Changing behaviour, ‘more or less’: Is de-implementation different from implementation?

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VA/HSR&D's Quality Enhancement Research Initiative (QUERI)
Implementation Seminar Series

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Objectives

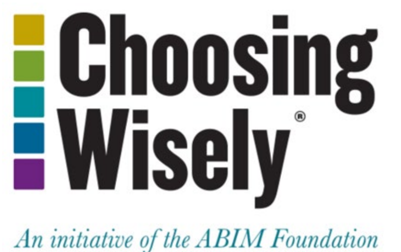
- At the end of this session you will:
  - Understand what the term de-implementation means
  - Question whether de-implementation differs from implementation
  - Understand what it means to ‘de-implement’
  - Likely have more questions than answers…

What is de-implementation?

- Prasad and Ioannidis (2014) defined it as:
  - The abandonment of medical interventions or divesting from ineffective and harmful medical practices.
- David Chambers (2015)
  - The removal of interventions that do not appear to provide optimal care to the population and setting in which they are delivered
- How is that different from implementation?
  - The National Institute of Health, at the 2007 conference on Dissemination and Implementation, defined implementation as 'the use of strategies to introduce or change evidence-based health interventions within specific settings'

Why is everyone so interested in de-implementation?

- Recent focus on the need for improving de-implementation interventions



Why is everyone so interested in de-implementation?

- Gaps in quality of healthcare
  - 20-25% of care provided is not required/ potentially harmful[1,2]

Bottom line

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

Recent research focussed on what it means to de-implement

- Are de-implementation and implementation all that different?

[1]Schuster, McGlynn, Brook (1998) [2]Grol (2001)

The value of a behaviour change approach

Guideline

Technique

Medication

Intervention

Policy

Technology

Someone in the healthcare system's **behaviour** need(s) to change

The value of a behaviour change approach

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Someone in the healthcare system's **behaviour** need(s) to change

- Clinical practice is comprised of sets of behaviours
  - Giving advice, performing examinations, prescribing medications
- Encouraging appropriate practice = supporting behaviour change
- This framing allows us to draw on decades of research in psychology

Are de-implementation and implementation different?

If about behaviour change….

do behavioural theories mention de -implementation?

- Do behavioural theories inform different strategies for implementation and de-implementation?
- De-implementation ~ Reducing frequency of behaviour

Do Psychology Theories Inform Different Strategies For Increasing & Decreasing Behaviours ?

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RESEARCH Open Access

CrossMark

Changing behaviour 'more or less'—do theories of behaviour inform strategies for implementation and de-implementation? A critical interpretive synthesis

Andrea M. Patey[1,2*], Catherine S. Hurt[1], Jeremy M. Grimshaw[2,3] and Jill J. Francis[1,2]

Abstract

Background: Implementing evidence-based care requires healthcare practitioners to do less of some things (de-implementation) and more of others (implementation). Variations in effectiveness of behaviour change interventions may result from failure to consider a distinction between approaches by which behaviour increases and decreases in

PURPOSE:

- To review published reviewed published literature to investigate whether there is a theoretical basis for identifying different strategies behaviour might be implemented (i.e. increased) versus de-implemented (i.e. decreased).

Critical Interpretive Synthesis:

- Included papers from a broad range of fields
  - biology, psychology, education, business
  - likely to report mechanisms of behaviour change for implementation and de-implementation.

Methods

- Articles were identified from databases using search terms related to theory and behaviour change.
  - Also included a scoping review (Davis et al., 2008) of 86 behaviour change theories

- Articles reporting changes in frequency of behaviour and explicit use of theory were included.
- **Data extracted**
  - direction of behaviour change,
  - how theory was operationalized,
  - theory-based techniques or recommendations for behaviour change.

- Analyses of extracted data were conducted iteratively and involved exploration of emergent ideas.
- Purposive sampling of additional papers to explore theoretical concepts in greater detail.

Results

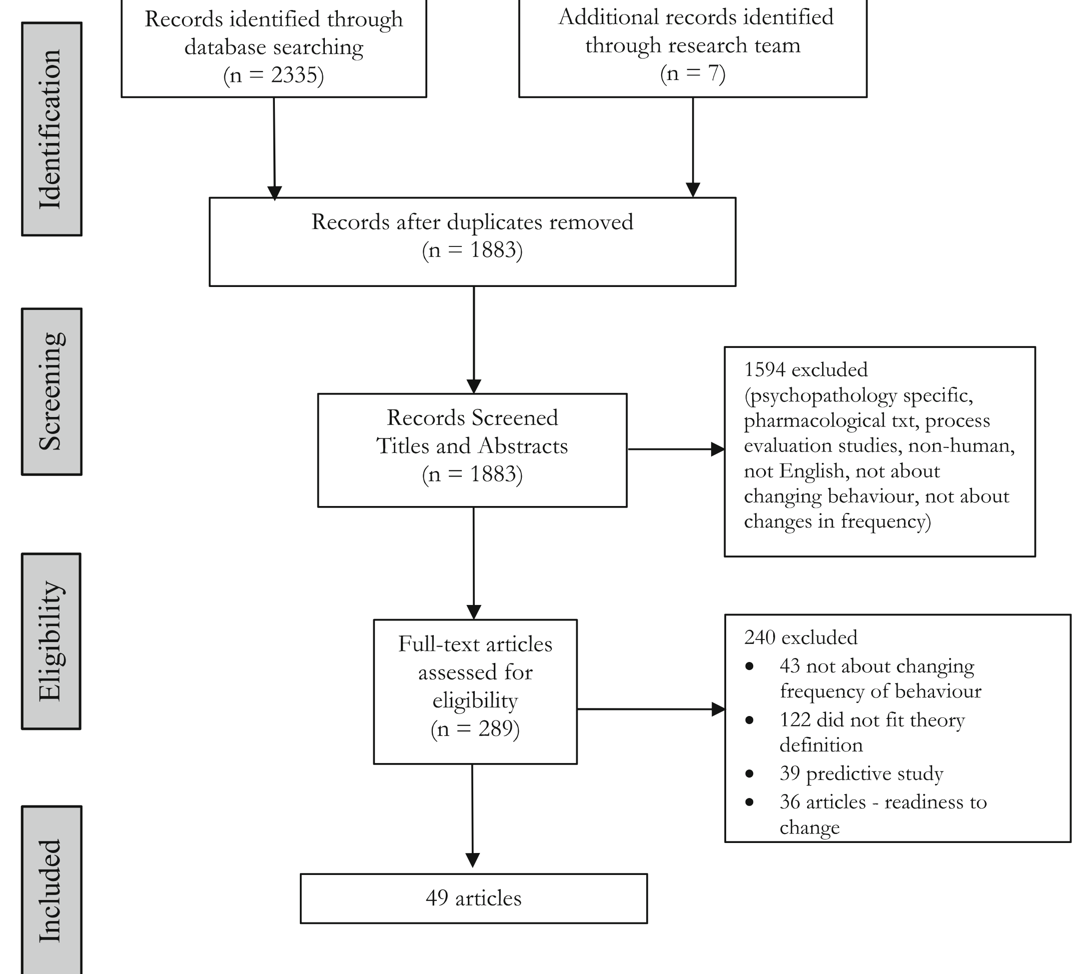

Fig. 1 Flow diagram adapted from PRISMA for the identification of study records at stage 1 of the review

Results

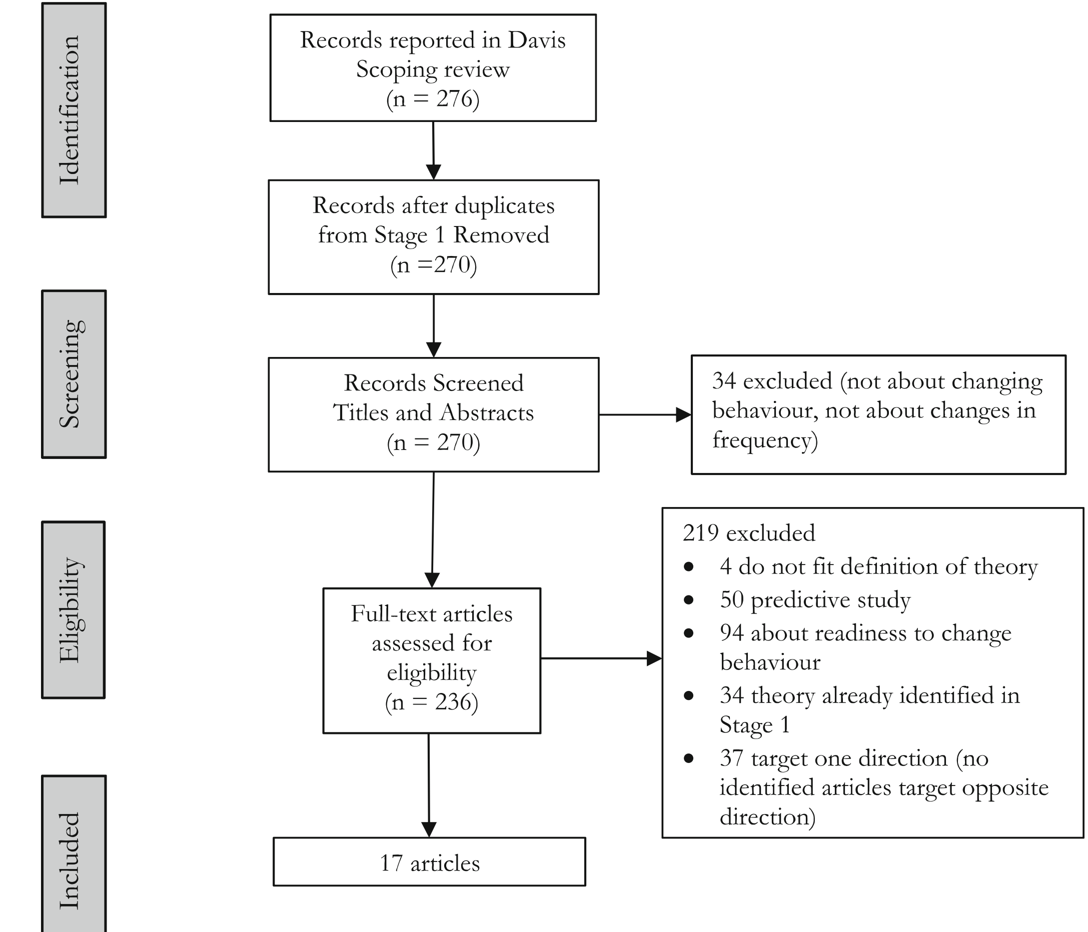

Fig. 2 Flow diagram adapted from PRISMA for the identification of articles from scoping review [32]

RESULTS

Table 1: Summary of theories reported in articles by direction of change in behaviour frequency

Theories / models applied to increase or decrease frequency of behaviour	Target: Increasing Frequency	Target: Decreasing Frequency	Different Directions Theorised Differently?
Operant Learning Theory	**Yes**	**Yes**	**Yes**
Implementation Intention	***Yes***	***Yes***	***No****
Social Cognitive Theory	***Yes***	***Yes***	***No****
Disconnected Value Model	***Yes***	***Yes***	***No****
Self Affirmation Theory	***Yes***	***Yes***	***No****
Self Determination Theory	***Yes***	***Yes***	***No****
Theory of Planned Behaviour	***Yes***	***Yes***	***No****
Theory of Reasoned Action	***Yes***	***Yes***	***No****
Temporal Self-Regulation Theory	***Yes***	***Yes***	***No****
Information-Motivation-Behaviour Skills Model[a]	***Yes***	***Yes***	***No****
Deterrent Theory	No	Yes	N/A
Control Theory	Yes	No	N/A
Goal Setting Theory	Yes	No	N/A
Health Action Process Approach	Yes	No	N/A
Health Belief Model	Yes	No	N/A
Protection Motivation Theory	Yes	No	N/A

[a] Models identified from scoping review

* Proposed decreasing an undesired behaviour by attempting to increase a substitute behaviour.

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Conclusions

- Behavioural theories provide little insight into the distinction between implementation and de-implementation.
- Future research could investigate how best to deliver strategies from Operant Learning Theory explicitly proposed different strategies for implementation and de-implementation.
- For behaviour substitution approaches for de-implementation, further research is required to develop systematic methods for selecting the substitute behaviour.

Designing De-implementation Interventions

- Few behaviour theories explicitly distinguish between how to increase or decrease behaviours (Patey AM, Hurt CS, Grimshaw JM, Francis JJ, Submitted to *Social Science and Medicine*)

- De-implementations Interventions are not a novel concept created in 2014
  - Quality improvement interventions
  - Infection disease control
  - Smoking cessation
  - Healthy eating (eat less fatty foods)

- Are implementation & de-implementation interventions different?

Do De-implementation and Implementation Interventions Include Different BCTs?

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Implementation Science

RESEARCH Open Access

Changing behaviour, 'more or less': do implementation and de-implementation interventions include different behaviour change techniques?

Andrea M. Patey[1,2*], Jeremy M. Grimshaw[2,3] and Jill J. Francis[1,2,4]

Abstract

Background: Decreasing ineffective or harmful healthcare practices (de-implementation) may require different approaches than those used to promote uptake of effective practices (implementation). Few psychological theories differentiate between processes involved in decreasing, versus increasing, behaviour. However, it is unknown

PURPOSE:

- To review published health professional behaviour change interventions and classify according to the direction of targeted behaviour change and Behaviour Change Technique

SAMPLING REVIEWS:

- Cochrane Effective Practice and Organization of Care (EPOC)
- 3 reviews (Antibiotic Practice, Audit & Feedback, Imaging Practice)

(Davey et al 2013, Ivers et al 2012, French et al 2010)

Methods

Systematic Review	Criteria for purposive selection
Antibiotic Practice	(1) should include interventions that may target both implementation and de-implementation
Audit and Feedback	(2) should not be limited to one professional group or setting but include various clinical settings and healthcare professions to diversify the population of healthcare professional groups. (e.g. primary care physicians, nurses, internists and other healthcare professionals in secondary and tertiary care facilities)
Imaging Practice	

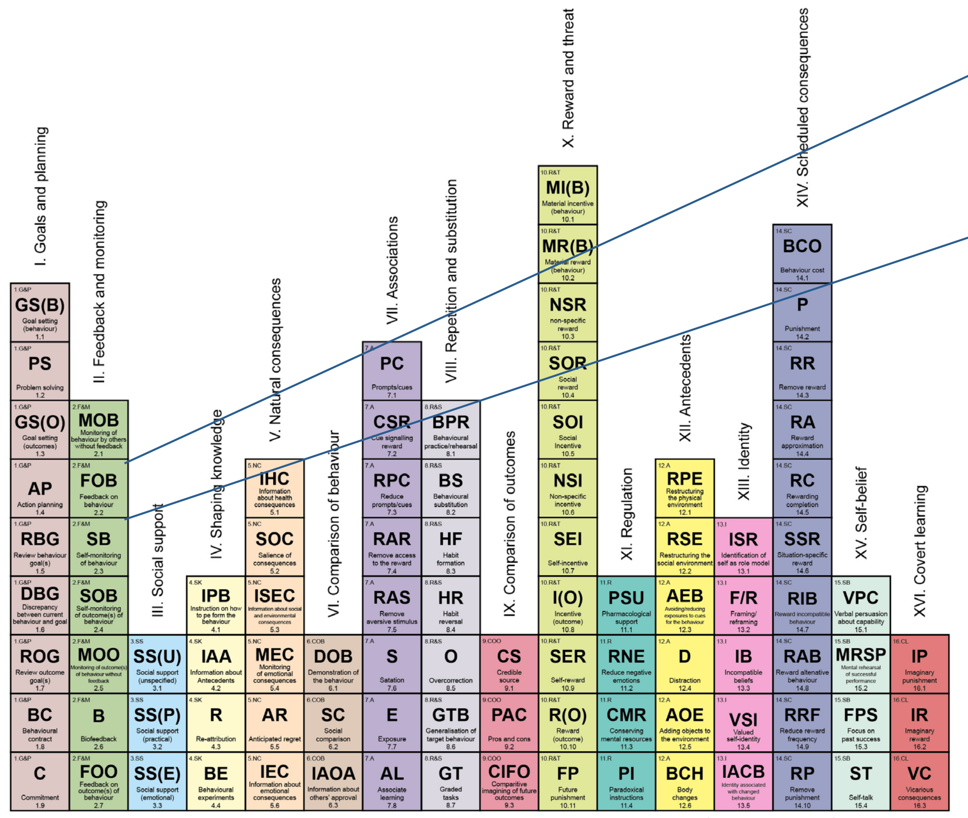
- Articles were screened for explicit reporting of direction of behaviour change (Increasing or decreasing)
- Coded intervention descriptions for Behaviour Change Techniques (BCT taxonomy V1 - Michie et al 2013)
  - 20% of descriptions coded by 2nd coders
- Comparisons across implementation and de-implementation interventions
- ANALYSIS - Pearson's Chi Squared for comparisons of frequency of BCTs

Behaviour Change Techniques Taxonomy Version 1 (BCTTv1)

- Susan Michie and colleagues developed a way to specify behaviour change intervention content in terms of **behaviour change techniques (BCTs): smallest components of interventions that on their own can bring about change**
- Results: 93 distinct techniques (in 16 categories)
- Used by researchers and practitioners working to achieve behaviour change

Michie et al. 2013

Behaviour change techniques taxonomy v1 (Michie et al 2013)



Feedback on

Monitor and provide informative or evaluative feedback on performance of the behavior *(e.g. form, frequency, duration, intensity)*

*Note: if Biofeedback, code only **2.6, Biofeedback** and not **2.2, Feedback on behavior**; if feedback is on **outcome(s)** of behavior, code **2.7, Feedback on outcome(s) of behavior**; if there is no clear evidence that feedback was given, code **2.1, Monitoring of behavior by others without feedback**; if feedback on behaviour is evaluative e.g. praise, also code **10.4, Social reward***

Inform the person of how many steps they walked each day (as recorded on a pedometer) or how many calories they ate each day (based on a food consumption questionnaire).

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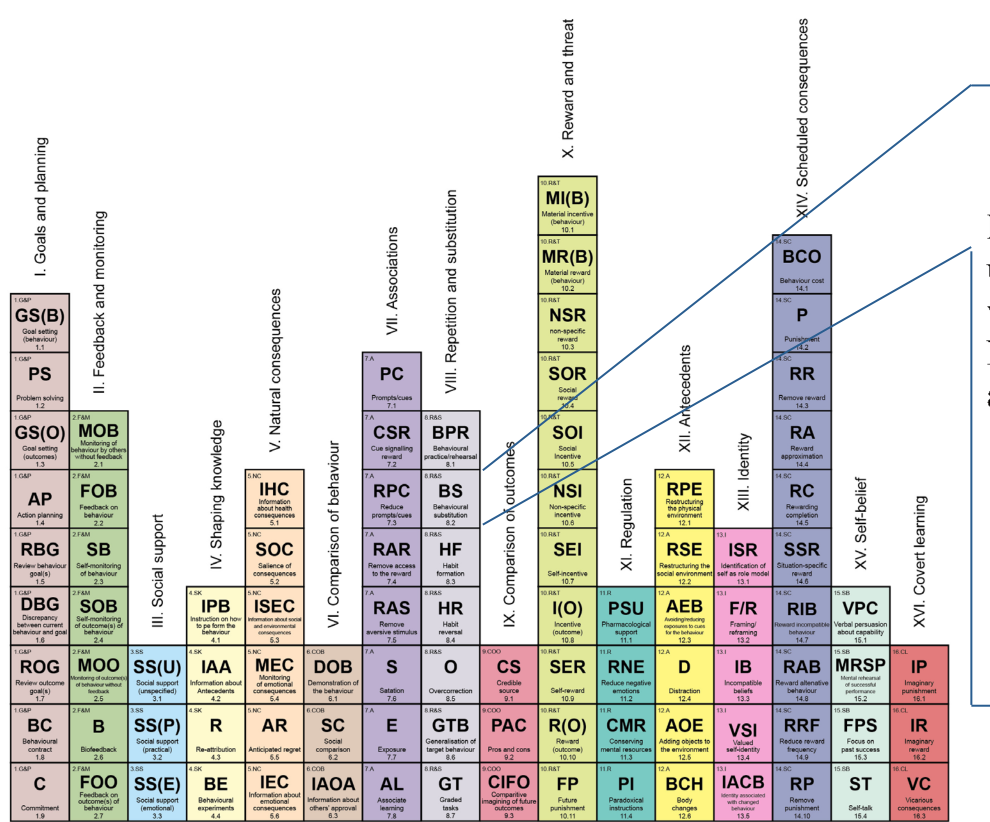
Behaviour change techniques taxonomy v1 (Michie et al 2013)



Behaviour Substitution

Prompt substitution of the unwanted behaviour with a wanted or neutral behaviour. Note: if this occurs regularly also code ***Habit reversal***

Suggest that the person goes for a walk rather than watches television

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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 outcomes

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 perform
Focus on past success
Self-talk

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

Comparison of behaviour
Demonstration of the behaviour
Social comparison
Information about others' approval

Results

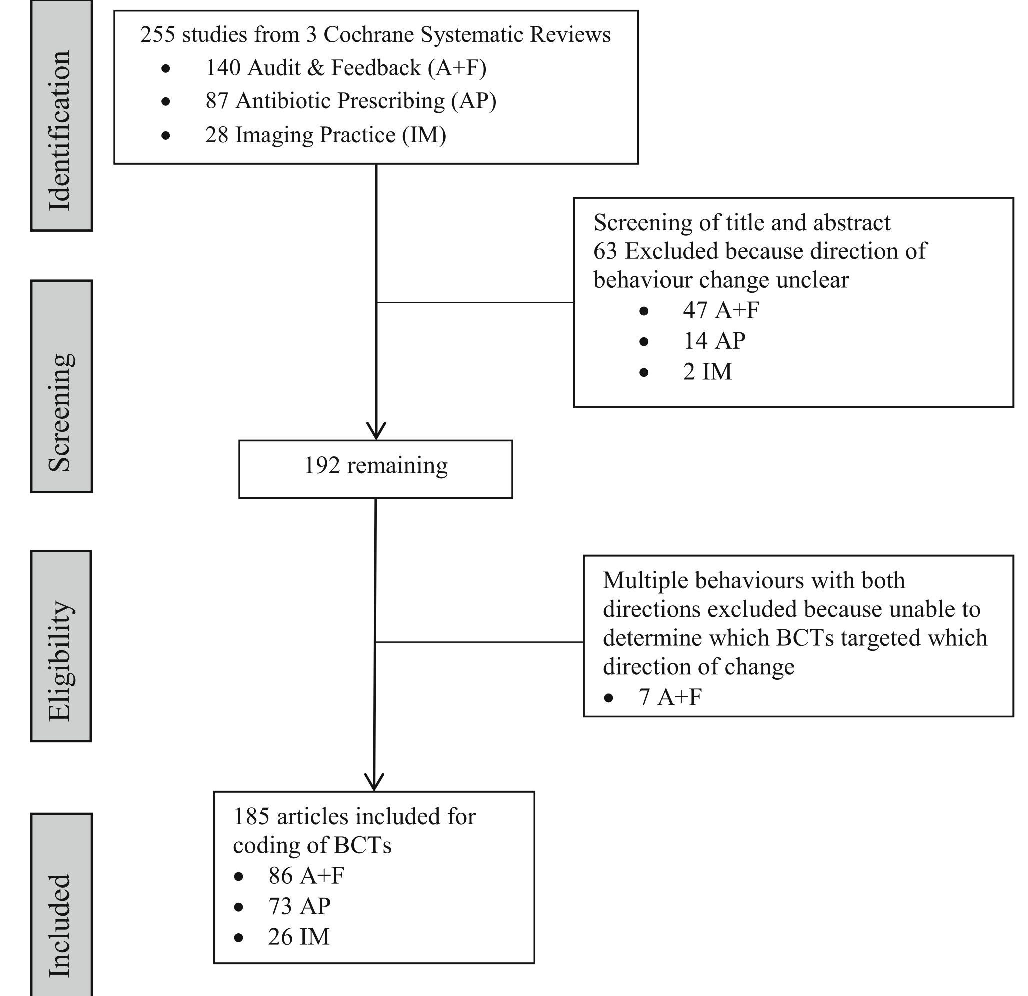


Fig. 1 Flow diagram adapted from PRISMA to identify articles from three EPOC Systematic Reviews for BCT coding

Results

TOP 5

DE-IMPLEMENTATION (n= 97)		IMPLEMENTATION (n= 81)	
INSTRUCTION ON HOW TO PERFORM THE BEHAVIOUR	69 (71%)	59 (73%)	FEEDBACK ON BEHAVIOUR
FEEDBACK ON BEHAVIOUR	42 (43%)	53 (65%)	INSTRUCTION ON HOW TO PERFORM THE BEHAVIOUR
BEHAVIOUR SUBSTITUTION	23 (24%)	27 (33%)	SOCIAL COMPARISON
MONITORING OF BEHAVIOUR BY OTHERS WITHOUT FEEDBACK	22 (23%)	20 (25%)	CREDIBLE SOURCE
SOCIAL COMPARISON	18 (19%)	17 (21%)	PROMPTS / CUES
RESTRUCTURING PHYSICAL ENVIRONMENT	16 (16%)	16 (20%)	GOAL SETTING (BEHAVIOUR)
CREDIBLE SOURCE	15 (15%)	12 (15%)	INFORMATION ABOUT HEALTH CONSEQUENCES
ADDING OBJECTS TO THE ENVIRONMENT	13 (13%)	12 (15%)	SOCIAL SUPPORT (UNSPECIFIED)
RESTRUCTURING THE SOCIAL ENVIRONMENT	13 (13%)	11 (14%)	FEEDBACK ON OUTCOMES OF BEHAVIOUR
INFORMATION ABOUT SOCIAL AND ENVIRONMENTAL CONSEQUENCES	12 (12%)	8 (10%)	REVIEW OF BEHAVIOURAL GOALS
FEEDBACK ON OUTCOMES OF BEHAVIOUR	11 (11%)	7 (9%)	PROS AND CONS
INFORMATION ABOUT HEALTH CONSEQUENCES	10 (10%)	6 (7%)	ADDING OBJECTS TO THE ENVIRONMENT
SOCIAL SUPPORT (UNSPECIFIED)	10 (10%)	6 (7%)	DISCREPANCY BETWEEN CURRENT BEHAVIOUR AND GOAL
SOCIAL SUPPORT (PRACTICAL)	7 (7%)	6 (7%)	SOCIAL SUPPORT (PRACTICAL)
PROMPTS / CUES	6 (6%)	5 (6%)	GOAL SETTING (OUTCOME)
GOAL SETTING (BEHAVIOUR)	4 (4%)	5 (6%)	PROBLEM SOLVING
PROBLEM SOLVING	4 (4%)	5 (6%)	RESTRUCTURING PHYSICAL ENVIRONMENT
PROS AND CONS	4 (4%)	4 (5%)	MATERIAL REWARD (BEHAVIOUR)
MONITORING OF OUTCOMES OF BEHAVIOUR WITHOUT FEEDBACK	3 (3%)	3 (4%)	BEHAVIOUR SUBSTITUTION
COMMITMENT	2 (2%)	3 (4%)	BEHAVIOURAL CONTRACT
REVIEW OF BEHAVIOURAL GOALS	2 (2%)	3 (4%)	INFORMATION ABOUT SOCIAL AND ENVIRONMENTAL CONSEQUENCES
DEMONSTRATION OF THE BEHAVIOUR	1 (1%)	3 (4%)	MATERIAL INCENTIVE (BEHAVIOUR)
DISCREPANCY BETWEEN CURRENT BEHAVIOUR AND GOAL	1 (1%)	3 (4%)	SELF-MONITORING OF BEHAVIOUR
MATERIAL INCENTIVE (BEHAVIOUR)	1 (1%)	2 (2%)	ACTION PLANNING
SELF-MONITORING OF BEHAVIOUR	1 (1%)	2 (2%)	NON-SPECIFIC INCENTIVE
GOAL SETTING (OUTCOME)	0 (0%)	1 (1%)	BEHAVIOURAL PRACTICE / REHEARSAL
MATERIAL REWARD (BEHAVIOUR)	0 (0%)	1 (1%)	COMMITMENT
BEHAVIOURAL CONTRACT	0 (0%)	1 (1%)	COMPARATIVE IMAGINING OF FUTURE OUTCOMES
ACTION PLANNING	0 (0%)	1 (1%)	MONITORING OF BEHAVIOUR BY OTHERS WITHOUT FEEDBACK
NON-SPECIFIC INCENTIVE	0 (0%)	0 (0%)	RESTRUCTURING THE SOCIAL ENVIRONMENT
BEHAVIOURAL PRACTICE / REHEARSAL	0 (0%)	0 (0%)	MONITORING OF OUTCOMES OF BEHAVIOUR WITHOUT FEEDBACK
COMPARATIVE IMAGINING OF FUTURE OUTCOMES	0 (0%)	0 (0%)	DEMONSTRATION OF THE BEHAVIOUR

Results

Table 4 Association between desired change in behaviour (implementation (*n*=81) and de-implementation (*n*=97)) and BCT present

BCT	Desired change in behaviour	BCT identified		Value	Significance value +
		Present	Absent		
Behaviour substitution	Implementation	3	78	**12.607**	**<.0005*[b]**
	De-implementation	**23**	74		
Feedback on behaviour	**Implementation**	**59**	22	**15.693**	**<.0001*[a]**
	De-implementation	42	55		
Monitoring of behaviour by others without feedback	Implementation	1	80	**16.187**	**<.0001*[b]**
	De-implementation	**22**	75		
Restructuring social environment	Implementation	0	81	**--**	**<.0005*[c]**
	De-implementation	**13**	84		
Goal setting (behaviour)	Implementation	16	65	9.301	.002[b]
	De-implementation	4	93		
Problem solving	Implementation	5	75	0.077	.781[b]
	De-implementation	4	93		

+ Significance value adjusted for 32 comparisons (Bonferroni; p< .0015); a - Pearson's chi-square; b - Yates' continuity correction for cells less than 5; c - Fisher's exact test for cells with 0 count

CONCLUSIONS

- There were some significant differences between BCTs reported in implementation and de- implementation interventions suggesting that researchers may have implicit theories about different BCTs required for de-implementation and implementation.

BEHAVIOUR SUBSTITUTION (Michie et al., 2014)

Behaviour Change Technique	Definition	Example
Behaviour substitution	Prompt substitution of the unwanted behaviour with a wanted or neutral behaviour. Note: if this occurs regularly also code ***Habit reversal***	Suggest that the person goes for a walk rather than watches television

What if we just give them something else to do?

Give them something else to do

- Wang and colleagues suggest that ‘replacement’ is one of four types of change in a de-implementation typology [1]

- Norton and Chambers note that ‘replacing’ is a unique type of de-implementation approach and argue the need for ‘minimum criteria’ to decide when to replace one behaviour with another [2]

1. Wang V, Maciejewski ML, Helfrich CD, Weiner BJ, Working smarter not harder: Coupling implementation to de-implementation. Healthcare; 2018: Elsevier.
2. Norton WE, Chambers DA. Unpacking the complexities of de-implementing inappropriate health interventions. Implementation Science. 2020;15(1):1-7.

Pragmatic

Likely more acceptable to HCPs

- Maintains clinical autonomy and self-regulation
- Better than the ethical and social consequences of using punitive techniques (no penalties)

Action oriented people

- Uncomfortable with the option of appearing to do nothing during patient consultations or in response to patient need

Theoretically it also makes sense

- Can be used with reinforcement to strengthen the new behaviour (OLT)
- Doing nothing can lead to greater regret than doing something (Cognitive Psych)

From BCT taxonomy

Behaviour Change Technique	Definition	Example
Behaviour substitution	Prompt substitution of the unwanted behaviour with a wanted or neutral behaviour. Note: if this occurs regularly also code ***Habit reversal***	Suggest that the person goes for a walk rather than watches television

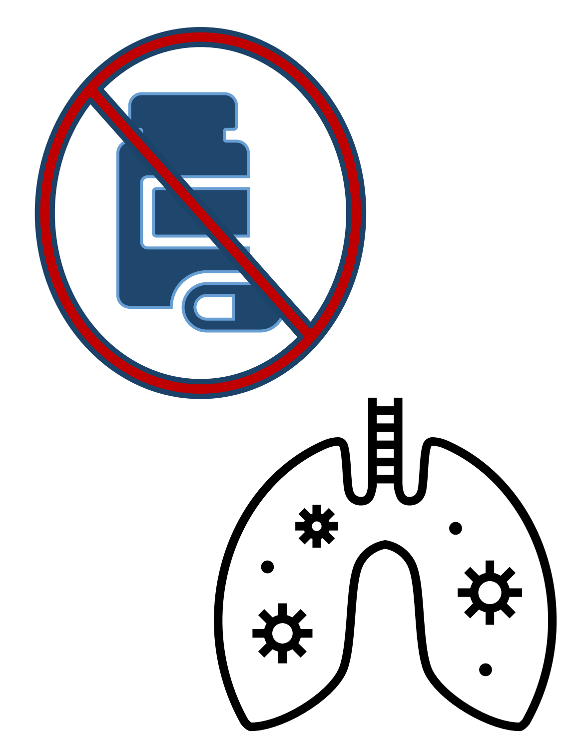
Excellent - behaviour substitution it is!

- What should we suggest HCPs do?

- POLL: Should we give the HCP a specific behaviour or let them decide what to do instead?
  - Give them a specific behaviour
  - Let them decide

Challenge with Behaviour substitution

- If we give the the option to do anything – what happens if they do another low value care behaviour?
- De-implement – antibiotics
- Rule out pneumonia – order x-ray



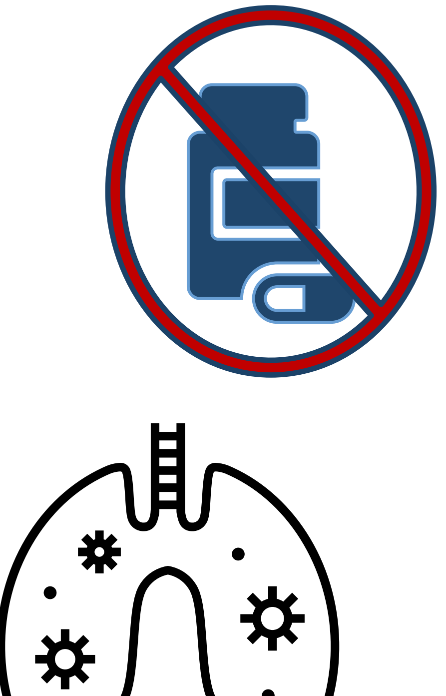
Be specific in the behaviour

- How do I pick what behaviour to give them?

- POLL: How important is it that the new behaviour have evidence indicating its benefit or could it be a neutral behaviour?
  - Must have evidence
  - Neutral

Evidence and Rationale

- Achieves better or equivalent patient outcomes than the undesirable behaviour.
- If the proposed substitute behaviour is neutral in its clinical effectiveness relative to the undesired behaviour
  - replacing one low-value care behaviour with another low-value care behaviour.



How do I pick a behaviour to substitute?

- POLL: is it okay if the substitute behaviour takes more time?
  - Heck no
  - Heck yes

How do I pick a behaviour to substitute?

- POLL: is it okay if the substitute behaviour takes more time?
  - Heck no
  - Heck yes
- POLL: should the HCP be required to learn new skills related to substitute behaviour?
  - Heck no
  - Heck maybe
  - Heck yes

Time and Skills

- Less time consuming – more likely to do it.
- Perceived time-consuming may lead HCPs to think they may have to neglect other tasks that are critical in the delivery of care.
- Should not require additional skills training.
- Substitute behaviours that align with HCPs' current skillsets would have a greater likelihood of uptake, because the HCP would not have the burden of learning new skills.

How do I pick a behaviour to substitute?

- POLL: how likely do you think organizations would be willing to invest in substitute
  - Not likely
  - Very likely

Cost

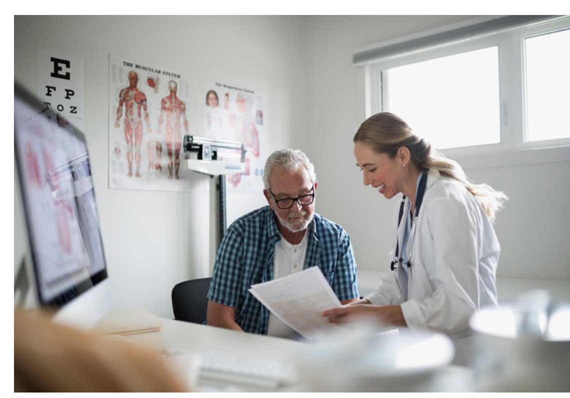
- From a systems perspective, a substitute behaviour should be no more expensive to perform than the undesired behaviour.

- If the cost of the substitute behaviour is higher than that of the undesired behaviour, and the outcomes are similar
  - organizations may be inclined to maintain the status quo.

Objective

- The substitute behaviour should serve the clinical objective (patient outcome) and practical objective.
  - Identifies what the behaviour is likely to achieve rather than the decreasing the original behaviour, but this is likely to be context specific

- Can also serve superficial attributes of the original behaviour (i.e., giving the patient an item, signalling the end of the consultation).
  - The patient will recognise this new behaviour as having the same 'social' or non-technical function as the original behaviour.



Ease to explain

- HCPs may have to consider that the patient's goal may be different from their own goals.
  - The patient's goal may be to be certain that their concerns are being acknowledged and addressed appropriately.
- If the patient has had experience of previous low-value care, they may be uncertain why the HCP is doing something different.
  - Having an easy explanation for this would be helpful in maintaining a positive clinician-patient relationship.

Table 1: Principles, with questions to consider and examples, for selecting a substitute behaviour for de-implementation interventions

Themes	Principle	Questions for practitioner / policymaker / researcher
Evidence and rationale	Identify a substitute behaviour that has a clinical rationale or strong evidence base for its use	Is there an evidence base that supports a different behaviour to perform in place of the undesired behaviour?
Objective	Identify a substitute behaviour that serves the clinical objective (patient outcome) and serves the practical objective (e.g., satisfy the patient that they have been taken seriously; offer symptom relief)	Are patient expectations and needs likely to be met by doing the substitute behaviour?
Ease to Explain	Identify a substitute behaviour that is easily explainable to patients.	Is the HCP able to explain to the patient why they are doing 'x' instead of 'y'?
Time	Identify a substitute behaviour that is no more time-consuming than the undesired behaviour	Will the substitute behaviour take up more time for the HCP; will they have to neglect other duties?
Fit with Skills	Identify a substitute behaviour that has good fit with existing skills	Will HCPs have to learn a new skillset, or do they already have the skills necessary to perform the substitute behaviour?
Cost	Identify a substitute behaviour that is no more expensive to perform than the undesired behaviour	Will the organization accrue extra costs for the HCP to perform the substitute behaviour?

Patey et al., *under review Implementation Research and Practice*

Process Framework

RESEARCH AND REPORTING METHODOLOGY

De-implementing wisely: developing the evidence base to reduce low-value care

Jeremy M Grimshaw,[1,2] Andrea M Patey,[1] Kyle R Kirkham,[3,4] Amanda Hall,[5] Shawn K Dowling,[6] Nicolas Rodondi,[7,8] Moriah Ellen,[9,10,11] Tijn Kool,[12] Simone A van Dulmen,[12] Eve A Kerr,[13,14] Stefanie Linklater,[1] Wendy Levinson,[15,16] R Sacha Bhatia[17,18]

Framework phase	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4
Key activities	Identification of potential areas of low-value healthcare	Identification of local priorities for implementation of CW recommendations	Identifying barriers and potential interventions to implement CW recommendations	Evaluation of CW implementation programs	Spread of effective CW implementation programs

Grimshaw et al., (2021) *BMJ Quality and Safety*

Final Thoughts

- It’s a start. Exploratory work.

Posters for Waiting Room:

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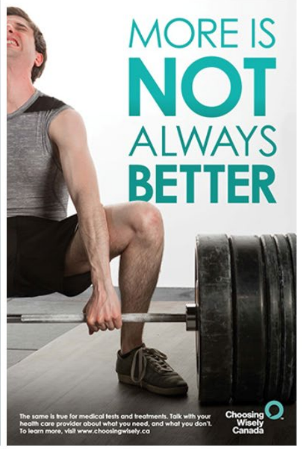
- We don't have the answer.
  - Operant Learning Theory
  - Behaviour Substitution

Posters for Waiting Room:



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  - Behaviour Substitution
- When evidence is strong:
  - Policy changes
  - Remove access
- What to do when evidence is 'not a strong'
  - Push back from individuals involved
  - **KEY THING IS TO GET PEOPLE TALKING ABOUT THE PROBLEM**

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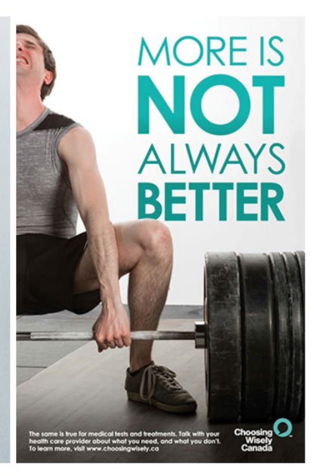

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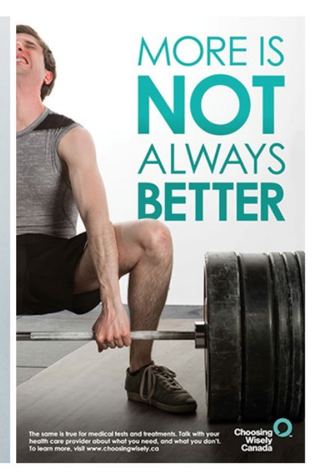

Unless a de-implementation intervention that is delivered at ***system-level*** **or** ***organisational-level*** actually **changes the care that a patient receives from healthcare teams and individual healthcare professionals**, it fails to enhance care quality and therefore fails to improve health outcomes.

(Patey et al., 2018, ImpSci)

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Thank you

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