The emerging field of implementation science

Implementation science is defined as “the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice and, hence, to improve the quality and effectiveness of health services and care” (Eccles & Mittman 2006). This field of inquiry emerged out of a need to address the ongoing difficulties associated with getting research into practice (Nilsen, P 2015). It is well documented that existing barriers are a main contributor to the discrepancy between evidence-based recommendations and practice (Rainbird 2006; Pearson, Field & Jordan 2007). The findings of a systematic review identified three overarching domains related to barriers and facilitators of implementing evidence into practice: system, staff and intervention (Geerligs et al. 2018). System-level barriers and facilitators include environmental context (staff time, workload, workflow, space and staff turnover), culture (attitude to change, commitment, motivation, roles/trust and champions), communication processes and external requirements (reporting, standards and guidelines) (Geerligs et al. 2018). Staff-level barriers and facilitators include staff commitment and attitude, understanding and awareness, identification of individual roles, skills, ability and confidence. (Geerligs et al. 2018) Barriers and facilitators related to the intervention include the ease of integration (complexity, costs and required resources), validity of the evidence base, safety, legal and ethical concerns, and supportive components such as education and training, marketing and awareness (Geerligs et al. 2018).

Implementation science seeks to understand these barriers and facilitators, and to empower health professionals to utilise evidence-based approaches with the end goal of improving the quality and service of healthcare (Tabak et al. 2012). Implementation has been defined as “the methods to promote the systematic uptake of clinical research findings and other evidence-based practices into routine practice and hence improve the quality and effectiveness of healthcare policy and practice” (Eccles & Mittman 2006).

A variety of theoretical approaches, models and frameworks are prescribed within this field, with the central aim to assist in developing a better understanding and explanation of why and how implementation succeeds or fails (Atkins et al. ; Ayanian & H. 2016; Brown & McCormack 2005; Gardner, Gardner & O’Connell 2014; Graham et al. 2006; Kralik 2017; Kitson, Harvey & McCormack 1998; Nilsen, 2015; Prochaska & DiClemente 1983; Rogers 1995; Rycroft-Malone & Bucknall 2010; Rycroft-Malone et al. 2002). Table 1 below details some of the existing frameworks and models available to assist with the implementation of evidence into practice. The list is by no means a comprehensive list of all existing frameworks and models, but it does highlight the complexity involved in getting evidence into practice. A recent review examining the differences and similarities of research translation frameworks identified 41 frameworks and models, with the four most published and cited frameworks being the Reaching Effectiveness Adoption Implementation Management (RE-AIM) framework, Knowledge to Action (KTA) framework, knowledge translation continuum models, or “T” models, and the PARiHS frameworks. All identified frameworks described the gap that exists between research knowledge and its application into policy and practice, and all acknowledged the importance and difficulty in closing this gap (Milat & Li 2017). A plethora of published information is available on the different frameworks and models.

Table 1: Description of Implementation Theories, Models and Frameworks

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<th>Theory / Model / Framework</th>
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| Diffusion of innovation model | • Knowledge phase: involves learning about the innovation to be implemented (such as a guideline, or best practice recommendation).  
• Persuasion phase: relies on opinion leaders with good knowledge, who are credible, approachable, can effectively influence practice and encourage others to take up new evidence in practice by personal example - facilitating individuals to form positive (or sometimes negative) attitudes to the innovation.  
• Decision phase: the point in time where the acceptability of the changes are determined by stakeholders as either worthwhile or not worth pursuing.  
• Adoption or rejection phase: reflects the outcome of the decision phase and is the ultimate decider as to whether evidence is implemented in practice. |
| Health education theory model | • Behaviour change requires that knowledge and skills be addressed at the individual level.  
• The positive impact of health education theory is proportional to the degree of active learning. |
| JBI Implementation frame work | The model has three governing principles that guide a seven-step process.  
| | The seven-step process is grounded in the audit/feedback/change/re-audit cycle and is of critical importance when attempting to promote sustainable change in health.  
| | Further detail provided in section 2 of this handbook. |
| Knowledge to action (KTA) frame work | Consists of two interconnected cycles (knowledge creation and action).  
| | At the centre of the model is knowledge creation, which includes the three phases of knowledge inquiry (primary research), synthesis (systematic reviews), and products/tools (guidelines, algorithms, etc.).  
| | Surrounding knowledge creation is the action cycle, which consists of seven phases. These phases may occur sequentially or simultaneously (identify problem; adapt knowledge to local context; assess barriers to knowledge use; select, tailor and implement interventions; monitor knowledge use; evaluate outcomes; sustain knowledge use). |
| PARiHS model | Research implementation expressed as a function of the relationships among evidence, context and facilitation:  
| | Evidence (research, clinical experience, patient experience)  
| | Context (culture, leadership and evaluation)  
| | Facilitation (purpose, role, skills and attitudes) |
| PDSA model | The model is cyclic comprising four stages:  
| | Plan - the change to be tested or implemented  
| | Do - carry out the test or change  
| | Study – based on the measurable outcomes agreed before starting, collect data before and after the change, and reflect on the impact of the change and what was learned  
| | Act - plan the next change cycle or full implementation |
| Pipeline model | Evidence enters the pipeline and flows through a variety of stages from awareness of the evidence to adherence by patients/clients.  
| | Between these are stages of acceptance of the evidence, applicability of the evidence and the ability to implement into the particular area of practice.  
| | Finally, there are stages of acting on the evidence, reaching agreement between practitioners and patients, and sustained adherence. It is only at this stage that patient outcomes will be affected. |
| RE-AIM | Reach (proportion of the target population that participated in the intervention).  
| | Efficacy or effectiveness (success rate if implemented as in guidelines; defined as positive outcomes minus negative outcomes).  
| | Adoption (proportion of settings, practices, and plans that will adopt intervention).  
| | Implementation (extent to which intervention is implemented as intended in the real world).  
| | Maintenance of intervention effects in individuals and settings over time. |
| Social theory model | Layers of culture and society at play in the work environment. |
| Theoretical domains frame work | A theoretical framework that targets behaviour change in health professionals and comprises 14 domains that encompass factors likely to influence healthcare professional behaviour change: knowledge; skills; social/professional role and identity; beliefs about capabilities; optimism; beliefs about consequences; reinforcement; intentions; goals; memory, attention, and decision processes; environmental context and resources; social influences; emotion; and behavioural regulation. |
| The triple C model | Stage 1: Consultation  
| | Stage 2: Collaboration  
| | Stage 3: Consolidation |
| Translation research continuum or "T"-models | • Description and discovery.  
• From discovery to health application.  
• From health application to evidence guidelines.  
• From guidelines to health practice.  
• Evaluation of effectiveness and cost-effectiveness of such interventions in the real world and in diverse populations. |
| Trans-theoretical model | • Pre-contemplation  
• Contemplation  
• Preparation  
• Action  
• Maintenance |