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Principles of Knowledge Translation

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Outline

- Background
- Terminology
- Knowledge to action loop
- Knowledge for knowledge translation
- Knowledge about the effects of knowledge translation strategies
- Opportunities for knowledge translation research
- Summary

Background

'All breakthrough, no follow through'

Woolf (2006) Washington Post op ed

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

Knowledge translation

Why do we need to think about knowledge translation?

- Traditional KT approaches have emphasised publication in peer reviewed journals
- Consistent evidence of failure to translate research findings into clinical practice
 - 30-40% patients do not get treatments of proven effectiveness
 - 20–25% patients get care that is not needed or potentially harmful

Schuster, McGlynn, Brook (1998). *Milbank Memorial Quarterly*

Grol R (2001). *Med Care*

KT terms encountered

applied health research
capacity building
co-optation - cooperation -
 competing
diffusion*
dissemination*
getting knowledge into practice
impact
Implementation*
knowledge communication
knowledge cycle
knowledge exchange
knowledge management
knowledge translation

knowledge mobilization
knowledge transfer
linkage and exchange
popularization of research,
research into practice
research mediation
research transfer
research translation
science communication
teaching
“third mission”
translational research
transmission
utilization

*cited most frequently

Knowledge translation

CIHR definition

- Knowledge translation is a dynamic and iterative process that includes the synthesis, dissemination, exchange and ethically-sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the healthcare system.
- This process takes place within a complex system of interactions between researchers and knowledge users which may vary in intensity, complexity and level of engagement depending on the nature of the research results and on the needs of the particular knowledge user.

Knowledge translation

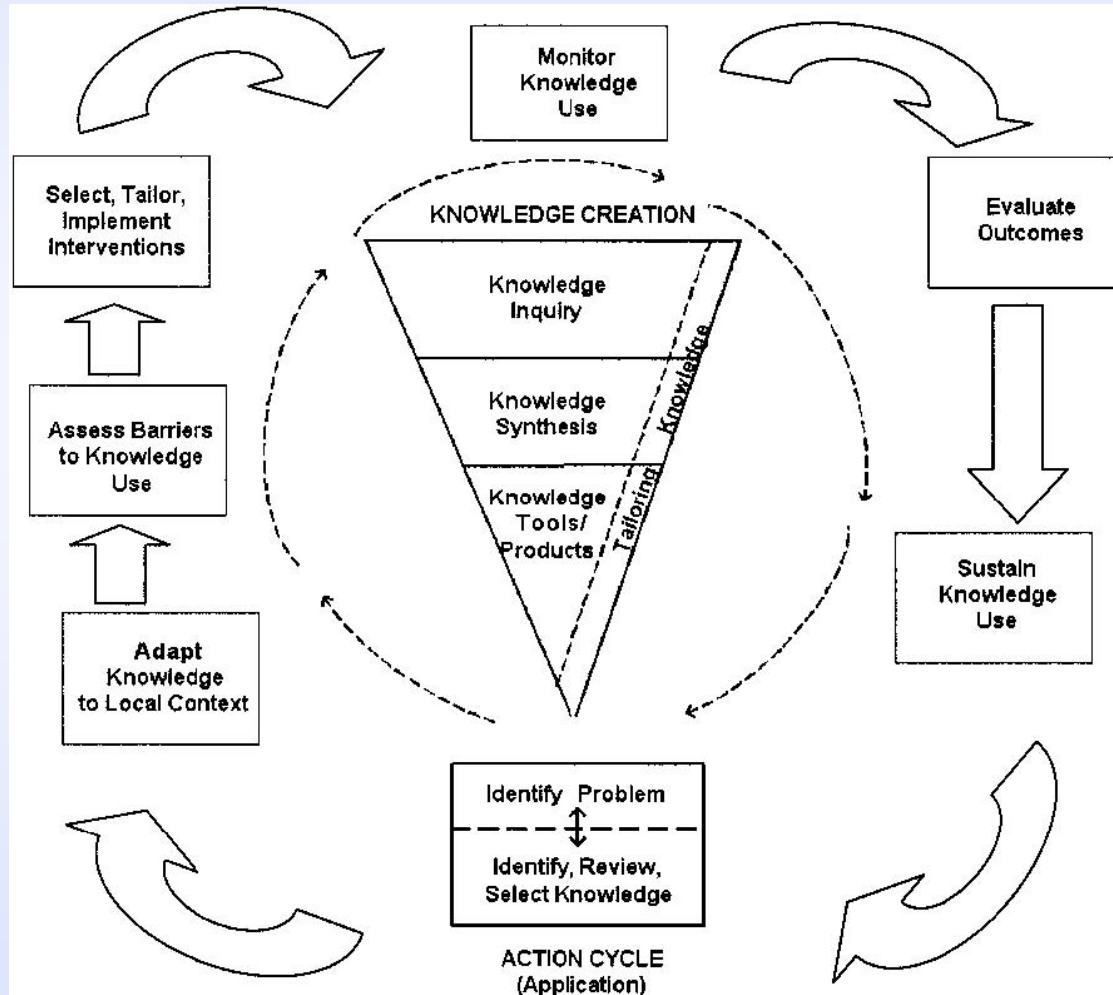
- Knowledge translation is about ensuring that:
 - stakeholders are aware of and use research evidence to inform their decision making
 - research is informed by current available evidence and the experiences and information needs of stakeholders

Knowledge translation

Audiences for KT

Audience	Basic	Clinical	Health Services	Population Health
Researchers	+++	+++	+++	+++
Professionals		+++	+++	
Patients		+++	+++	
Administrators			+++	+++
Policy Makers		+++	+++	+++
Industry	+++	+++		
.....				

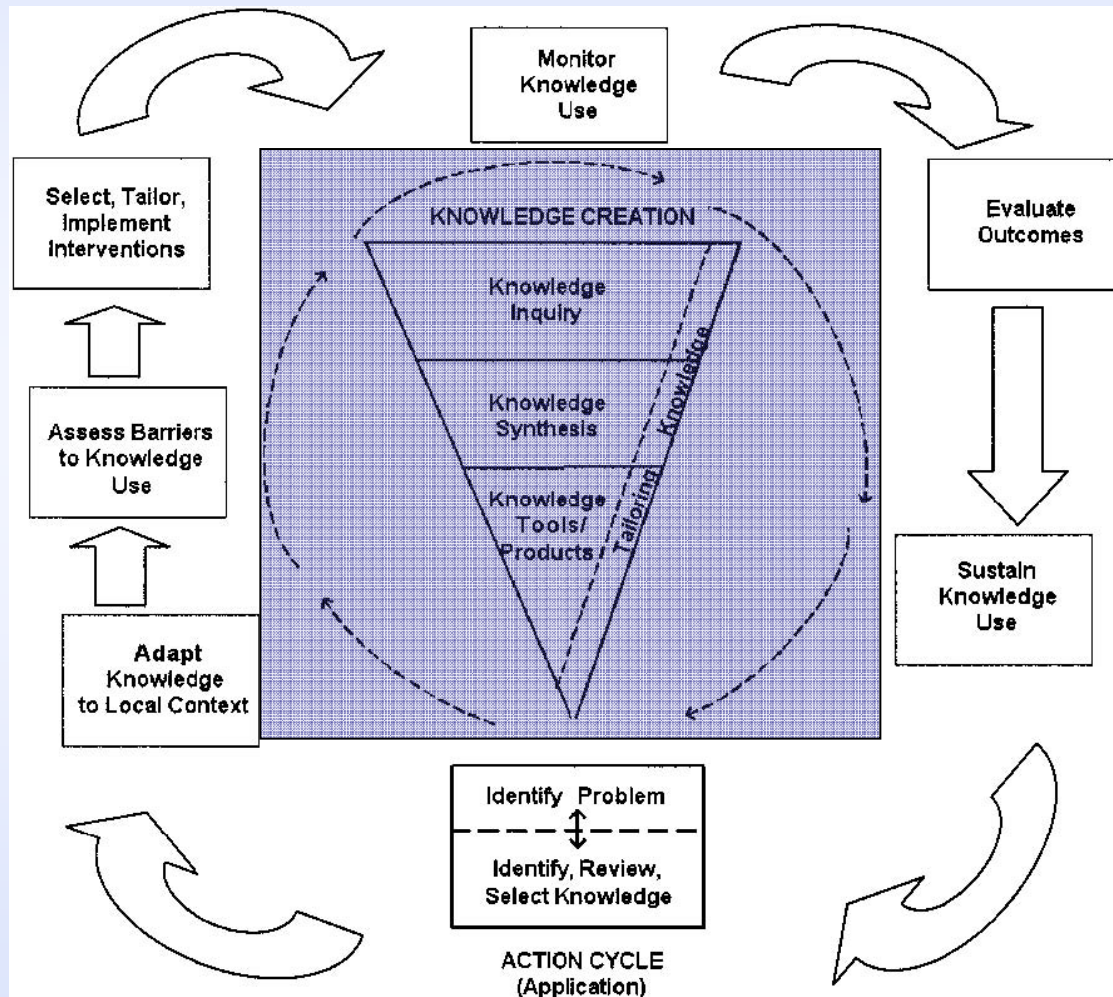
Knowledge to action loop



Knowledge to Action loop

From: Graham ID et al. Lost in Knowledge Translation: Time for a Map? *Journal of Continuing Education in the Health Professions*, 2006

Knowledge for knowledge translation



Knowledge to Action loop

From: Graham ID et al. Lost in Knowledge Translation: Time for a Map? *Journal of Continuing Education in the Health Professions*, 2006

K for KT

- **Individual studies rarely by themselves provide sufficient evidence for policy or practice changes**
- **Individual studies are often misleading**
- **An additional issue is dealing with the hype from scientific discoveries**

Don't believe the hype: early highly positive results often contradicted

ORIGINAL CONTRIBUTION

Contradicted and Initially Stronger Effects in Highly Cited Clinical Research

John P. A. Ioannidis, MD

CLINICAL RESEARCH ON IMPORTANT questions about the efficacy of medical interventions is sometimes followed by subsequent studies that either reach opposite conclusions or suggest that the original claims were too strong. Such disagreements may upset clinical practice and acquire publicity in both scientific circles and in the lay press. Several empirical investigations have tried to address whether specific types of studies are more likely to be contradicted and to explain observed controversies. For example, evidence exists that small studies may sometimes be refuted by larger ones.^{1,2}

Similarly, there is some evidence on disagreements between epidemiological studies and randomized trials.³⁻⁵ Prior investigations have focused on a variety of studies without any particular attention to their relative importance and scientific impact. Yet, most research publications have little impact while a small minority receives most attention and dominates scien-

Context Controversy and uncertainty ensue when the results of clinical research on the effectiveness of interventions are subsequently contradicted. Controversies are most prominent when high-impact research is involved.

Objectives To understand how frequently highly cited studies are contradicted or find effects that are stronger than in other similar studies and to discern whether specific characteristics are associated with such refutation over time.

Design All original clinical research studies published in 3 major general clinical journals or high-impact-factor specialty journals in 1990-2003 and cited more than 1000 times in the literature were examined.

Main Outcome Measure The results of highly cited articles were compared against subsequent studies of comparable or larger sample size and similar or better controlled designs. The same analysis was also performed comparatively for matched studies that were not so highly cited.

Results Of 49 highly cited original clinical research studies, 45 claimed that the intervention was effective. Of these, 7 (16%) were contradicted by subsequent studies, 7 others (16%) had found effects that were stronger than those of subsequent studies, 20 (44%) were replicated, and 11 (24%) remained largely unchallenged. Five of 6 highly-cited nonrandomized studies had been contradicted or had found stronger effects vs 9 of 39 randomized controlled trials ($P = .008$). Among randomized trials, studies with contradicted or stronger effects were smaller ($P = .009$) than replicated or unchallenged studies although there was no statistically significant difference in their early or overall citation impact. Matched control studies did not have a significantly different share of refuted results than highly cited studies, but they included more studies with "negative" results.

Conclusions Contradiction and initially stronger effects are not unusual in highly cited research of clinical interventions and their outcomes. The extent to which high citations may provoke contradictions and vice versa needs more study. Controversies are most common with highly cited nonrandomized studies, but even the most highly cited randomized trials may be challenged and refuted over time, especially small ones.

JAMA. 2005;294:218-228

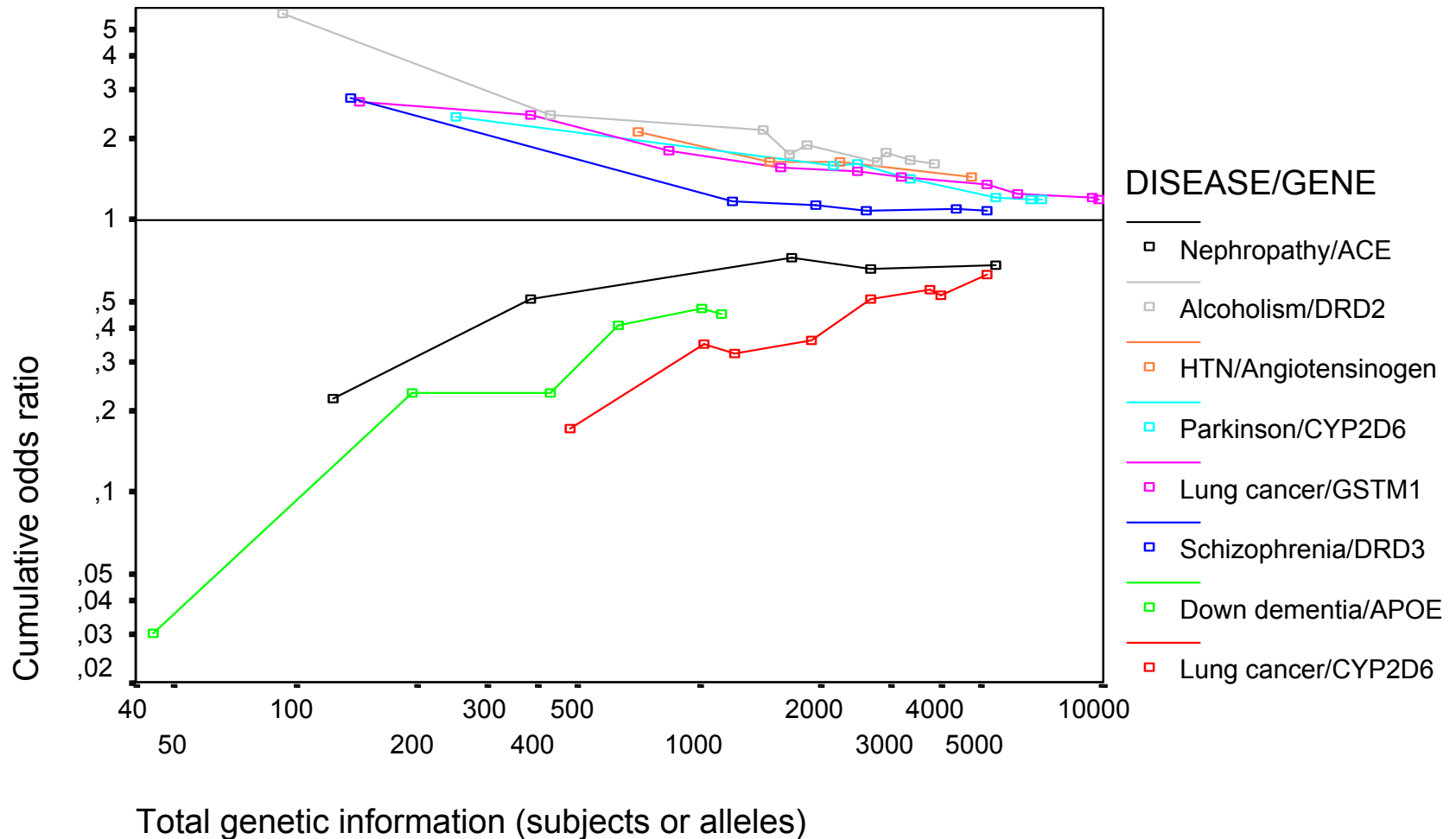
www.jama.com

Don't believe the hype: early highly positive results often contradicted

- Analyzed 115 articles published in 1990-2003 in the 3 major general medical journals (NEJM, JAMA, Lancet) and specialty journals that had received over 1000 citations each by August 2004**
- 49 reported evaluations of health care interventions; 45 claimed that the interventions were effective.**
- By 2004 5/6 non randomised studies and 9/39 randomised trials were already contradicted or found to be exaggerated**

Ioannidis JP. JAMA 2005

Don't believe the hype: early highly positive results often contradicted



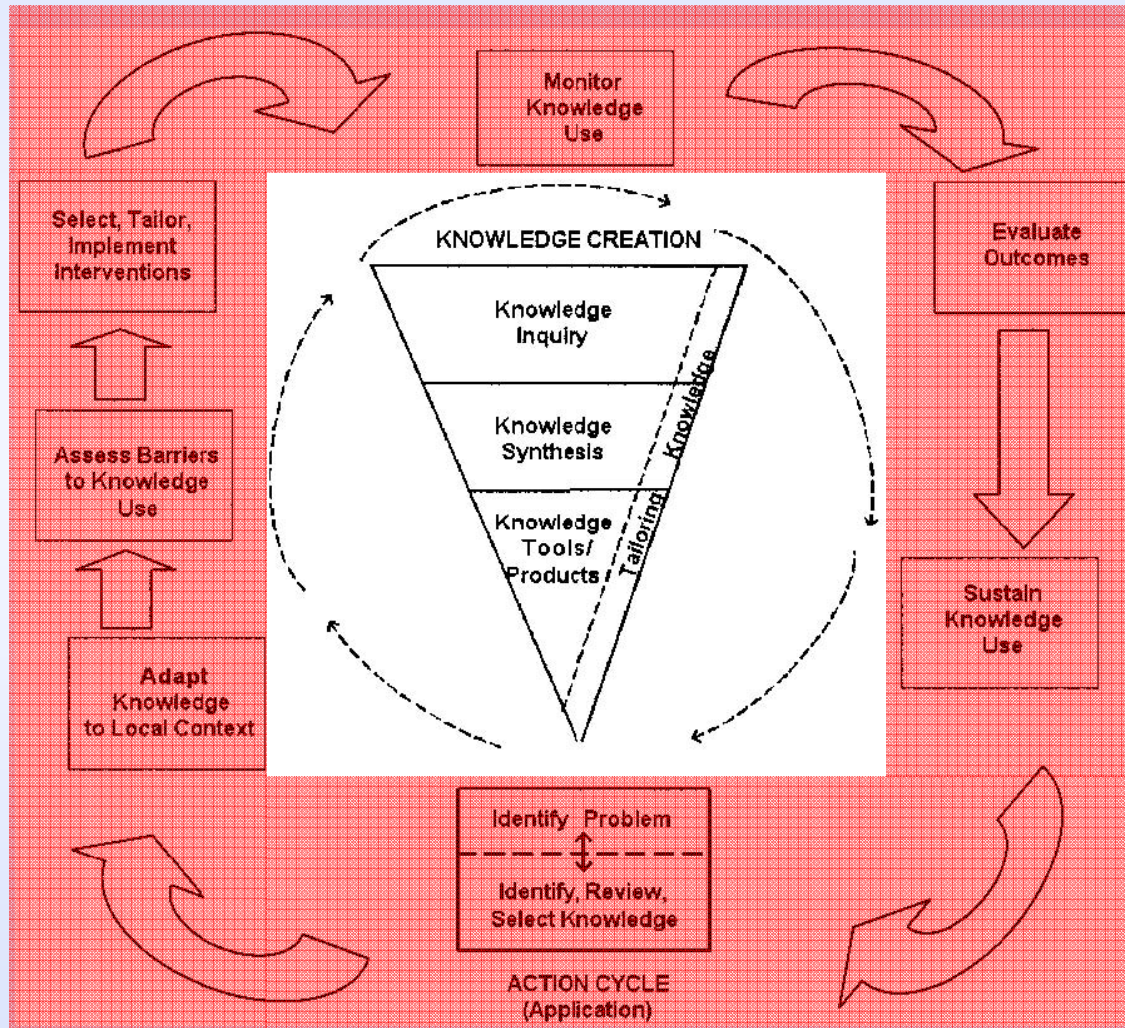
K for KT

- The results of individual studies need to be interpreted alongside the totality of evidence (ie systematic reviews)
- Emphasis on KT of individual studies may distract the stakeholder group (increasing the noise to signal)
 - **‘Don’t believe the hype’**
 - **‘Don’t generate the hype’**

K for KT

- **Increasing availability of high quality guidelines and systematic reviews available to support practice:**
 - **Cochrane Collaboration**
 - **AHRQ evidence based practice reports**
 - **HUGENet**
 - **Multiple guideline development agencies**

Action cycle



Knowledge to Action loop

From: Graham ID et al. Lost in Knowledge Translation: Time for a Map? *Journal of Continuing Education in the Health Professions*, 2006

Barriers to KT

- **Structural (e.g. financial disincentives)**
- **Organisational (e.g. inappropriate skill mix, lack of facilities or equipment)**
- **Peer group (e.g. local standards of care not in line with desired practice)**
- **Individual (e.g. knowledge, attitudes, skills)**
- **Professional - patient interaction (e.g. problems with information processing)**

KT key concepts

- **Five key questions**
 - **What should be transferred?**
 - **To whom should research knowledge be transferred?**
 - **By whom should research knowledge be transferred?**
 - **How should research knowledge be transferred?**
 - **With what effect should research knowledge be transferred?**

Lavis JN, Robertson D, Woodside JN, Mcleod CB, Abelson J (2003) *Milbank Quarterly*

Effects of KT strategies

- **Most of the approaches to dissemination and implementation are more often based on beliefs than on scientific evidence**
- ***‘Evidence based medicine should be complemented by evidence based implementation’***

Grol (1997). *British Medical Journal*.

Effects of KT strategies targeting policy makers and managers

- **Health policy-makers perceptions of their use of evidence: a systematic review**
- **24 studies involving 2014 interviews with health policy makers**
- **Most studies focused on hypothetical scenarios or retrospective perception of the use of evidence in relation to specific cases.**

Innvaer, Vist, Trummald, Oxman (2002). *Journal of Health Services Research and Policy*

Effects of KT strategies targeting policy makers and managers

- **Facilitators**
 - **Personal contact (13/24)**
 - **Timely relevance (13/24)**
 - **Inclusion of summaries with policy recommendations (11/24)**
- **Barriers**
 - **Absence of personal contact (11/24)**
 - **Lack of timeliness or relevance of research (9/24)**
 - **Mutual mistrust (8/24)**
 - **Power and budget struggles (7/24)**

Innvaer, Vist, Trummald, Oxman (2002). *Journal of Health Services Research and Policy*

Effects of KT strategies targeting policy makers and managers

- **Current ideas:**
 - **Targetted push of actionable messages**
 - **Knowledge brokers**
 - **Stakeholder partners in research enterprise**
 - **Capacity enhancement (eg EXTRA)**
 - **Communities of practice**
 - **.....**

Cochrane Effective Practice and Organisation of Care (EPOC) Group

- EPOC aims to undertake systematic reviews of professional, organisation, financial and regulatory interventions to improve health care systems and health care delivery
- Register of 5000+ primary studies
- 41 reviews, 41 protocols
- Overview of 50 systematic reviews relevant to changing prescribing behaviour funded by CADTH COMPUS program



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- ▶ [Events](#)
- ▶ [Careers](#)
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The **Rx for Change** database summarizes current research evidence about the effects of strategies to improve drug prescribing practice and drug use. This database houses summaries of key findings from systematic reviews that evaluate the effects of strategies targeting professionals, the organization of health care, and consumers.

For more information, please see: [About the Rx for Change Database](#) and [Methods for Development](#)

▼ [Professional](#)

- ▶ ***Interventions that target professionals directly, aiming to improve practice.***
- ▶ Educational Meetings ?
- ▶ Audit and Feedback ?
- ▶ Educational Outreach Visits
- ▶ Patient-Mediated ?
- ▶ Local Opinion Leaders ?
- ▶ Mass Media ?
- ▶ Reminders - Computer Decision Support Systems (drug dosing) ?
- ▶ Reminders - Computer Physician Order Entry ?
- ▶ Reminders - General ?
- ▶ Tailored Interventions ?
- ▶ Distribution of Educational Materials ?

Overview of reviews of professional behaviour change strategies

- Educational materials (1)
- Educational meetings (1)
- Educational outreach (1)
- Audit and feedback (2)
- Opinion leaders (1)
- Mass media (1)
- Reminders – general (4)
- Reminders – Computer assisted drug dosage (3)
- Reminders – CPOE (1)
- Tailored interventions (1)
- Multifaceted interventions (1)
- Prescribing – general (10)
- Prescribing - safety (2)
- Changing roles – nursing (1)
- Changing roles – pharmacy (7)
- Financial (4)
- Regulatory (1)
- General (10)

Educational outreach

- ***Educational outreach*** - Use of a trained person who met with providers in their practice settings to give information with the intent of changing the provider's practice. The information given may have included feedback on the performance of the provider(s).

Educational outreach

- Derives from social marketing approach
- Use social persuasion methods to target individual's knowledge and attitudes
- Typically aim to get maximum of 3 messages across in 10-15 minutes using approach tailored to individual health care provider
- Typically use additional strategies to reinforce approach
- Typically focus on relatively simple behaviours in control of individual physician eg choice of drugs to prescribe

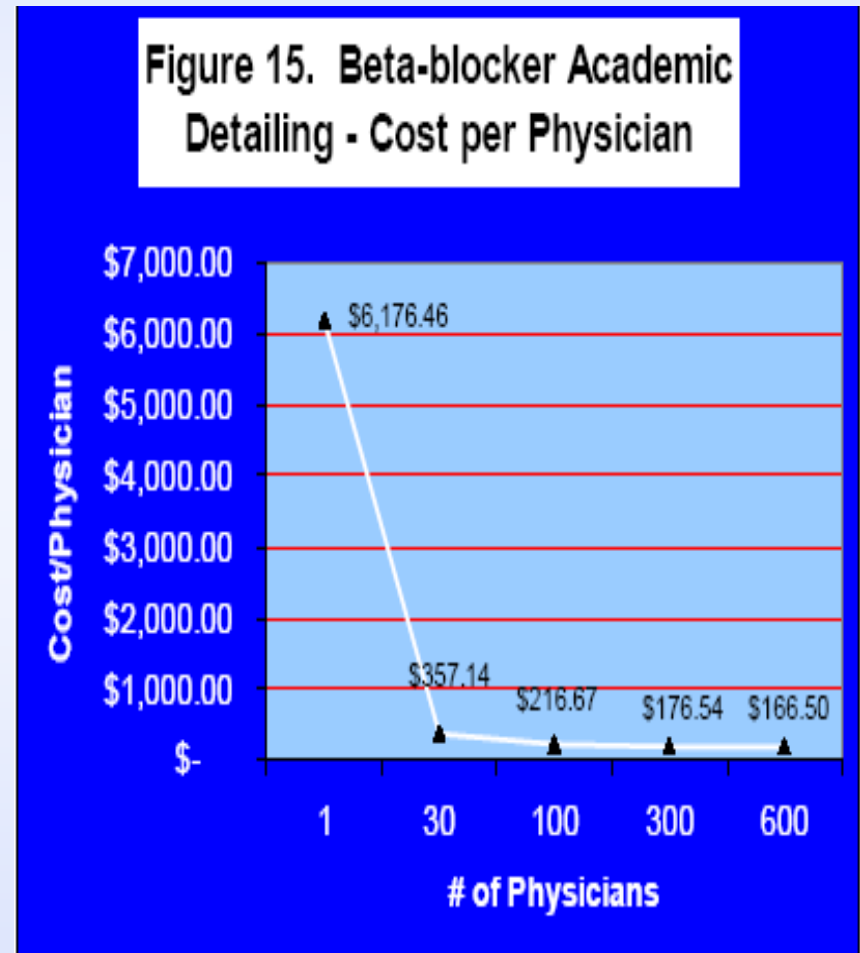
Educational outreach

O'Brien (2007) Cochrane Library

- High quality review
- 69 studies (RCT, CCT)
- Multifaceted educational outreach visits were generally effective for improving appropriate care
- Prescribing behaviours - median effect across 17 comparisons 4.8% absolute improvement, interquartile range 3.0% to 6.5%
- Other behaviours – median effect across 17 comparisons 6.0% absolute improvement, interquartile range 3.6% to 16.0%

Educational outreach

- Relatively expensive although may still be efficient
- May be less effective for complex behaviours requiring team or system change



Overview of reviews summary

Summary

- Variety of interventions to change health professional behaviour – effects tend to be modest but important from population perspective
- However ‘No Magic Bullets’ – effects of interventions appears to vary across targeted behaviours, professionals and settings
- Feasibility and resources required for interventions also likely to vary

Effects of KT strategies targeting patients

- Cochrane Consumers and Communication Review Group aims to undertake systematic reviews of interventions to improve communication with consumers
- Register of 6400+ primary studies
- 24 systematic reviews and 16 protocols
- Overview of 21 systematic reviews of interventions that target consumers to promote evidence based prescribing for and drug use by consumers funded by CADTH COMPUS program

Effects of KT strategies targeting patients

- Decision aids for people facing health treatment or screening decisions
- Included 35 RCTs
- Decision aids improved:
 - knowledge
 - more realistic expectations
 - lower decisional conflict related to feeling informed
 - increased proportion of people active in decision making
 - reduced proportion of people who remained undecided post intervention
- Decision aids had a variable effect on which healthcare options were selected.

O'Connor AM, *et al* (2003). *Cochrane Library*

Effects of KT strategies targeting patients

- Generally effective interventions include patient reminders, simplifying dosage regimes, collaborative care strategies in primary care self monitoring of medications, practical medication management strategies, practice delayed prescribing, provide individualised patient support, lay health workers

Knowledge translation research

- Knowledge translation is a human enterprise that can be studied to understand and improve dissemination and implementation approaches
- Knowledge translation research is the scientific study of the determinants, processes and outcomes of dissemination and implementation.

Knowledge translation research

- Knowledge synthesis (to identify the knowledge base for KT);
- Research into the evolution and critical discourse around research evidence;
- Research into knowledge retrieval, evaluation and knowledge management infrastructure;
- Identification of knowledge to action gaps;
- Development of methods to assess barriers and facilitators to KT;
- Development of the methods for optimizing KT strategies;
- Evaluations of the effectiveness and efficiency of KT strategies;
- Development of KT theory; and
- Development of KT research methods.

Summary

- Knowledge translation is about ensuring that stakeholders are aware of and use research evidence to inform their decision making
- Knowledge to action loop provides framework for thinking about knowledge translation
- Knowledge translation should be based on syntheses of research evidence

Summary

- Different approaches likely to be needed depending on innovation, barriers to adoption, targeted stakeholders and health care system
- Evidence base about how to do KT is incomplete especially for policy makers
- Nevertheless opportunities for researchers to be more thoughtful about KT throughout research process
- Substantial opportunities for KT research to improve evidence base for KT

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