BEHAVIOURAL APPROACHES TO ENHANCING ANTIMICROBIAL STEWARDSHIP PROGRAMS

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EXPRESSIONS OF INTEREST

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- No other conflicts of interest declared.
Antibiotic resistance a serious health-care threat to Canadians, experts say

Survey finds many Canadians mistakenly think antibiotic resistance doesn’t affect them

Sheryl Ubelacker · The Canadian Press · Posted: Nov 16, 2018 4:00 AM ET | Last Updated: November 16, 2018
ANTIMICROBIAL STEWARDSHIP PROGRAMS
ANTIMICROBIAL STEWARDSHIP PROGRAMS

- 221 relevant studies (58 RCTs, and 163 NRS; 96 from North America)
- 15% increase in appropriate antibiotic prescribing (on average from 43% to 58%)
- Duration of antibiotic use reduced by 1.95 days
- No change in mortality, probable reduction in length of stay of 1.12 days
- High levels of heterogeneity
Cochrane review also explored mechanism of action of antimicrobial stewardship programs, specifically presence or absence of:

- **Restriction** – ‘using rules to reduce the opportunity to engage in the target behaviour (or increase the target behaviour by reducing the opportunity to engage in competing behaviours)’.

- **Enablement** – ‘increasing means/reducing barriers to increase capability or opportunity’

- With or without co-interventions (eg audit and feedback)
ANTIMICROBIAL STEWARDSHIP PROGRAMS

Larger effects were seen for programs that included:

- Enablement + restriction
- Restriction
- Enablement
- Enablement plus feedback

(One RCT and six NRS raised concerns that restrictive interventions may lead to delay in treatment and negative professional culture (because of breakdown in communication and trust between infection specialists and clinical teams))
ANTIMICROBIAL STEWARDSHIP PROGRAMS

- Good news – antimicrobial stewardship programs ‘in general work’
- High levels of heterogeneity suggesting uncertainty about when they work best and how best to optimize them
- Mechanism of action analysis suggests design of programs influence effectiveness
- Likely opportunities to further optimize the effectiveness of antimicrobial stewardship programs
Successful implementation of antimicrobial stewardship programs needs key actors (healthcare providers (prescribers and infection control professionals, managers and policy makers) to change their behaviours and/or decisions whilst working in the complex (ordered chaos) of healthcare environments.

There is a substantial evidence base and availability of tools in implementation and behavioural sciences that can support the development of effective antimicrobial stewardship programs.
Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework

Simon D French1,2, Sally E Green1, Denise A O'Connor1, Joanne E McKelvie1, Jill J Francis2, Susan Michel2, Rachelle Buchbinder1,3, Peter Schlesinger1, Neil Spiker1 and Jeremy M Grimshaw1

Abstract

Background: There is little systematic operational guidance about how best to develop complex interventions to bridge the gap between practice and evidence. This article is one in a series of papers documenting the development and use of a Theoretical Domains Framework (TDF) to advance the science of implementation research.

Methods: The intervention was developed considering three main components: theory, evidence, and practical issues. We used a four-step approach, consisting of guiding questions, to direct the choice of the most appropriate components of an implementation intervention which needs to be put, differently: using a theoretical framework, which barriers and enablers need to be addressed? Which intervention components (behaviour change techniques and models of delivery) could overcome the modifiable barriers and enhance the enabled? And how can behaviour change be measured and understood?

Results: A complex implementation intervention was designed that aimed to improve acute low back pain management in primary care. We used the TDF to identify the barriers and enablers to the uptake of evidence into practice and to guide the choice of intervention components. These components were then combined into a cohesive intervention. The intervention was delivered in two facilitated interactive small group workshops. We also produced a TDF to discuss all participants in the intervention group. We chose outcome measures in order to test the mediating mechanisms of behaviour change.

Conclusions: We have illustrated a four-step systematic method for developing an intervention designed to change clinical practice based on a theoretical framework. The method of development provides a systematic framework that could be used by others developing complex implementation interventions. While this framework should be iteratively adjusted and refined to suit other context and settings, we believe that the four-step process should be maintained as the primary framework to guide researchers through a comprehensive intervention development process.
Step 1: *Who needs to do what, differently?*
Whose behaviour need to change, and which behaviours? What is the evidence supporting this?

Step 2: *What factors determine whether or not they do it?*
What are the barriers and enablers?

Step 3: *Which strategies can be effectively used to target those factors?*
Which behaviour change techniques are best suited to specifically target the identified barriers and enablers

Step 4: *How can we robustly measure the outcome?*

(French et al., 2012)
Step 1: Who needs to do what, differently?
Whose behaviour need to change, and which behaviours? What is the evidence supporting this?

- Helpful to specify as Who needs to do what, differently, when, and where?
- Prescribers – appropriate initial choice of antibiotic, stepping down antibiotics when sensitivities available, reducing length of antibiotics
- Infectious disease physicians – ensure recommendations consistent with local guidelines during consults (when appropriate)
- Other actors - eg stewardship programs, laboratories, quality improvement programs, management

(French et al., 2012)
Step 2: What factors determine whether or not they do it? What are the barriers and enablers?

There are consistent modifiable factors that influence whether a behaviour is performed or not. Some factors are intuitive; many are not.

Advantages of using theory to understand barriers and enablers

- Provides a ‘leg-up’ of factors to focus on
- Provides a shared language for shared understanding
- More Efficient: Helps us to learn from each other and others rather than starting from scratch each time in each setting
- Links to techniques/strategies best suited to address barriers
Step 2: What factors determine whether or not they do it?
What are the barriers and enablers?

Theoretical Domains Framework (TDF)
Step 2: What factors determine whether or not they do it?
What are the barriers and enablers?

Theoretical Domains Framework (TDF)

- Decades of research in behavioural sciences about modifiable factors that determine behaviour across a range of settings
- Attempts to make psychological theory more useful to those interested in applying psychological theory but who do not necessarily have a background in psychology
- 33 theories containing 128 constructs distilled into 12 domains that may explain health-related behaviour change
- Provides a list of topics to explore that are known to affect behaviour
Step 2: What factors determine whether or not they do it? What are the barriers and enablers?

Theoretical Domains Framework (TDF)

The TDF advantage
- Applicable to any target, action, context, time, and actor (TACT-A)
- Covers a breadth of factors associated with behaviour
- Linked to strategies / techniques for addressing barriers/enablers (informs selection and tailoring of implementation interventions)

- Conducting interviews or focus groups with healthcare professionals and other stakeholders to understand their views about what helps and hinders their performance of a specific behaviour
Step 2: What factors determine whether or not they do it?  
What are the barriers and enablers?

Theoretical Domains Framework (TDF)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Existing procedural knowledge, knowledge about guidelines, knowledge about evidence and how that influences what the participants do</td>
</tr>
<tr>
<td>Skills</td>
<td>Competence and ability about the procedural techniques required to perform the behaviour</td>
</tr>
<tr>
<td>Social / professional role and identity</td>
<td>Boundaries between professional groups (i.e., is the behaviour something the participant is supposed to do or someone else’s role?)</td>
</tr>
<tr>
<td>Beliefs about capabilities</td>
<td>Perceptions about competence and confidence in doing the behaviour</td>
</tr>
<tr>
<td>Optimism</td>
<td>Whether the participant’s optimism or pessimism about the behaviour influences what they do</td>
</tr>
<tr>
<td>Beliefs about consequences</td>
<td>Perceptions about outcomes, advantages, and disadvantages of performing the behaviour and how that influences whether they perform the behaviour</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>Previous experiences that have influenced whether or not the behaviour is performed</td>
</tr>
</tbody>
</table>
BEHAVIORAL APPROACH TO DESIGNING STEWARDSHIP PROGRAMS

Step 2: What factors determine whether or not they do it?
What are the barriers and enablers?

<table>
<thead>
<tr>
<th>Domain</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention</td>
<td>A conscious decision to perform a behaviour or a resolve to act in a certain way</td>
</tr>
<tr>
<td>Goals</td>
<td>Priorities, importance, commitment to a certain course of actions or behaviours</td>
</tr>
<tr>
<td>Memory, attention, and decision processes</td>
<td>Attention control, decision-making, memory (i.e., is the target behaviour problematic because people simply forget?)</td>
</tr>
<tr>
<td>Environmental context and resources</td>
<td>How factors related to the setting in which the behaviour is performed (e.g., people, organisational, cultural, political, physical, and financial factors) influence the behaviour</td>
</tr>
<tr>
<td>Social influences</td>
<td>External influence from people or groups to perform or not perform the behaviour</td>
</tr>
<tr>
<td></td>
<td>How the views of colleagues, other professions, patients and families, and doing what you are told, influence the behaviour</td>
</tr>
<tr>
<td>Emotion</td>
<td>How feelings or affect (positive or negative) may influence the behaviour</td>
</tr>
<tr>
<td>Behavioural regulation</td>
<td>Ways of doing things that relate to pursuing and achieving desired goals, standards, or targets</td>
</tr>
<tr>
<td></td>
<td>Strategies the participants have in place to help them perform the behaviour</td>
</tr>
<tr>
<td></td>
<td>Strategies the participants would like to have in place to help them</td>
</tr>
</tbody>
</table>
Step 2: What factors determine whether or not they do it? What are the barriers and enablers?

Theoretical Domains Framework (TDF)

- Conducting interviews or focus groups with healthcare professionals and other stakeholders to understand their views about what helps and hinders their performance of a specific behaviour
Step 3: Which strategies can be effectively used to target those factors?
Which behaviour change techniques are best suited to specifically target the identified barriers and enablers

Choice of strategy, should be based upon:
• ‘Diagnostic’ assessment of barriers
• Understanding of mechanism of action of interventions
• Empirical evidence about effects of interventions
• Available resources
• Practicalities & logistics
Step 3: Which strategies can be effectively used to target those factors?
Which behaviour change techniques are best suited to specifically target the identified barriers and enablers

We have found it useful to distinguish:

**What** we are trying to change?

**Why** are we trying to change it? (constructs: barriers and enablers)

**How** are we going to change it, including

**Behaviour change technique**

**Method of delivery**: eg group meeting, DVD

**Content**: how the technique will be operationalised?
Step 3: Which strategies can be effectively used to target those factors?
Which behaviour change techniques are best suited to specifically target the identified barriers and enablers.

Cochrane Effective Practice and Organisation of Care (EPOC) group undertakes systematic reviews of interventions to improve health care systems and health care delivery including:

- Professional interventions (e.g. continuing medical education, audit and feedback)
- Financial interventions (e.g. professional incentives)
- Organisational interventions (e.g. the expanded role of pharmacists)
- Regulatory interventions
# EPOC Taxonomy (Methods of Delivery)

<table>
<thead>
<tr>
<th><strong>Healthcare worker-focused</strong></th>
<th><strong>Organization-focused</strong></th>
<th><strong>Who provides health care</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Audit and Feedback</td>
<td>• Organizational culture</td>
<td>• Role expansion or task shifting</td>
</tr>
<tr>
<td>• Clinical incident reporting</td>
<td></td>
<td>• Self-management</td>
</tr>
<tr>
<td>• Monitoring performance of care delivery</td>
<td></td>
<td>• Length of consultation</td>
</tr>
<tr>
<td>• Communities of practice</td>
<td></td>
<td>• Staffing models</td>
</tr>
<tr>
<td>• Continuous quality improvement</td>
<td></td>
<td>• Exit interviews</td>
</tr>
<tr>
<td>• Educational games</td>
<td></td>
<td>• Movement of health workers between public or private</td>
</tr>
<tr>
<td>• Educational materials</td>
<td></td>
<td>• Pre-licensure education</td>
</tr>
<tr>
<td>• Educational meetings</td>
<td></td>
<td>• Recruitment and retention strategies</td>
</tr>
<tr>
<td>• Educational outreach visits/</td>
<td></td>
<td><strong>Information and communication technology</strong></td>
</tr>
<tr>
<td>• Clinical practice guidelines</td>
<td></td>
<td>• Health information systems</td>
</tr>
<tr>
<td>• Inter-professional education</td>
<td></td>
<td>• Smart home technologies</td>
</tr>
<tr>
<td>• Local consensus processes</td>
<td></td>
<td>• Telemedicine</td>
</tr>
<tr>
<td>• Local opinion leaders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Managerial supervision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Patient-mediated interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Public release of performance data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Reminders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Patient-reported outcome measures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Tailored interventions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Coordination of care**

- Care pathways
- Case management
- Communication between providers
- Continuity of care
- Discharge planning
- Disease management
- Integration
- Packages of care
- Patient-initiated appointment systems
- Procurement
- Referral systems
- Shared care
- Shared decision-making
- Teams
- Transition of care

[http://epoc.cochrane.org/epoc-taxonomy](http://epoc.cochrane.org/epoc-taxonomy)
## COCHRANE EFFECTIVE PRACTICE AND ORGANISATION OF CARE (EPOC) GROUP

<table>
<thead>
<tr>
<th>Intervention</th>
<th># of trials</th>
<th>Median absolute effect</th>
<th>Interquartile range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit and feedback (Ivers 2011)</td>
<td>140</td>
<td>+4.3%</td>
<td>+0.5% - +16%</td>
</tr>
<tr>
<td>Educational meetings (Forsetlund 2009)</td>
<td>81</td>
<td>+6%</td>
<td>+3 – +15%</td>
</tr>
<tr>
<td>Financial incentives (Scott 2011)</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Hand hygiene (Gould 2010)</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
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
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

Feedback and monitoring
Monitoring of behavior by others without feedback
Feedback on behavior/outcomes of behavior
Feedback on outcomes of behavior
Self-monitoring of behavior
Self-monitoring of outcomes of behavior
Monitoring of outcome(s) of behavior 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 (behavior)
Social incentive
Non-specific incentive
Self-incentive
Self-reward
Reward (outcome)
Material reward (behavior)
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
## BCT TAXONOMY (BCTTV1): EXAMPLES

<table>
<thead>
<tr>
<th>BCT</th>
<th>Definition</th>
<th>Application example</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td><em>Demonstration of the behavior</em></td>
<td>Provide an observable sample of the performance of the behaviour, directly in person or indirectly e.g. via film, pictures, for the person to aspire to or imitate (includes ‘Modelling’). <em>Note: if advised to practice, also code 8.1, Behavioural practice and rehearsal; if provided with instructions on how to perform, also code 4.1, Instruction on how to perform the behaviour</em>.</td>
</tr>
<tr>
<td>6.2</td>
<td><em>Social comparison</em></td>
<td>Draw attention to others’ performance to allow comparison with the person’s own performance <em>Note: being in a group setting does not necessarily mean that social comparison is actually taking place</em>.</td>
</tr>
</tbody>
</table>
Step 3: Which strategies can be effectively used to target those factors?

Which behaviour change techniques are best suited to specifically target the identified barriers and enablers.
<table>
<thead>
<tr>
<th>Technique for behaviour change</th>
<th>Techniques judged to be effective in changing each construct domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal/target specified: behaviour or outcome</td>
<td>1  2  3  4  5  6  7  8  9  10  11</td>
</tr>
<tr>
<td>Monitoring</td>
<td></td>
</tr>
<tr>
<td>Self-monitoring</td>
<td></td>
</tr>
<tr>
<td>Contract</td>
<td></td>
</tr>
<tr>
<td>Rewards; incentives (inc. self-evaluation)</td>
<td></td>
</tr>
<tr>
<td>Graded task, starting with easy tasks</td>
<td></td>
</tr>
<tr>
<td>Increasing skills: problem-solving, decision-making, goal-setting</td>
<td></td>
</tr>
<tr>
<td>Stress management</td>
<td></td>
</tr>
<tr>
<td>Coping skills</td>
<td></td>
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<tr>
<td>Rehearsal of relevant skills</td>
<td></td>
</tr>
<tr>
<td>Role-play</td>
<td></td>
</tr>
<tr>
<td>Planning, implementation</td>
<td></td>
</tr>
<tr>
<td>Prompts, triggers, cues</td>
<td></td>
</tr>
<tr>
<td>Environmental changes (e.g. objects to facilitate behaviour)</td>
<td></td>
</tr>
<tr>
<td>Social processes of encouragement, pressure, support</td>
<td></td>
</tr>
<tr>
<td>Persuasive communication</td>
<td></td>
</tr>
<tr>
<td>Information regarding behaviour, outcome</td>
<td></td>
</tr>
<tr>
<td>Personalised message</td>
<td></td>
</tr>
<tr>
<td>Modelling/demonstration of behaviour by others</td>
<td></td>
</tr>
<tr>
<td>Homework</td>
<td></td>
</tr>
<tr>
<td>Personal experiments, data collection (other than self-monitoring of behaviour)</td>
<td></td>
</tr>
<tr>
<td>Experiential: tasks to gain experiences to change motivation</td>
<td></td>
</tr>
<tr>
<td>Feedback</td>
<td></td>
</tr>
<tr>
<td>Self-talk</td>
<td></td>
</tr>
<tr>
<td>Use of imagery</td>
<td></td>
</tr>
<tr>
<td>Perform behaviour in different settings</td>
<td></td>
</tr>
<tr>
<td>Shaping of behaviour</td>
<td></td>
</tr>
<tr>
<td>Motivational interviewing</td>
<td></td>
</tr>
<tr>
<td>Relapse prevention</td>
<td></td>
</tr>
<tr>
<td>Cognitive restructuring</td>
<td></td>
</tr>
<tr>
<td>Relaxation</td>
<td></td>
</tr>
<tr>
<td>Desensitisation</td>
<td></td>
</tr>
<tr>
<td>Problem-solving</td>
<td></td>
</tr>
<tr>
<td>Time management</td>
<td></td>
</tr>
<tr>
<td>Identify/prepare for difficult situation/problems</td>
<td></td>
</tr>
</tbody>
</table>

**KEY**:
- Agreed use
- Uncertain
- Disagreement
- Agreed non-use

**Techniques judged to be effective in changing each construct domain**
1. Social/Professional role and identity
2. Knowledge
3. Skills
4. Beliefs about capabilities
5. Beliefs about consequences
6. Motivation and goals
7. Memory, attention, decision processes
8. Environmental context and resources
9. Social influences
10. Emotion
11. Action planning
Step 3: Which strategies can be effectively used to target those factors?
Which behaviour change techniques are best suited to specifically target the identified barriers and enablers.

REALITY CHECK
Step 3: Which strategies can be effectively used to target those factors?

- Be provided multiple times
- Present feedback as soon as possible
- Provide individual rather than general data
- Include clear comparators that reinforce desired behaviour change
- Support an action perceived to be a priority for recipients
- Recommend actions that can improve and are under control of the recipient
- Recommend a specific action
- Tailor feedback interventions based on situation-specific barriers

- Closely link visual display and summary message
- Be presented in multiple ways
- Minimize cognitive load
- Address barriers that prevent use of the feedback
- Provide short, actionable messages followed by more detail
- Address credibility of the information
- Increase motivation to change practice
- Encourage social construction of feedback rather than passive delivery
Step 3: Which strategies can be effectively used to target those factors?
Which behaviour change techniques are best suited to specifically target the identified barriers and enablers

AVOID POOR DESIGN
Step 3: Which strategies can be effectively used to target those factors?
Which behaviour change techniques are best suited to specifically target the identified barriers and enablers

Human factors approaches

▶ Designing for the way people are, not the way we wish they were

▶ Adapting systems to people, rather than expecting people to adapt to systems
BEHAVIORAL APPROACH TO DESIGNING STEWARDSHIP PROGRAMS

Step 3: Which strategies can be effectively used to target those factors?

Which behaviour change techniques are best suited to specifically target the identified barriers and enablers

► Method of delivery for antibiotic stewardship programs likely fixed (antibiotic stewardship/infection control teams, infectious disease consults (+/- audit and feedback))

► Suggests central role for ID physicians as change agents in delivering stewardship programs

► Yet many have little (or no) training in behavior change
Step 3: Which strategies can be effectively used to target those factors?
Which behaviour change techniques are best suited to specifically target the identified barriers and enablers

- Behaviour change skills represent potential new area of competency for ID physicians if we want to deliver effective stewardship programs.
- Opportunities to develop behavior change skills (using behavior change techniques that target common barriers to antibiotic stewardship)
Step 4: How can we robustly measure the outcome?

- So far have argued that adoption of behavioural approaches may enhance effectiveness of stewardship programs
- However this is a hypothesis that needs testing
- Opportunities to undertake rigorous research to explore this.

(French et al., 2012)
Step 4: How can we robustly measure the outcome?

(French et al., 2012)
Step 4: How can we robustly measure the outcome?

| Theme 1. Establishing the evidence base and understanding current practice in ASPs | Comprehensively identifying barriers and facilitators to implementing ASPs and clinical recommendations intended to optimize antibiotic prescribing (i.e. good clinical practice for antibiotic use). Identifying actors (‘who’) and actions (‘what needs to be done’) of ASPs and clinical teams. Synthesizing available evidence to support future research and planning for ASPs. Specifying the activities in current ASPs with the purpose of defining a ‘control group’ for comparison with new initiatives. | 4 |
| Theme 2. Design and evaluation of ASPs | Defining a balanced set of outcomes and measures to evaluate the effects of interventions focused on reducing unnecessary exposure to antibiotics. Conducting robust evaluations of ASPs with built-in process evaluations and fidelity assessments. Defining and designing ASPs. | 1 |
| Theme III. Research priority topics crosscutting to themes 1 and 2 | Establishing the evidence base for impact of ASPs on resistance. Investigating the role and impact of government and policy contexts on ASPs. Understanding what matters to patients in ASPs in hospitals. | 3 |

ASPs, antibiotic stewardship programmes.

The involvement of patients in hospital antibiotic stewardship research has been traditionally limited and hence was ranked as No. 10. This is because patients treated with antimicrobials in hospital settings are typically more ill than patients treated in primary care settings, so they may have less capacity to make their own decisions about their care.

(French et al., 2012)
Antibiotic stewardship programs lead to improved appropriateness of antibiotic prescribing.

Using a behavioural perspective highlights substantial empirical and theoretical insights (and practical tools) from behavioural and organisational disciplines.
Use of behavioural and organisational theory to assess barriers and design interventions potentially increases transparency around hypothesised mechanism of action and logic model of interventions

Behavioural approaches potentially extend the ‘toolbox’ and could improve the effectiveness of antibiotic stewardship
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