Models, Strategies, and Tools

Theory in Implementing Evidence-Based Findings into Health Care Practice

Anne Sales, MSN, PhD, RN,¹ Jeffrey Smith, PhD,² Geoffrey Curran, PhD,^{2,3}
Laura Kochevar, PhD⁴

¹VA Puget Sound Health Care System and the Department of Health Services, University of Washington, Seattle, WA, USA; ²Little Rock VA Medical Center, Little Rock, AR, USA; ³Department of Psychiatry, University of Arkansas, Little Rock, AR, USA; ⁴Minneapolis VA Medical Center, Minneapolis, MN, USA.

This paper presents a case for careful consideration of theory in planning to implement evidence-based practices into clinical care. As described, theory should be tightly linked to strategic planning through careful choice or creation of an implementation framework. Strategies should be linked to specific interventions and/or intervention components to be implemented, and the choice of tools should match the interventions and overall strategy, linking back to the original theory and framework. The thesis advanced is that in most studies where there is an attempt to implement planned change in clinical processes, theory is used loosely. An example of linking theory to intervention design is presented from a Mental Health Quality Enhancement Research Initiative effort to increase appropriate use of antipsychotic medication among patients with schizophrenia in the Veterans Health Administration.

KEY WORDS: evidence-based medicine; organizational change; professional practice; behavior.

DOI: 10.1111/j.1525-1497.2006.00362.x

J GEN INTERN MED 2006; 21:S43–49.

© 2006 by the Authors. No claim for US Government Works.

Most attempts to implement evidence-based practices in clinical settings are either only partially successful, or unsuccessful, in the attempt.^{1–6} Our objective in this paper is to describe ways to use theory to provide a foundation for designing and planning strategies for intervention and selecting tools with a better than random probability of success in implementing evidence-based findings into practice. We focus on theories appropriate to change processes in clinical settings, typically complex organizations with multiple functioning parts.

We believe that explicitly outlining and understanding some form of theory that explains the reason for why an intervention may work to induce planned change is a critical step in

planning interventions to change provider or patient behavior, particularly in order to promote evidence-based care. We also believe that the information presented in this paper is relevant and important both for researchers and for people involved in quality improvement activities in health care organizations. In quality improvement, there may be a reluctance to examine theoretical bases for planning implementation activities and efforts, possibly in part because of a perceived need to differentiate between the nature of quality improvement activities and the nature of research, and in part because a focus on theory may not appear relevant, when the imperative is to act quickly. This has been described as the Nike™ school of implementation: Just do it.

A prominent recent example is the administrative data feedback for effective cardiac treatment (AFFECT) study report of a negative trial of administrative data feedback in attempting to improve hospital performance on key indicators of cardiac care.⁷ The principles guiding the design of the study were empirical, applying insights and findings from prior studies. No explicit theories of individual or organizational behavior change were applied in planning the design and conducting the study. While several limitations were acknowledged by the authors, the authors did not address the “why” of the unsuccessful trial beyond pointing to elements that could have been improved. In his accompanying editorial, Peterson⁸ points to additional features that could have been incorporated into this trial that may have enhanced the probability of success. Implicit in his discussion are theoretical perspectives, such as those underlying the use of opinion leaders to influence key stakeholders within the target organizations in the study, or the concept of intensity or dose of intervention. Underlying the concept of sufficient dose is the mechanism of action: until there is a clear understanding of the mechanism of action by which an intervention is likely to succeed, it is difficult to grapple with issues of dose or intensity. We posit that in interventions to induce planned change in health care, theory provides clues to the mechanism(s) by which the intervention is successful. Without explicit attention to theory, many key aspects of the intervention may be ignored.

Another recently published article describes the difficulties in applying evidence from a systematic review of audit and feedback interventions to decision making about how best to use audit and feedback in future intervention efforts.⁹ The authors describe their inability to glean information on key aspects of conducting audit and feedback from the published literature. As a result, little can be learned from prior efforts other than success or failure in specific attempts.

Even when theory is used to frame a study, it may then be largely ignored in the development of strategies, interventions, and selection of tools. A counter example to this approach is

The authors have no conflicts of interest to declare for this article.

Address correspondence and requests for reprints to Dr. Sales: Health Services Research and Development Center of Excellence (152), VA Puget Sound Health Care System, 1660 S. Columbian Way, Seattle, WA 98108 (e-mail: ann.sales@med.va.gov or asales@u.washington.edu).

See Editorial by Catarina I. Kiffe and Anne Sales, p. S67.

the PProcess modelling in ImpleMentation research (PRIME) study, a collaborative effort among researchers in Canada and the UK, which is embarking on a multiyear, multiphase proposal to construct and test instruments to measure and operationalize concepts from a carefully selected set of behavior change theories, then test the relationship between the concepts as theorized and the amount of change observed in the specific areas under study.¹⁰ This study has particular promise for exploring the value of a number of widely known and applied theories of behavior change at the individual and dyadic levels. As yet, the links from the theoretical concepts or constructs to intervention planning have not been developed, but this is planned in the next phase of the project, once the measurement development and validation processes are completed.

One problem with having little or no theoretical basis for intervention planning is that strategies adopted for implementation, and tools selected as mechanisms to induce behavior change, are neither tightly linked to strategy nor to any underlying theory. As a result, there is little reason to believe *a priori* that the actions, which constitute the intervention, would succeed in inducing behavior change. We propose an approach that can be applied using any theoretical framework that specifies reasons for behavior change at the individual level, or at levels above the individual, to be applied as part of an implementation planning process. As part of this approach, we specify questions to be addressed as models are considered, strategies selected, and tools created, adopted, and/or adapted for use in the implementation process. We refer the reader to another paper in this issue to guide the process of selecting interventions, which should follow a thorough diagnosis or needs assessment as part of the planning process (Kochevar et al., under review, this issue).

In addition to the general issue of motivating intervention choices by a strong theoretical basis for action, the interaction between individual and organization is not always addressed in planning interventions. We believe that this interaction, particularly in complex organizations such as those in health care, is critical to selecting appropriate theory to predict both individual behavior change, and change in an organizational context. Use of theory may be most helpful when the targeted action takes place in an organiza-

tion with multiple actors, multiple layers, and complex factors affecting decision-making processes, which characterizes almost any health care organization. There are many diverse theories that describe processes contributing to organizational change.¹¹⁻¹⁹ However, theories of organizational change rarely apply to planned activities of change, particularly when the change operates at levels within the organization, and do not necessarily affect the organization as a whole.

A POTENTIAL ROLE FOR THEORY IN CONSTRUCTING MODELS

In Figure 1, we show a schematic approach to using theory systematically in the process of moving to intervention and evaluation.

Many proposals for implementation research projects or studies use models or frameworks to guide their implementation planning. However, many of the models used are not based on theory, or are based only loosely on underlying theory from which they are derived. While they might have been more closely linked to theory when they were initially proposed, these models have often been restated and reinterpreted, and the original tight linkage with theory is lost. This process is analogous to repeatedly copying copies of originals; over time, the original signal is attenuated, and the meaning can be lost.

A fully developed theory, in the context of behavior change, addresses the question: why do people or organizational entities behave as they do? Given the way they behave, what would motivate them to change behavior? Expanding this to include organizational issues, theory should provide hypotheses and guidance to action at both the individual and higher levels of the organization: the subunit or microsystem, or the unit level (e.g., clinic or nursing unit), or still higher levels. For example, theories guiding social marketing could be linked with those taking an ecologic view of competition for scarce resources within that organization, and a model marketing information for competitive advantage could be developed for use as part of a strategy of introducing planned change. Theory informs the models that provide the under girding or infrastructure, much like the frame of a house.

FIGURE 1. An approach to using theory for implementation planning.

THE ROLE OF MODELS IN CHOOSING STRATEGY

In most health services research studies, heuristic models are used primarily to demonstrate the variables to be included in measurement and in analysis. The boxes in the models are used as categories to demonstrate types of variables. Little attention is paid, often, to the meaning of arrows, and to placement of the boxes. In implementation research, both the boxes and what is contained in them, and the arrows indicating theorized functional relationships, are important. If, for example, a set of patient factors (age, gender, marital status, health status), and a set of provider factors (age, gender, years of practice, type of provider) have been identified as theoretically important, the functional relationship between them needs to be specified. For example, using a modified principal-agent theory which predicts that when providers are similar to patients in age, gender, socio-economic status, and race/ethnicity, they are more likely to listen to their patients and act according to the patients' expressed wishes, an implementation researcher may decide on a strategy to promote empathy between provider and patient.

The strategy may still be high level, linked to theory. It provides overall direction for further planning. It may include more than 1 intervention, and should also include contingency plans for addressing barriers and maximizing use of facilitators, as these emerge through the process of implementing the intervention and carrying out the planned strategy. Assessment and enumeration of probable barriers and facilitators should be precursors to strategy selection or be concurrent as part of strategy planning. Development of strategy, and strategic planning for implementing an intervention, are often not included in the process of planning to initiate behavior change. Many of the lessons learned through the QuERI projects to date (Hagedorn et al., under review, this issue) demonstrate the importance of engaging in a systematic, strategic planning process before initiating an intervention or set of interventions. If the theory underlying the planned change includes both individual-level theory and change at some level above that of the individual, an assessment of organizational readiness to change and existing organizational culture and climate may be appropriate as part of strategic planning.

THE ROLE OF STRATEGY IN SELECTING INTERVENTIONS

Once a guiding strategy is selected based on the underlying theory or theories guiding the study, mapping the strategy to interventions is essential. Here the literature on interventions in promoting evidence-based practice implementation is helpful. There is a broad catalogue of interventions, with some information about what appears to be more or less effective.^{3,20-28}

However, it is possible that lack of effectiveness could be because of several factors, including those we address in this paper. Lack of tight linkage to theory, as well as lack of tight linkage to problem diagnosis (Kochevar et al., under review, this issue) can decrease the likelihood of successful implementation. In addition, issues related to organizational factors that may not have been appropriately addressed can also make implementation unsuccessful. Because a fair amount of implementation research has either ignored, or only partially dealt with, organizational issues, it is difficult to as-

sess how effective strategies might be if these concerns were addressed.

The choice of intervention, which is the focus of most implementation studies, should be dependent primarily on the selected theory: why do people behave as observed in this setting, and what intervention could effect desirable change?

CHOOSING TOOLS

Tailoring an intervention to a specific context requires development of tools that are usually very specific to the intervention, to the content of the desired change, and frequently to the context in which the intervention will take place. There are many examples of tools available from prior studies. One difficulty is that these tools are often highly specific to the intervention, content, and context of the particular implementation effort they were designed for, and they may only provide examples and possible guidelines for new studies or implementation efforts. Examples of tools, including some available for download and tailoring, are given in Section II Part 2 of the QuERI Guide to Implementation Research, available online at: <http://www.hsrd.research.va.gov/queri/implementation>.²⁹

The primary example we use in this paper comes from a systematic attempt to change processes of clinical care, where the primary agent or target of the desired change may be an individual provider, but the planning for the intervention explicitly acknowledges that the provider operates within the context of an organization, which sets goals, performance standards, guidelines, expectations, and provides resources of various types to assist in getting the task accomplished.

EXAMPLE: APPLICATION OF THEORY TO INTERVENTION DESIGN AND IMPLEMENTATION FROM THE MENTAL HEALTH QUERI

Background

This example comes from Mental Health QuERI researchers' application of theory to inform the design of a multicomponent intervention, the Antipsychotic Treatment Improvement Program (ATIP). The goal of this effort was to translate research evidence about antipsychotic medication treatment for patients with schizophrenia into routine clinical practice.³⁰ Specifically, the goal of the ATIP intervention was to improve clinician adherence with schizophrenia treatment guidelines, which recommend the use of moderate antipsychotic doses and newer "atypical" antipsychotic agents for patients who fail to respond to conventional antipsychotics.³¹

Intervention Design and Theoretical Underpinnings

A central component of the ATIP intervention was the use of physician *opinion leaders* as key motivators of change within the clinics that participated in the study. Local opinion leaders were identified and trained by Mental Health QuERI staff. The rationale for using local opinion leaders to facilitate the adoption of evidence-based practices was supported by a collection of behavioral theories, including *Diffusion of Innovation Theory*,³² *Social Cognitive Theory*,³³ and *Social Influence Theory*.³⁴ In the ATIP project, these theories suggested that opin-

ion leaders who are highly knowledgeable about antipsychotic treatment of patients with schizophrenia, and who are also viewed by their peers as a credible and approachable resource for information and advice about such issues, can be very effective in influencing improvement in clinical practice by encouraging other clinicians to utilize evidence-based practices and by themselves modeling the use of evidence-based practices to their peers.

The ATIP intervention complemented the use of physician opinion leaders with additional intervention tools designed to enhance the intervention's impact, including use of educational materials to inform clinicians about guideline-recommended care for schizophrenia, implementation of electronic clinical reminders, and systematic performance monitoring of clinician prescribing habits with interactive feedback. The selection of these complementary intervention components was informed by the Predisposing, Reinforcing, and Enabling Constructs in Ecosystem Diagnosis and Evaluation (PRECEDE) planning model³⁵ for influencing the adoption of targeted behaviors. The PRECEDE model stresses the importance of applying multiple strategies to influence the use of evidence-based practices, including: (1) strategies such as the dissemination of educational materials that can help *predispose* physicians to be able to make desired changes by increasing their knowledge of guideline recommendations; (2) utilizing clinical reminders and/or other clinical support tools to help *enable* providers to follow guideline recommendations at the point of care; and (3) applying social incentives through performance reporting and feedback to help *reinforce* providers' implementation of targeted behaviors.

Finally, *complexity theory*^{36,37} suggests that although it is very important for researchers to assess and understand the initial conditions in a health care organization to inform the

design and implementation of an intervention to influence change, organizations are highly adaptive and change over time. Consequently, initial conditions that led to the selection of specific intervention tools or strategies may change, creating unanticipated challenges to continued use of certain intervention tools or the need for additional tools or strategies that were not included in the original intervention package. Recognizing this, the ATIP intervention included an *external facilitation* component,³⁸ which involved a member of the MH QuERI team maintaining regular contact with participating clinical staff to assist them in problem-solving and working through challenges to intervention implementation as they arose.

Study Results and Conclusions

Study findings showed that the ATIP intervention improved antipsychotic prescribing in concordance with guideline recommendations and also reduced pharmacy costs for antipsychotics. Further, participating clinicians reported positive experiences with the program's educational and support materials. This is an example of how multiple theoretical frameworks were applied in the design and implementation of a multifaceted, multilevel intervention that resulted in improvements in antipsychotic treatment of patients with schizophrenia. Although some may argue toward the development of a single "unified" theory to inform the implementation of evidence-based practices, this example shows that thoughtful consideration of a collection of conceptual models may be useful in designing successful interventions. Table 1 lists select components/tools included in the ATIP intervention, summarizes the rationale for their selection, and identifies the theories that supported their inclusion in the intervention package.

Table 1. Theoretical Support for Mental Health QuERI Antipsychotic Treatment Improvement Program (ATIP) Components and Tools

Component/Tool	Rationale for Component/Tool Selection	Supporting Theory and/or Planning Model
Clinical opinion leader	Utilize influential local clinician leaders to inform other clinical staff about evidence-based antipsychotic medication management, model-targeted prescribing behaviors, and motivate practice change	Diffusion of Innovation Theory, Social Cognitive Theory, Social Influence Theory
External facilitation	External facilitator maintained regular contact with clinical opinion leader at participating sites to assist with problem-solving and addressing challenges to intervention implementation as needed	Promoting Action on Research Implementation in Health Services (PARIHS), Complexity Theory
Psychosis guidelines help file	Computerized resource with clinical pathway diagrams and flowcharts designed to enhance provider knowledge of guideline recommendations for treatment of schizophrenia (<i>addresses predisposing determinants of care</i>)	PRECEDE
Pocket card on antipsychotic treatment for schizophrenia	Brief, practical tool that allows clinicians to reference guideline recommendations for antipsychotic dosing and side effect monitoring as needed at the point of care (<i>enables appropriate care</i>)	PRECEDE
Pharmacy order-entry reminder on dose recommendations for antipsychotics	Computerized clinical reminder that provides guideline-recommended dose range on pharmacy order entry screen in electronic medical record when a physician prescribes an antipsychotic medication (<i>enables appropriate care</i>)	PRECEDE
Clinical reminder on olanzapine and diabetes/high lipids	Computerized clinical reminder that alerts physician when a patient is being treated with olanzapine and has also been identified as having diabetes mellitus and/or elevated lipids (conditions which may be worsened when olanzapine is used); reminder also offers potential clinical adjustments for physician consideration (<i>enables appropriate care</i>)	PRECEDE
Feedback performance report on use of antipsychotics	Monthly reports to provide ongoing feedback to clinical staff on performance related to dosing and monitoring side effects of antipsychotic medications (<i>reinforces adherence to guideline recommendations</i>)	PRECEDE

SUMMARY

We have outlined an approach to linking theory, models, strategy, and tools to design interventions or sets of interventions to implement planned change. We recognize that this may appear to be a complex, and seemingly unnecessary, process for planning, and conducting desired practice change. Certainly, change to promote evidence-based practices has been accomplished without elaborate conceptualization and planning. However, the results of these prior studies have been mixed, especially when the effort is made to replicate the intervention in a different setting or context. While many factors underlie this mixed set of results, we have found that a consistent theme of inadequately linking action to theory, coupled with inadequate planning, may contribute to mixed outcomes.

A counter to the thesis we are advancing is that there is no widely held unifying theory of human behavior in organizations, or of organizational change supported by evidence from well-designed experiments. As a result, there is no evidence to support our thesis: that tight linkage between theory and models based on theory, strategies based on these models, and tools based on these strategies will result in better outcomes, where better outcomes is defined as a higher probability of success in implementing desired behavior change (for a debate on this point see Rothman³⁹ and Jeffery⁴⁰). This is a very valid critique, and can only be countered by the observation that in the experimental work to date in this field, proceeding without a tight theory base has not yielded great success. In the absence of strong evidence, awaiting experimental work in this area, we believe that opening a discussion about the relevance and importance of theory may help stimulate the design of experiments that will provide evidence to support the utility or lack thereof of linkage to theory.

As we note in Fig. 1, there must be a feedback loop between the implementation efforts and theory development and refinement. It is likely that the inapplicability of current theory is related to the lack of a sustained effort to create and build the feedback loop. There will be cases in which it becomes clear that there are inadequate tools, instruments that link assessment, measurement, and theory together, or inadequate theory. However, many researchers in this field are working collaboratively to develop instruments and tools. PProcess modelling in ImpleMentation research is an excellent example of this type of work. Their focus is on the individual or dyadic level; similar ventures are needed at higher levels, and across levels, because almost no interaction in health care is free of organizational context.

The work described in this paper was supported by VA Health Services Research and Development Service. The conclusions reached are the responsibility of the authors; the Department of Veterans Affairs does not endorse the statements and conclusions drawn in this paper.

REFERENCES

1. **Eccles MP, Grimshaw JM.** Selecting, presenting and delivering clinical guidelines: are there any "magic bullets"? *Med J Aust.* 2004;180(suppl): S52–S54.
2. **Holden JD.** Systematic review of published multi-practice audits from British general practice. *J Eval Clin Pract.* 2004;10:247–72.
3. **Oxman AD, Thomson MA, Davis DA, Haynes RB.** No magic bullets: a systematic review of 102 trials of interventions to improve professional practice. *Canadian Medical Association J.* 1995;153:1423–31.
4. **Shojania KG, Grimshaw JM.** Still no magic bullets: pursuing more rigorous research in quality improvement. *Am J Med.* 2004;116:778–80.
5. **Eccles M, Grimshaw J, Walker A, Johnston M, Pitts N.** Changing the behavior of healthcare professionals: the use of theory in promoting the uptake of research findings. *J Clin Epidemiol.* 2005;58:107–12.
6. **Grimshaw JM, Eccles MP, Walker AE, Thomas RE.** Changing physicians' behavior: what works and thoughts on getting more things to work. *J Contin Educ Health Prof.* 2002;22:237–43.
7. **Beck CA, Richard H, Tu JV, Pilote L.** Administrative data feedback for effective cardiac treatment: AFFECT, a cluster randomized trial. *JAMA.* 2005;294:309–17.
8. **Peterson ED.** Optimizing the science of quality improvement. *JAMA.* 2005;294:369–71.
9. **Foy R, Eccles MP, Jamtvedt G, Young J, Grimshaw JM, Baker R.** What do we know about how to do audit and feedback? Pitfalls in applying evidence from a systematic review. *BMC Health Serv Res.* 2005;5:50.
10. **Walker AE, Grimshaw J, Johnston M, Pitts N, Steen N, Eccles M.** PRIME—PProcess modelling in ImpleMentation research: selecting a theoretical basis for interventions to change clinical practice. *BMC Health Serv Res.* 2003;3:22.
11. **Eccles M, Grimshaw J, Campbell M, Ramsay C.** Research designs for studies evaluating the effectiveness of change and improvement strategies. *Qual Saf Health Care.* 2003;12:47–52.
12. **Ferlie E.** Large-scale organizational and managerial change in health care: a review of the literature. *J Health Serv Res Policy.* 1997;2:180–9.
13. **Ferlie E, Fitzgerald L, Wood M.** Getting evidence into clinical practice: an organisational behaviour perspective. *J Health Serv Res Policy.* 2000;5:96–102.
14. **Grimshaw JM, Eccles MP.** Is evidence-based implementation of evidence-based care possible? *Med J Aust.* 2004;180(6 suppl):S50–S51.
15. **Grol R, Grimshaw J.** Evidence-based implementation of evidence-based medicine. *Jt Comm J Qual Improv.* 1999;25:503–13.
16. **Grol R, Wensing M.** What drives change? Barriers to and incentives for achieving evidence-based practice. *Med J Aust.* 2004;180(6 Suppl): S57–S60.
17. **Mowatt G, Grimshaw JM, Davis DA, Mazmanian PE.** Getting evidence into practice: the work of the Cochrane Effective Practice and Organization of care Group (EPOC). *J Contin Educ Health Prof.* 2001;21:55–60.
18. **Rhydderch M, Elwyn G, Marshall M, Grol R.** Organisational change theory and the use of indicators in general practice. *Qual Saf Health Care.* 2004;13:213–7.
19. **Rycroft-Malone J, Kitson A, Harvey G, et al.** Ingredients for change: revisiting a conceptual framework. *Qual Saf Health Care.* 2002;11: 174–80.
20. **Davis DA, Thomson MA, Oxman AD, Haynes RB.** Changing physician performance. A systematic review of the effect of continuing medical education strategies. *JAMA.* 1995;274:700–5.
21. **Davis DA, Thomson MA, Oxman AD, Haynes RB.** Evidence for the effectiveness of CME. A review of 50 randomized controlled trials. *JAMA.* 1992;268:1111–7.
22. **Grimshaw J, McAuley LM, Bero LA, et al.** Systematic reviews of the effectiveness of quality improvement strategies and programmes. *Qual Saf Health Care.* 2003;12:298–303.
23. **Grimshaw JM, Shirran L, Thomas R, et al.** Changing provider behavior: an overview of systematic reviews of interventions. *Med Care.* 2001; 39(suppl 2):2-II45.
24. **Thomson O'Brien MA, Freemantle N, Oxman AD, Wolf F, Davis DA, Herrin J.** Continuing education meetings and workshops: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev.* 2001;2:CD003030.
25. **Thomson O'Brien MA, Oxman AD, Davis DA, Haynes RB, Freemantle N, Harvey EL.** Educational outreach visits: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev.* 2000;2: CD000409.
26. **Thomson O'Brien MA, Oxman AD, Davis DA, Haynes RB, Freemantle N, Harvey EL.** Audit and feedback versus alternative strategies: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev.* 2000;2:CD00260.
27. **Thomson O'Brien MA, Oxman AD, Davis DA, Haynes RB, Freemantle N, Harvey EL.** Audit and feedback: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev.* 2000; 2:CD000259.
28. **Thomson O'Brien MA, Oxman AD, Haynes RB, Davis DA, Freemantle N, Harvey EL.** Local opinion leaders: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev.* 2000;2:CD000125.

29. Guide for Implementing Evidence-Based Clinical Practice and Conducting Implementation Research. Available at: <http://www.hsrd.research.va.gov/queri/implementation/>. Accessed: October 24th, 2005.
30. Owen RR, Thrush CR, Cannon D, et al. Use of electronic medical record data for quality improvement in schizophrenia treatment. *J Am Med Inform Assoc*. 2004;11:351-7.
31. **Mental Health Strategic Healthcare Group**. Veterans Health Administration Clinical Guideline for Management of Persons with Psychoses, Version 2.0. Washington, DC: Department of Veterans Affairs; 2004.
32. Rogers E. *The Diffusion of Innovations*. 4th edn. New York, NY: The Free Press; 1995.
33. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. 1977;84:191-215.
34. Mittman BS, Tonesk X, Jacobson PD. Implementing clinical practice guidelines: social influence strategies and practitioner behavior change. *QRB Qual Rev Bull*. 1992;18:413-22.
35. Green L. *Health Education Planning: A Diagnostic Approach*. Palo Alto, CA: Mayfield Publishing Co.; 1980.
36. Plsek P. Complexity and the Adoption of Innovation in Health Care. Washington, DC: National Committee for Quality Health Care; 2003.
37. McDaniel RJD, JJ. Complexity science and health care management. *Adv Health Care Manage*. 2001;2:11-36.
38. Kitson A, Harvey G, McCormack B. Enabling the implementation of evidence based practice: a conceptual framework. *Qual Health Care*. 1998;7:149-58.
39. Rothman AJ. "Is there nothing more practical than a good theory?": why innovations and advances in health behavior change will arise if interventions are used to test and refine theory. *Int J Behav Nutr Phys Act*. 2004;1:11.
40. Jeffery RW. How can health behavior theory be made more useful for intervention research? *Int J Behav Nutr Phys Act*. 2004;1:10.
41. Ajzen I, Fishbein M. Questions raised by a reasoned action approach: comment on Ogden (2003). *Health Psychol*. 2004;23:431-4.
42. Albarracin D, Johnson BT, Fishbein M, Muellerleile PA. Theories of reasoned action and planned behavior as models of condom use: a meta-analysis. *Psychol Bull*. 2001;127:142-61.
43. Fishbein M. A theory of reasoned action: some applications and implications. *Nebr Symp Motiv*. 1980;27:65-116.
44. Ogden J. Some problems with social cognition models: a pragmatic and conceptual analysis. *Health Psychol*. 2003;22:424-8.
45. Chapanis NP, Chapanis A. Cognitive dissonance: five years later. *Psychol Bull*. 1964;61:1-22.
46. Draycott S, Dabbs A. Cognitive dissonance. 2: a theoretical grounding of motivational interviewing. *Br J Clin Psychol*. 1998;37(part 3):355-64.
47. Draycott S, Dabbs A. Cognitive dissonance. 1: an overview of the literature and its integration into theory and practice in clinical psychology. *Br J Clin Psychol*. 1998;37(part 3):341-53.
48. Festinger L. Cognitive dissonance. *Sci Am*. 1962;207:93-102.
49. Glass DC, Canavan D, Schiavo S. Achievement motivation, dissonance, and defensiveness. *J Pers*. 1968;36:474-92.
50. Gruber M. Cognitive dissonance theory and motivation for change: a case study. *Gastroenterol Nurs*. 2003;26:242-5.
51. Margulis ST, Songer E. Cognitive dissonance: a bibliography of its first decade. *Psychol Rep*. 1969;24:923-35.
52. Richter MN Jr. The concept of cognitive dissonance. *J Psychol*. 1965;60:291-4.
53. Kerr EA, Mittman BS, Hays RD, Siu AL, Leake B, Brook RH. Managed care and capitation in California: how do physicians at financial risk control their own utilization? *Ann Intern Med*. 1995;123:500-4.
54. van Leeuwen YD, Mol SS, Pollemans MC, Drop MJ, Grol R, van der Vleuten CP. Change in knowledge of general practitioners during their professional careers. *Fam Pract*. 1995;12:313-7.
55. Patrick K, Sallis JF, Prochaska JJ, et al. A multicomponent program for nutrition and physical activity change in primary care: PACE+for adolescents. *Arch Pediatr Adolesc Med*. 2001;155:940-6.
56. Allen NA. Social cognitive theory in diabetes exercise research: an integrative literature review. *Diab Educ*. 2004;30:805-19.
57. Bandura A. Health promotion by social cognitive means. *Health Educ Behav*. 2004;31:143-64.
58. Bandura A. Swimming against the mainstream: the early years from chilly tributary to transformative mainstream. *Behav Res Ther*. 2004;42:613-30.
59. Bandura A. Social cognitive theory: an agentic perspective. *Annu Rev Psychol*. 2001;52:1-26.
60. Bandura A. Human agency in social cognitive theory. *Am Psychol*. 1989;44:1175-84.
61. Lorig KR, Sobel DS, Stewart AL, et al. Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: a randomized trial. *Med Care*. 1999;37:5-14.
62. Harvey G, Loftus-Hills A, Rycroft-Malone J, et al. Getting evidence into practice: the role and function of facilitation. *J Adv Nurs*. 2002;37:577-88.
63. Kitson A, Ahmed LB, Harvey G, Seers K, Thompson DR. From research to practice: one organizational model for promoting research-based practice. *J Adv Nurs*. 1996;23:430-40.
64. McCormack B, Kitson A, Harvey G, Rycroft-Malone J, Titchen A, Seers K. Getting evidence into practice: the meaning of 'context.' *J Adv Nurs*. 2002;38:94-104.
65. Rycroft-Malone J, Harvey G, Kitson A, McCormack B, Seers K, Titchen A. Getting evidence into practice: ingredients for change. *Nurs Stand*. 2002;16:38-43.
66. Rycroft-Malone J, Seers K, Titchen A, Harvey G, Kitson A, McCormack B. What counts as evidence in evidence-based practice? *J Adv Nurs*. 2004;47:81-90.
67. Dziewaltowski DA, Glasgow RE, Klesges LM, Estabrooks PA, Brock E. RE-AIM: evidence-based standards and a web resource to improve translation of research into practice. *Ann Behav Med*. 2004;28:75-80.
68. Glasgow RE, Goldstein MG, Ockene JK, Pronk NP. Translating what we have learned into practice. Principles and hypotheses for interventions addressing multiple behaviors in primary care. *Am J Prev Med*. 2004;27(2 suppl):88-101.
69. Daniel DM, Norman J, Davis C, et al. A state-level application of the chronic illness breakthrough series: results from two collaboratives on diabetes in Washington State. *Jt Comm J Qual Saf*. 2004;30:69-79.
70. Grimshaw JM, Thomas RE, MacLennan G, et al. Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technol Assess*. 2004;8:iii-iv, 1-72.

APPENDIX: DEFINING TERMS

Theory

A set of logical constructs that jointly offer answers to the questions "why" and "how," as in "why would someone change their behavior in this way?" and "how could this behavior/situation/outcome be changed?" Theories can be quite elaborate, or relatively simple. Examples include the theory of reasoned action⁴¹⁻⁴⁴; theories of cognitive dissonance⁴⁵⁻⁵²; stages of change⁵³⁻⁵⁵; Roger's Diffusion of Innovation Theory³²; Social Cognitive Theory⁵⁶⁻⁶¹; and Social Influence Theory.^{18,28}

Model

A heuristic framework that joins theory to some specific state or action that is desired or is to be taken. In our construction, models are more specific and concrete than theory, and can usually be shown in a diagram or picture, while a theory may or may not lend itself to graphic display. Models can also be more or less elaborate, but should contain specific elements derived from theory that either predict action or outcome, or contribute in some way to achieving the desired change. Examples of models include Promoting Action Research in Health Services (PARIHS)^{19,38,62-66} and Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM).^{67,68} We use the term "framework" interchangeably with "model."

Strategies

Articulate how to go from the skeleton, in an anatomic analogy, to the physiology of actually making change occur, and may include several different interventions.

Interventions

The specific steps that translate both model and strategy into action. There are numerous examples within the literature of types of interventions, ranging from types that require re-engineering the delivery system to single-shot educational interventions.^{6,24–28,69,70}

Tools

Concrete items such as educational pamphlets or pocket cards used within an intervention to facilitate the desired action and outcome. They are often highly specific to the intervention, content, and context of the intervention, and may be useful in other studies and contexts, but usually not without considerable tailoring and adjustment. A variety of examples are available on the VA QUERI Guide to Implementation web site.²⁹