 (-0.41 to 0.52)
Other BCT categories	0.26 (-0.83 to 1.23)

## Results: Hierarchical meta-regression BCT categories targeting patients



<b>BCT categories</b>	<b>Median point estimate in reduced HbA1c (95% CrI)</b>
<b>Shaping knowledge</b>	
<b>Instruction on how to perform behaviour</b>	<b>-0.47 (-0.84 to -0.09)</b>
Social support	-0.62 (-1.22 to 0.02)
<b>Feedback and monitoring</b>	
<b>Feedback on outcomes of behaviour</b>	<b>-0.38 (-0.76 to -0.01)</b>
Self-monitoring of outcome(s) of behaviour	-0.10 (-0.83 to 0.80)
Self-monitoring of behaviour	-0.02 (-0.90 to 0.92)
Feedback on behaviour	0.08 (-1.67 to 1.83)
Monitoring of outcomes of b w/out feedback	1.08 (-1.22 to 3.45)
<b>Other BCT categories</b>	
Antecedents	-0.12 (-0.43 to 0.20)
Goals and planning	-0.18 (-0.65 to 0.29)
Comparison of outcomes	-0.08 (-0.78 to 0.83)
Associations	0.08 (-0.23 to 0.36)
Natural consequences	0.30 (-0.17 to 0.78)

CrI = Credible Interval

# Summary of BCTs in trials of diabetes quality improvement interventions

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- ▶ Reliance on **only a subset of possible BCTs**:
  - Opportunities for improved reporting and novel (theory based) implementation intervention design
- ▶ It is possible to characterise implementation interventions in terms of BCTs and **investigate which BCTs are associated with improved clinical outcomes**

## Overall summary

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- ▶ **We know quite a bit, but gaps between research and practice persist worldwide: no one has solved this, there is no ‘magic bullet’**
  - Important to **understand who needs to do what differently and what might stop them from doing so before jumping to solutions**
- ▶ Behavioural science provides a number of exciting approaches to implementation science
- ▶ Implementation science is a relatively new field, with tremendous opportunity for national and international interdisciplinary collaboration
  - We need collaborative networks so that we can **work together to move more health ‘breakthroughs’ into ‘follow-throughs’**

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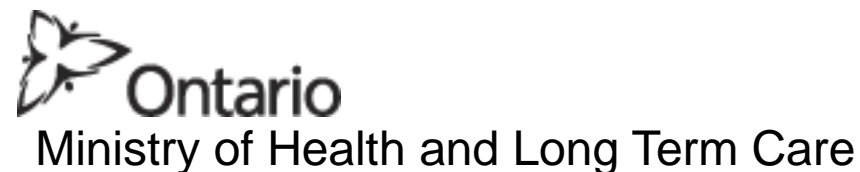
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