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## ***Smoke and mirrors: where is the K for KT ?***

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# Outline

- Definitions
- K for KT
- Effects of KT strategies
  - **KT for policy makers**
  - **KT for clinicians**
  - **KT for patients**
- Putting it together
- Summary

***Say what you mean ....***

# 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 the exchange, synthesis and ethically-sound application of researcher findings within a complex system of relationships among researchers and knowledge users.**

# 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 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*

# 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 basic science discoveries**

# Don't believe the hype – likelihood of benefit from basic science discoveries

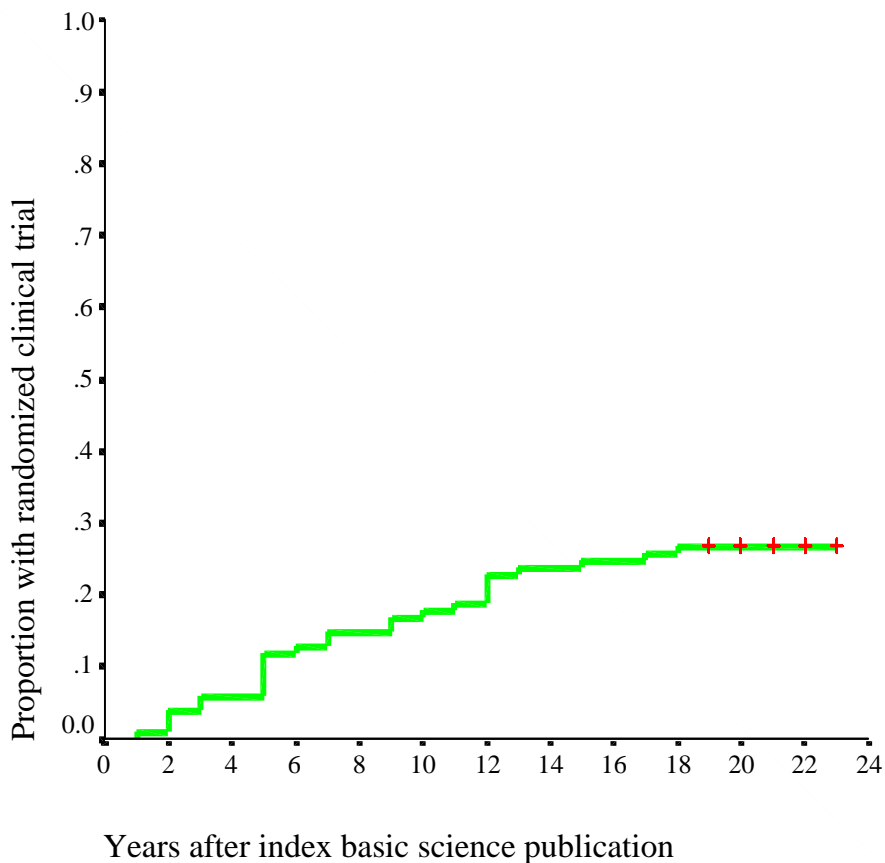
**25, 190 articles (published in 1979-1983 in Nature, Science, Cell, JEM, JCI, JBC)**

**562 articles (retrieved key word search)**

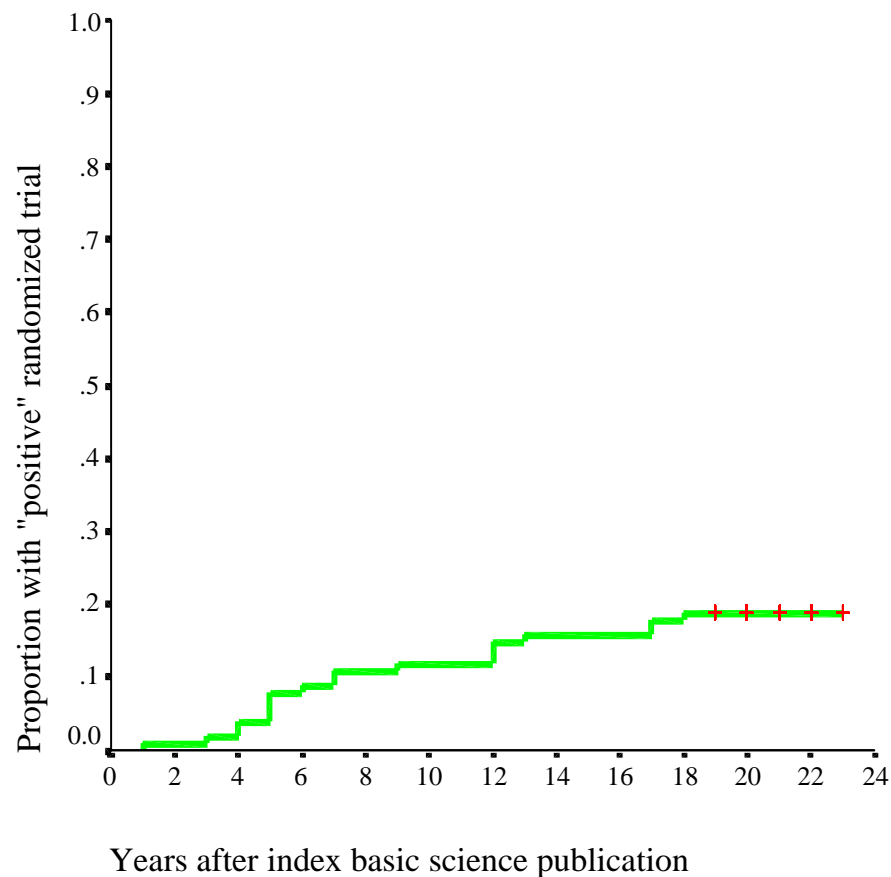
**153 potentially eligible articles (full text)**

**101 original articles that made clear promises for immediate clinical translation**

# Don't believe the hype – likelihood of benefit from basic science discoveries



**RCT**



**Positive RCT**

# 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

**C**LINICAL 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.<sup>1,2</sup>

Similarly, there is some evidence on disagreements between epidemiological studies and randomized trials.<sup>3-5</sup> 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

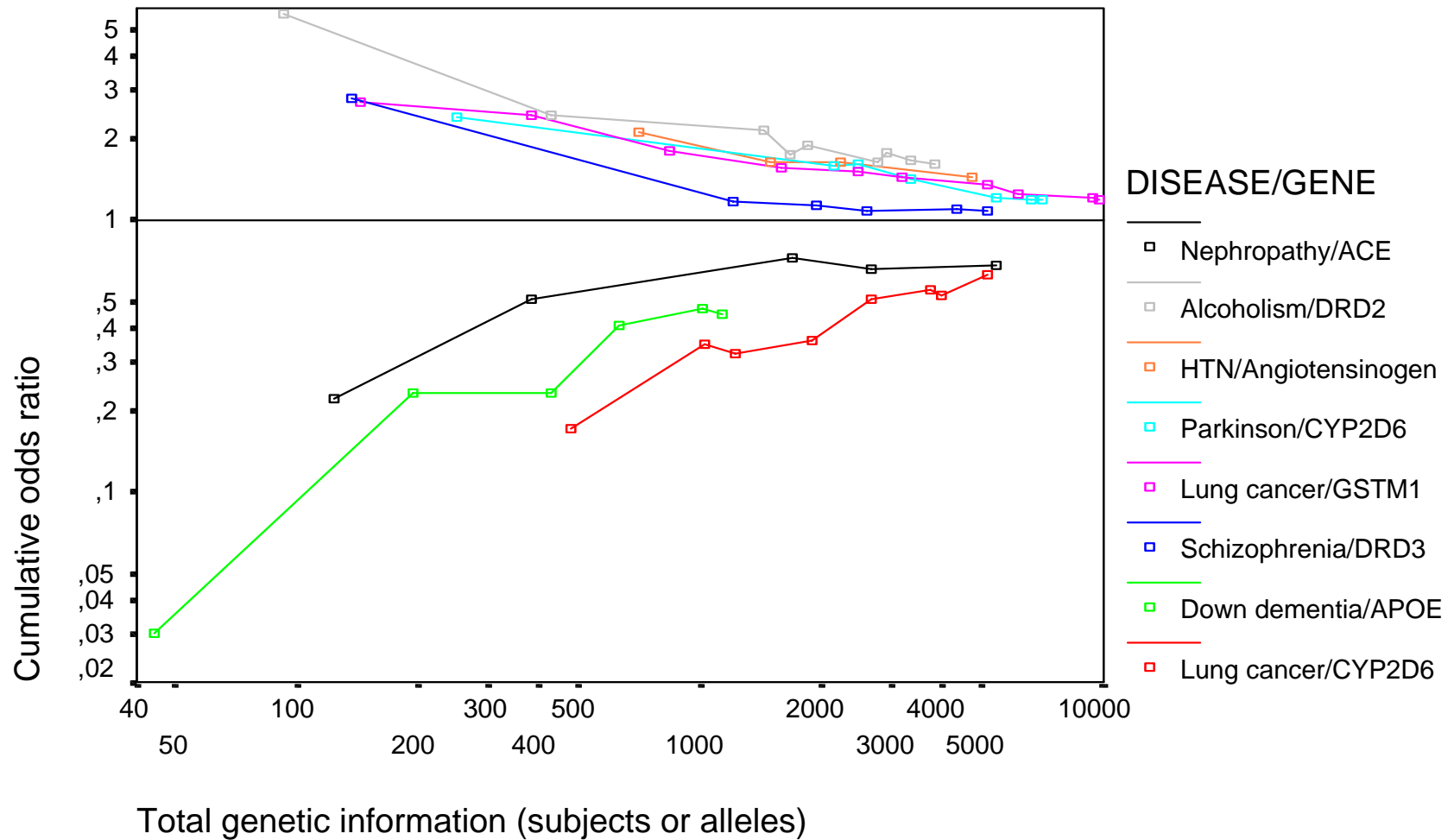
www.jama.com

# **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

## Users' Guides to the Medical Literature

***'We now recommend that resolving a clinical problem begins with a search for a valid systematic review or practice guideline as the most efficient method of deciding on the best patient care.'***

Guyatt GH, Rennie D (1994). *JAMA*.

***Knowledge translation is not always about knowledge (in fact, knowledge translation is often not about knowledge) ....***

# 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)**

# Barriers to KT

- **Ferlie and Shortell suggest four levels of KT interventions to improve the quality of health care:**
  - **the individual health professional;**
  - **health care groups or teams;**
  - **organisations providing health care;**
  - **the larger health care system or environment in which individual organizations are embedded.**
- **Different types of interventions will be relevant to interventions at different levels**

Ferlie, Shortell (2001). *Milbank Quarterly*

# 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*

# KT key concepts

## Five key questions

- **What is the behavior (or series of linked behaviors) that you are trying to change?**
- **Who performs the behavior(s)? (potential adopter)**
- **When and where does the potential adopter perform the behavior?**
- **Are there obvious practical barriers to performing the behavior?**
- **Is the behavior usually performed in stressful circumstances? (potential for acts of omission)**

# Barriers to KT

## Potential stakeholders for KT

- Policy makers
  - **Macro (national/provincial)**
  - **Meso (organisational)**
- Managerial
- Provider
- Consumer
- Citizen
- Researchers
- Industry

# 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*.

# Towards evidence based implementation

- **Rigorous evaluations (mainly randomised controlled trials) provide the best evidence of effectiveness of different interventions because:**
  - **Effects of interventions are modest**
  - **Limited understanding of likely confounders**
  - **Substantial opportunity costs if ineffective or inefficient dissemination and implementation strategies used**

Eccles (2003) *Quality and Safety in Health Care*

# Towards evidence based implementation

- **Systematic reviews of rigorous evaluations of implementation interventions should inform decisions because they:**
  - **identify and summarise evidence on the effectiveness of interventions**
  - **allow the generalisability and consistency of research findings to be assessed**
  - **allow exploration of data inconsistencies to be explored.**

Mulrow (1994) *British Medical Journal*  
Grimshaw (2003) *Quality and Safety in Health Care*

***One size doesn't fit all ....***

**OR**

***Beware persuasive salesmen .....***

**OR**

***The future is more like Blade Runner  
than Star Trek ....***

# 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**
  - **.....**

# Effects of KT strategies targeting health care professionals



**Grimshaw JM, Thomas RE, MacLennan G, Fraser C, Ramsay C, Vale L *et al.* Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technol Assess* 2004.**

(Available from:  
<http://www.hta.nhsweb.nhs.uk/>)

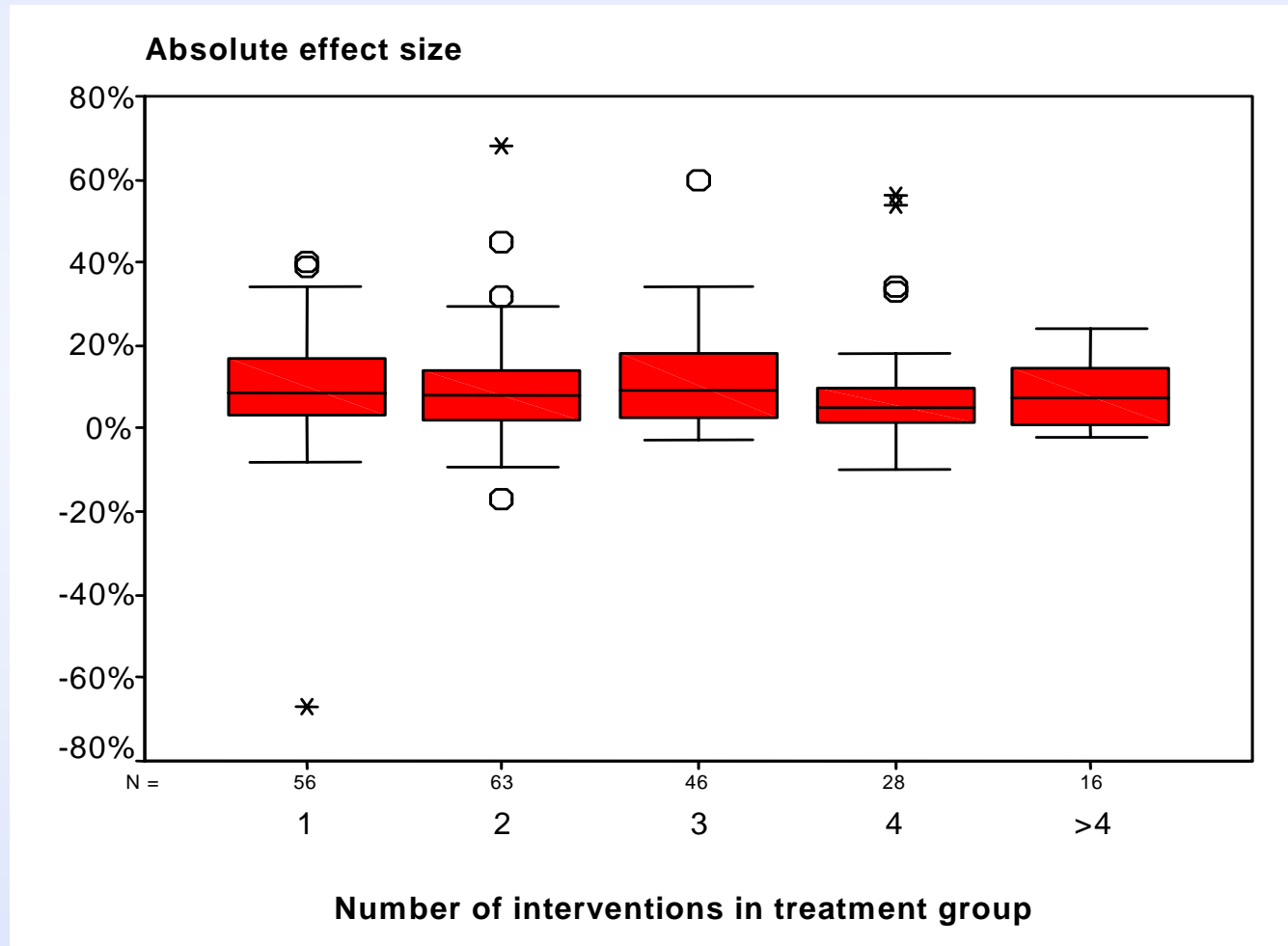
# Effects of KT strategies targeting health care professionals

## Single interventions

Intervention	Number of CRCTs	Range	Median effect size
Educational materials	4	+3.6%, +17.0%	+8.1%
Audit and feedback	5	+1.3%, +16.0%	+7.0%
Reminders	14	-1.0%, +34.0%	+14.1%

# Effects of KT strategies targeting health care professionals

## Multifaceted interventions



# 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 4538 primary studies**
- **12 systematic reviews and 20 protocols**
  - **Decision aids for people facing health treatment or screening decisions**
  - **Interventions for helping patients to follow prescriptions for medications**
  - **Recordings or summaries of consultations for people with cancer**

# 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.

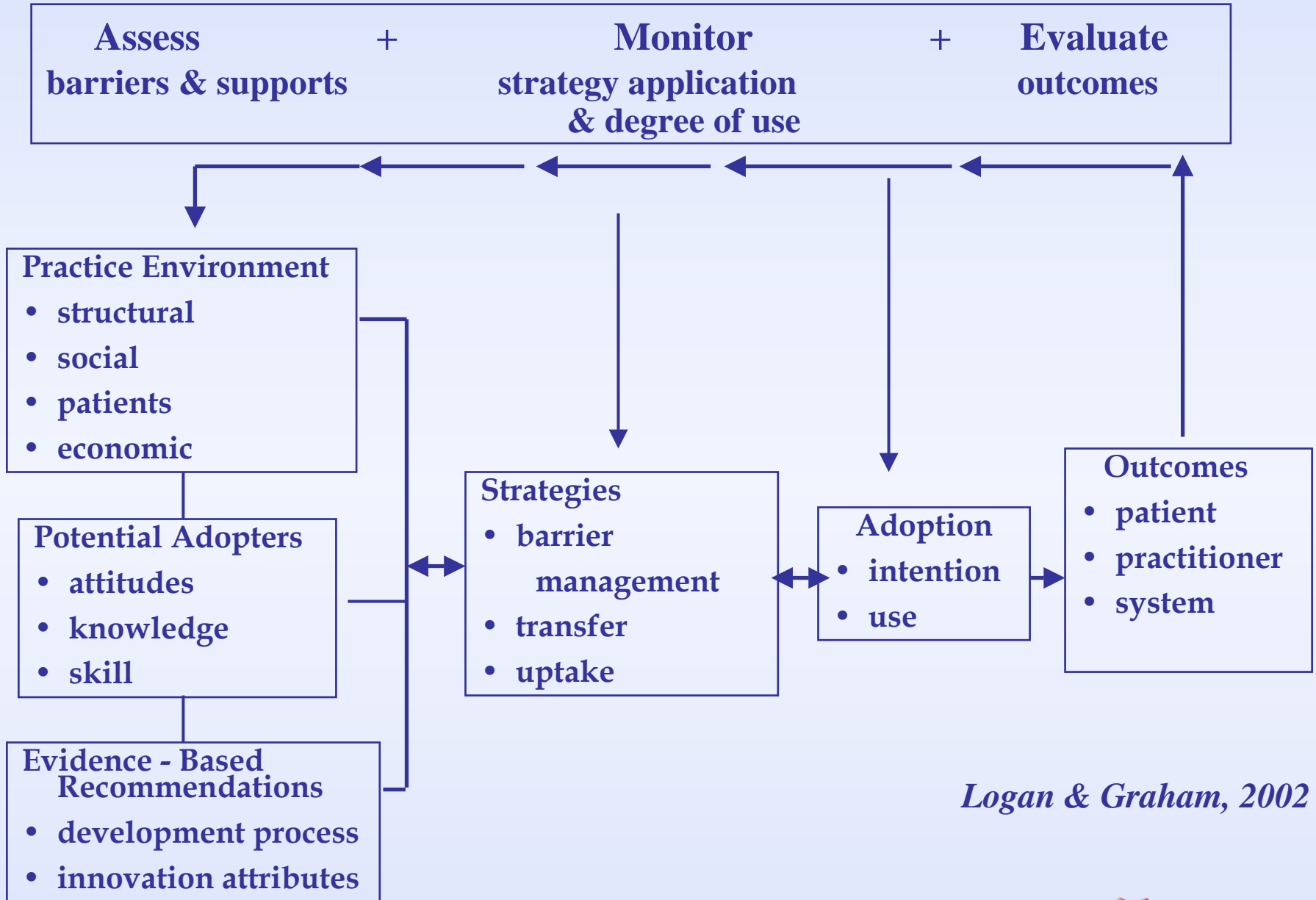
O'Connor AM, et al (2003). *Cochrane Library*

**Putting it together ....**

**OR**

**It's the system and the health care  
professionals and the patient and  
the ....**

# Ottawa Model of Research Use



*Logan & Graham, 2002*

# Thrombolysis in acute stroke

- **For eligible patients without CT evidence of a large acute infarct we recommend administration of IV tPA ... provided that treatment is initiated within 3 hours of clearly defined symptom onset (Grade 1A)**

# Thrombolysis in acute stroke

- **Attributes of behavior - complex behavior involving patients, paramedics, emergency physicians/triage, neurologists, radiologists within tight timeframe**
- **Attributes of adopters – possible knowledge gaps, possible ambivalent attitudes**
- **Attributes of environment – patient awareness of stroke symptoms, response times by EMS, streamlined processes with emergency rooms, availability of CT scan plus radiologist**

# Thrombolysis in acute stroke

- **Possible interventions**
  - **Community – stroke awareness campaigns**
  - **High risk patients – stroke awareness campaigns**
  - **Paramedics – systems for identifying and prioritising possible stroke patients**
  - **Emergency room – rapid triage of patients, standing orders for investigation and referral to neurologist, rapid transfer of patient to investigation departments and point of treatment**

# Aspirin in stroke

- **For patients with ischemic stroke who are not receiving thrombolysis, we recommend early aspirin therapy (160 to 325 mg per day) *within 48 hours* (Grade 1A).**

# Aspirin in stroke

- **Attributes of behavior – relatively simple, physician driven, less time pressure**
- **Attributes of adopters – reasonable knowledge, attitudes and intentions (may be intention behavior gap)**
- **Practice environment – issues of responsibility, especially if care provided by multiple physicians over time, acts of omission due to chaotic environment**

# Aspirin in stroke

- **Possible interventions**
  - **Physician – education and social influence if poor knowledge or intentions**
  - **Practice environment – reminders, standing orders on admission, professional substitution**

# Summary

- **Knowledge translation is about ensuring that stakeholders are aware of and use research evidence to inform their decision making**
- **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) but growing empirical and theoretical base.**