

# Using Evidence Synthesis in Your Practice in Chronic Pain

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Capital Health



# Disclosure

- I have no conflicts of interest related to this presentation.

## Acknowledgements for Materials Presented

- Cochrane Collaboration Entities
- Jeremy Grimshaw
- Brian Haynes

# Objectives

- Understand role of evidence-informed practice
- Be able to formulate an answerable clinical question
- Understand a framework for thinking about types of clinical research evidence
- Be aware of resources to facilitate evidence use in practice



# Evidence-Based Practice

- Integration of:
  - ▶ Individual clinical expertise, with
  - ▶ Best available external evidence (from systematic research), and
  - ▶ Patient's values & expectations

*Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. BMJ. 1996 Jan 13;312(7023):71-2.*

# Parachute use to prevent death and major trauma related to gravitational challenge: systematic review of randomised controlled trials

Gordon C S Smith, Jill P Pell

## Abstract

**Objectives** To determine whether parachutes are effective in preventing major trauma related to gravitational challenge.

**Design** Systematic review of randomised controlled trials.

**Data sources:** Medline, Web of Science, Embase, and the Cochrane Library databases; appropriate internet sites and citation lists.

**Study selection:** Studies showing the effects of using a parachute during free fall.

**Main outcome measure** Death or major trauma, defined as an injury severity score  $> 15$ .

**Results** We were unable to identify any randomised controlled trials of parachute intervention.

**Conclusions** As with many interventions intended to prevent ill health, the effectiveness of parachutes has not been subjected to rigorous evaluation by using randomised controlled trials. Advocates of evidence based medicine have criticised the adoption of interventions evaluated by using only observational data. We think that everyone might benefit if the most radical protagonists of evidence based medicine organised and participated in a double blind, randomised, placebo controlled, crossover trial of the parachute.

## Introduction

The parachute is a

accepted intervention was a fabric device, secured by strings to a harness worn by the participant and released (either automatically or manually) during free fall with the purpose of limiting the rate of descent. We excluded studies that had no control group.

### Definition of outcomes

The major outcomes studied were death or major trauma, defined as an injury severity score greater than 15.<sup>5</sup>

### Meta-analysis

Our statistical approach was to assess outcomes in parachute and control groups by odds ratios and quantified the precision of estimates by 95% confidence intervals. We chose the Mantel-Haenszel test to assess heterogeneity, and sensitivity and subgroup analyses and fixed effects weighted regression techniques to explore causes of heterogeneity. We selected a funnel plot to assess publication bias visually and Egger's and Begg's tests to test it quantitatively. Stata software, version 7.0, was the tool for all statistical analyses.

## Results

Our search strategy did not find any randomised controlled trials of the parachute.

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BMJ 2003;327:1459-61

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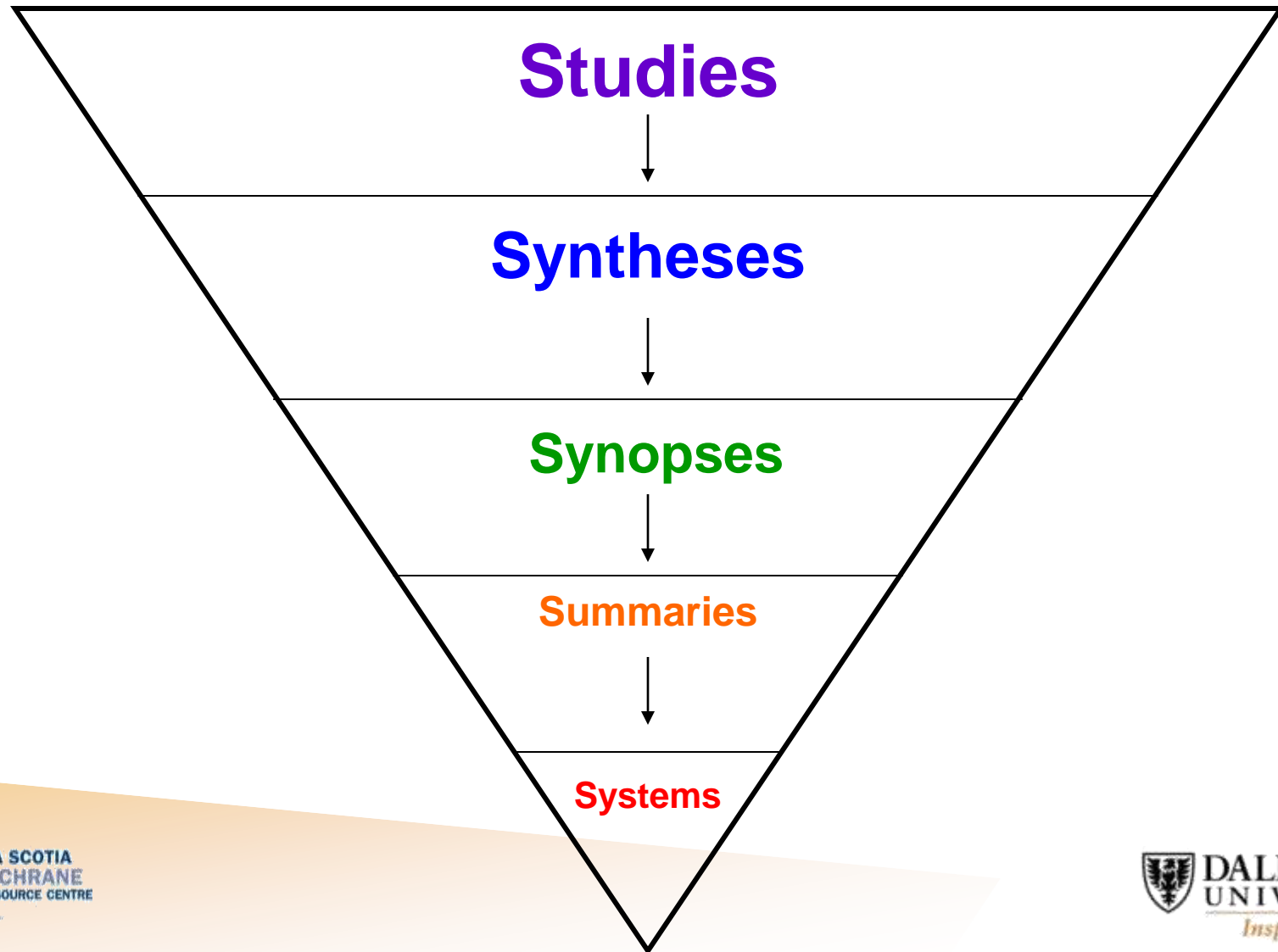
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# Haynes 5S Model: Evidence for Decision-Making



# Importance of the Question

- Clearly framed question will guide the search for evidence
- Guide the researcher:
  - ▶ Identify & select subjects
  - ▶ Deliver or measure exposures
  - ▶ Assess outcomes
  - ▶ Analyze and report results
- Guide the decision-maker:
  - ▶ Assessment of relevance

# Types of Clinical Questions

- Etiology:
  - Incidence rate
  - Risk factors
- Diagnostic and screening tests
- Prognosis:
  - Course
  - Prognostic factors
  - Predictive models
- Effectiveness of interventions

# Compare these Research Questions

- Does watching TV cause obesity?
- In school children, is increased TV viewing associated with an increased incidence of obesity measured using body mass index?

# Compare these Research Questions

- Is gabapentin effective for chronic pain?
- In adult patients with neuropathic pain, do daily doses of 1200 mg or more gabapentin lead to clinically important reduction in pain intensity and/or pain relief compared to placebo?

# Compare these Research Questions

- What is the best way to diagnose lumbar radiculopathy?
- What is the diagnostic accuracy of the Straight Leg Raising test for radiculopathy due to lower lumbar disc herniation as established during surgery or imaging in surgical patients with low-back pain and sciatica?

# Architecture of a Focused Question

- P
- I
- C
- O

# Architecture of a Focused Question

- Population(s)
- Intervention (Exposure)
- Comparison
- Outcome

**PICO**

# Population(s)

- Groups in a defined setting or with specific characteristic
- Disease/condition of interest?
  - ▶ Explicit criteria to establish presence
- Setting of interest?
  - ▶ Living in community, outpatients, hospitalized
- Restrictions should be evidence-based

# Interventions / Exposures & Comparisons

- Specify intervention/exposure(s) of interest
  - ▶ Single or Combination?
  - ▶ Intensity/dose?
  - ▶ Duration?
- Define comparison
  - ▶ What is/are the control group(s)?
  - ▶ Inactive control or Active control?

# Outcomes

- Important clinical outcomes (5 D's)
  - ▶ Death
  - ▶ Disease
  - ▶ Discomfort
  - ▶ Disability
  - ▶ Dissatisfaction
- Specify criteria for establishing presence of outcome (e.g., timing, how measured)
- Will you consider adverse effects data?

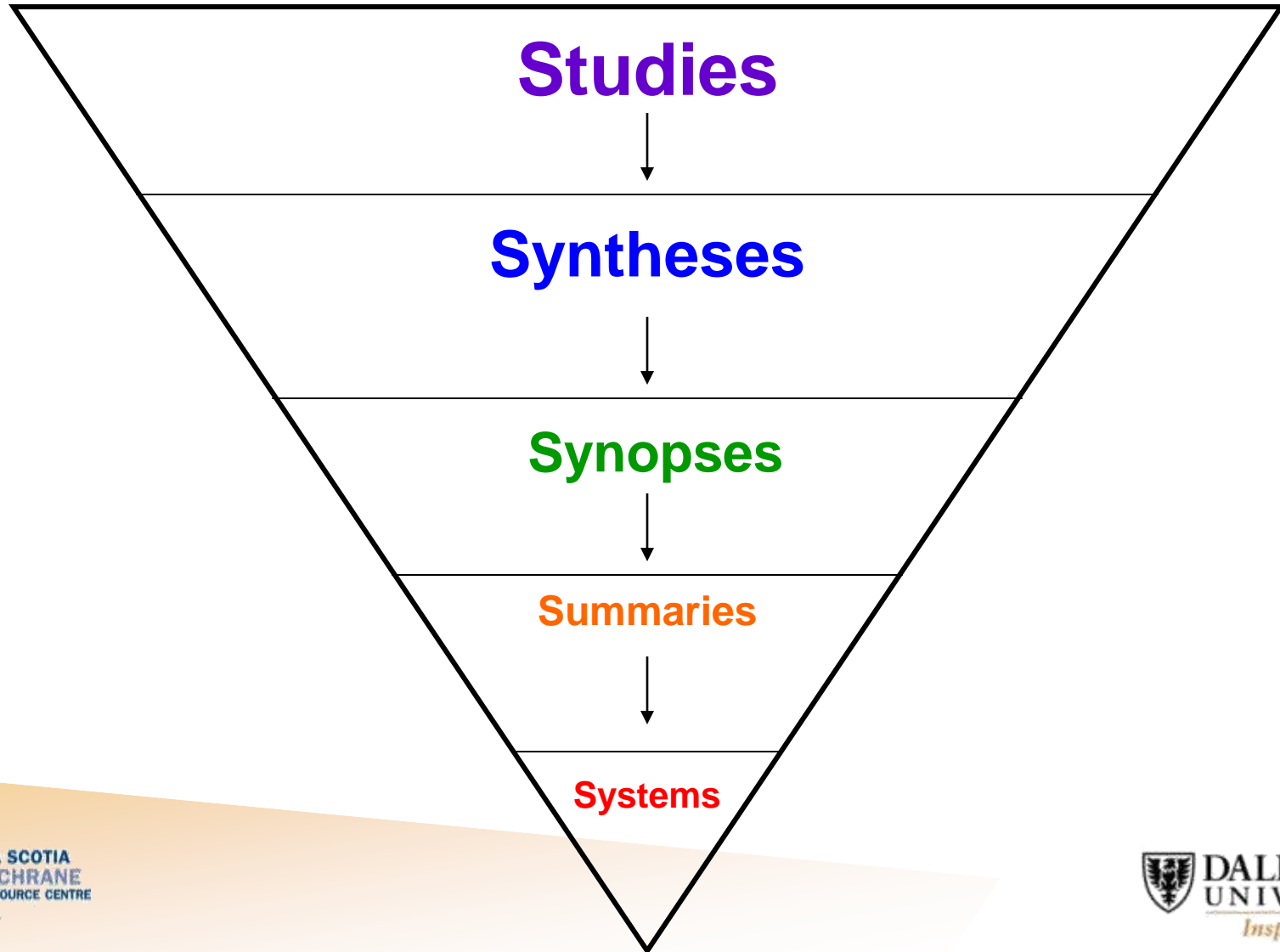
# Consider your last clinical question...

- Did you use evidence to inform your clinical decision?
  - ▶ What source
  - ▶ What type of evidence?
- Could research evidence have informed your decision?



# Haynes 5S Model: Evidence for Decision-Making

Expert opinion



# Hierarchy of Study Designs



# Evidence for Decision-making



# 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

**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.

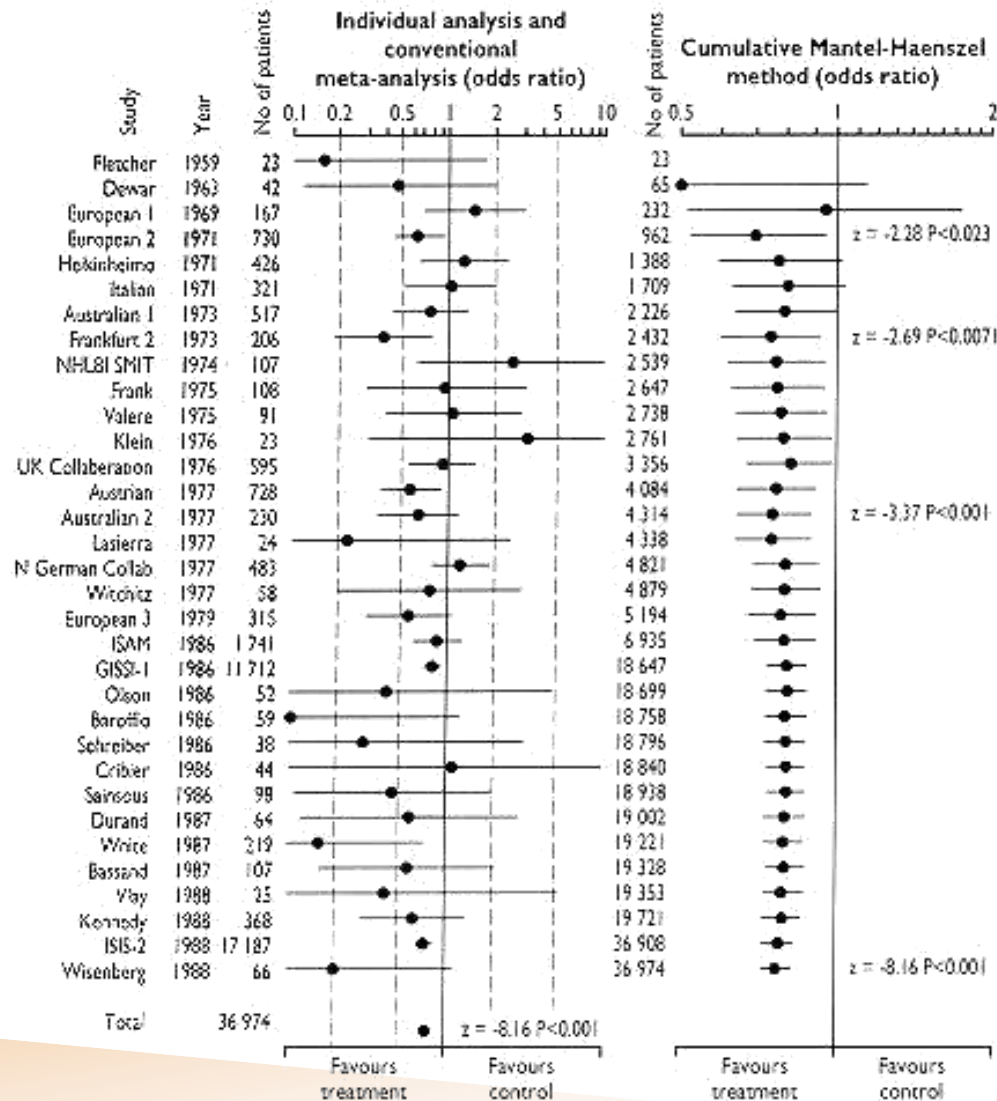
**Results** Of 49 highly cited original clinical research studies, 45 claimed that the intervention was effective. Of these, 7 (16%) were contradicted by subsequent studies, 7 others (16%) had found effects that were stronger than those of subsequent studies, 20 (44%) were replicated, and 11 (24%) remained 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 intervention citations may provoke contradictions

Source: Ioannidis JP. JAMA 2005;294-228

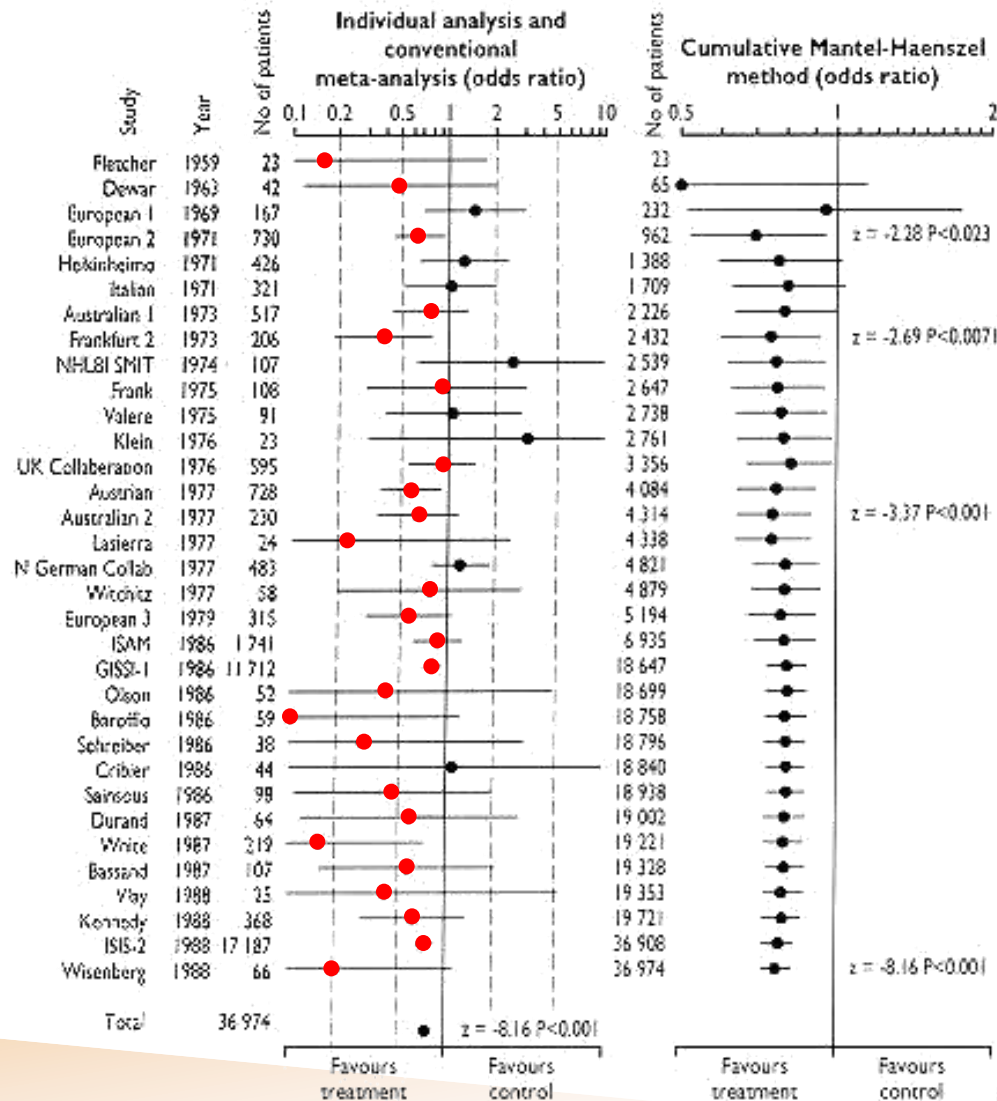
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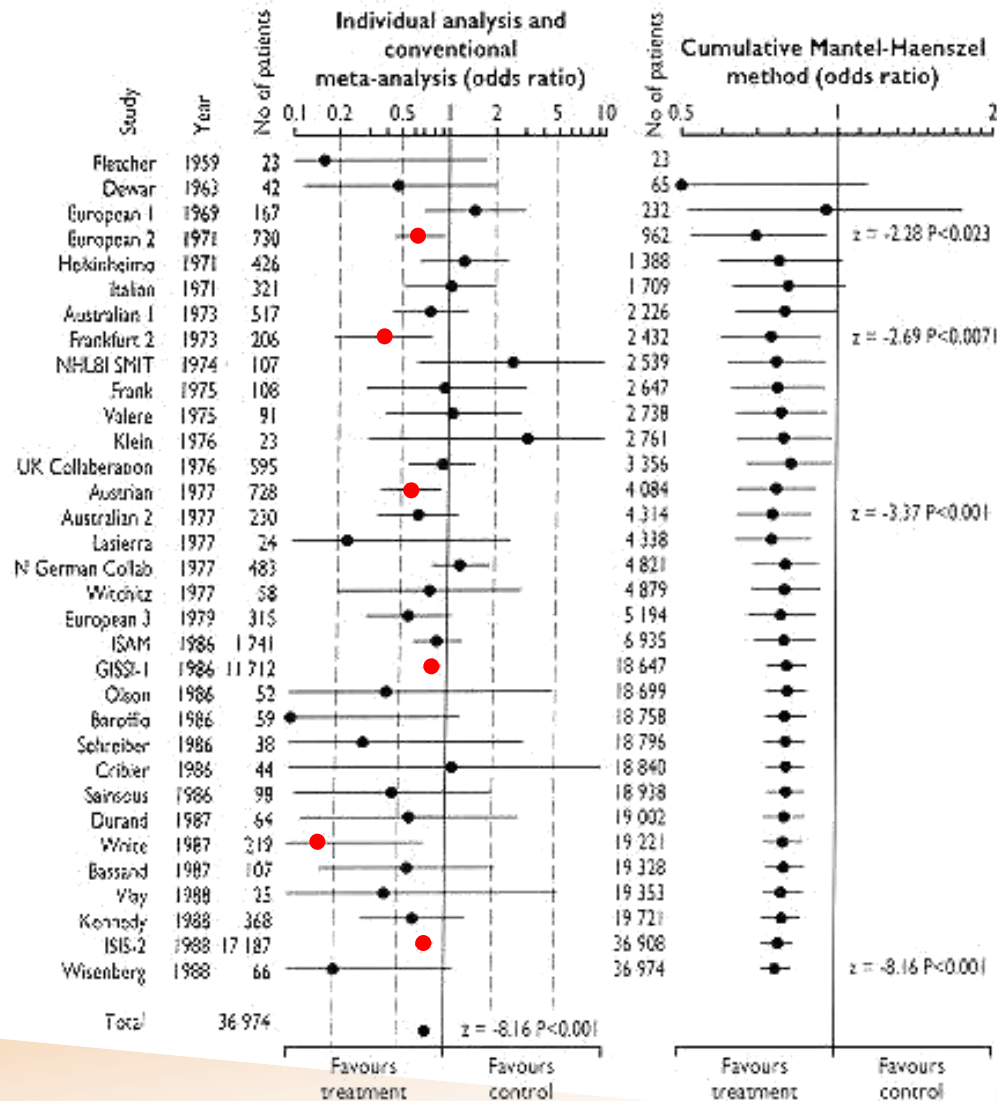
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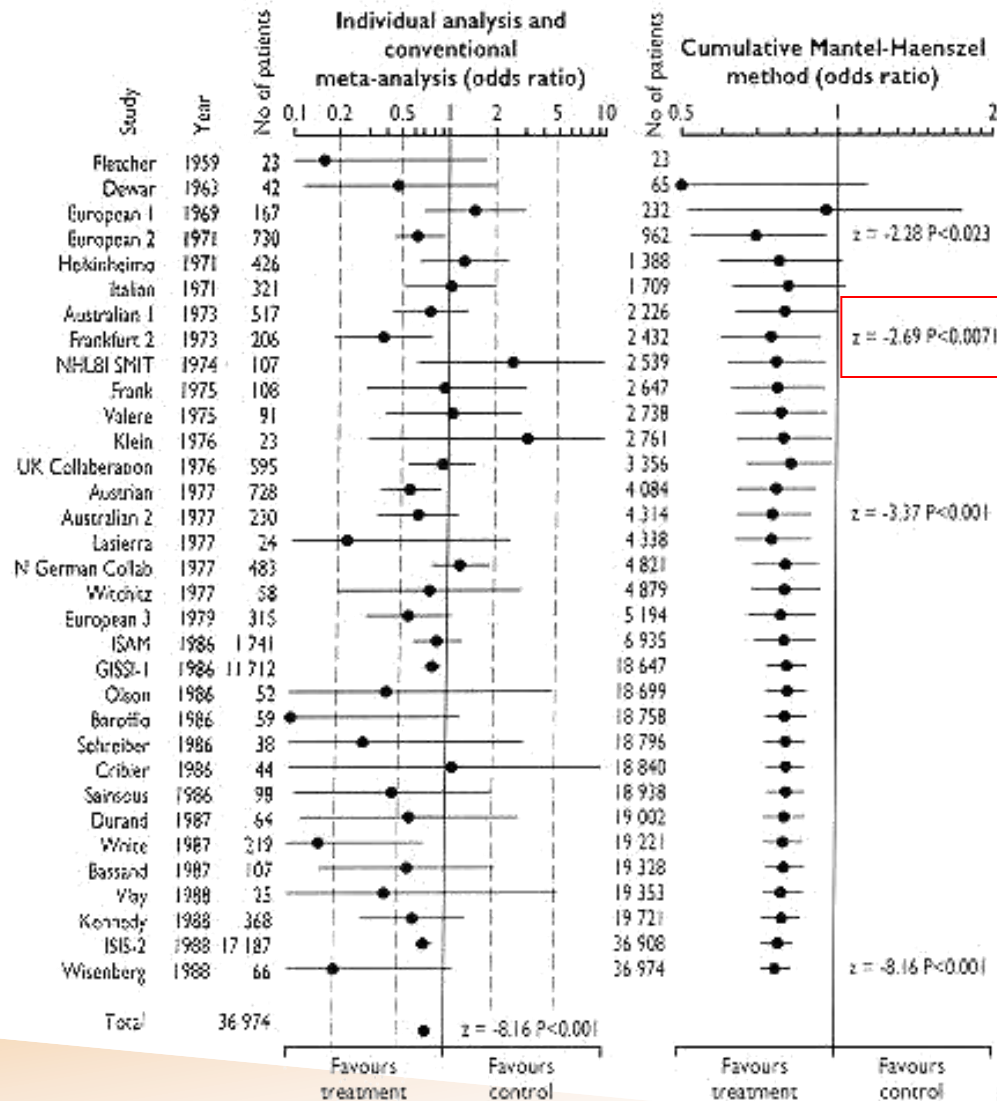
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Classic example:  
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placebo in patients  
hospitalized for  
acute MI



1973

# Types of Literature Reviews

|                               | <b>Narrative</b>                            | <b>Systematic</b>                                   |
|-------------------------------|---------------------------------------------|-----------------------------------------------------|
| <b>Question</b>               | Often broad in scope                        | Often a focused clinical question                   |
| <b>Sources &amp; Searches</b> | Not usually specified<br>Potentially biased | Comprehensive source and strategy explicitly stated |
| <b>Selection</b>              | Not usually specified<br>Potentially biased | Criterion-based uniformly applied                   |
| <b>Appraisal</b>              | Variable                                    | Rigorous critical appraisal                         |
| <b>Synthesis</b>              | Qualitative summary common                  | Qualitative summary +/- Meta Analysis               |
| <b>Inferences</b>             | Sometimes evidence-based                    | Evidence-based                                      |

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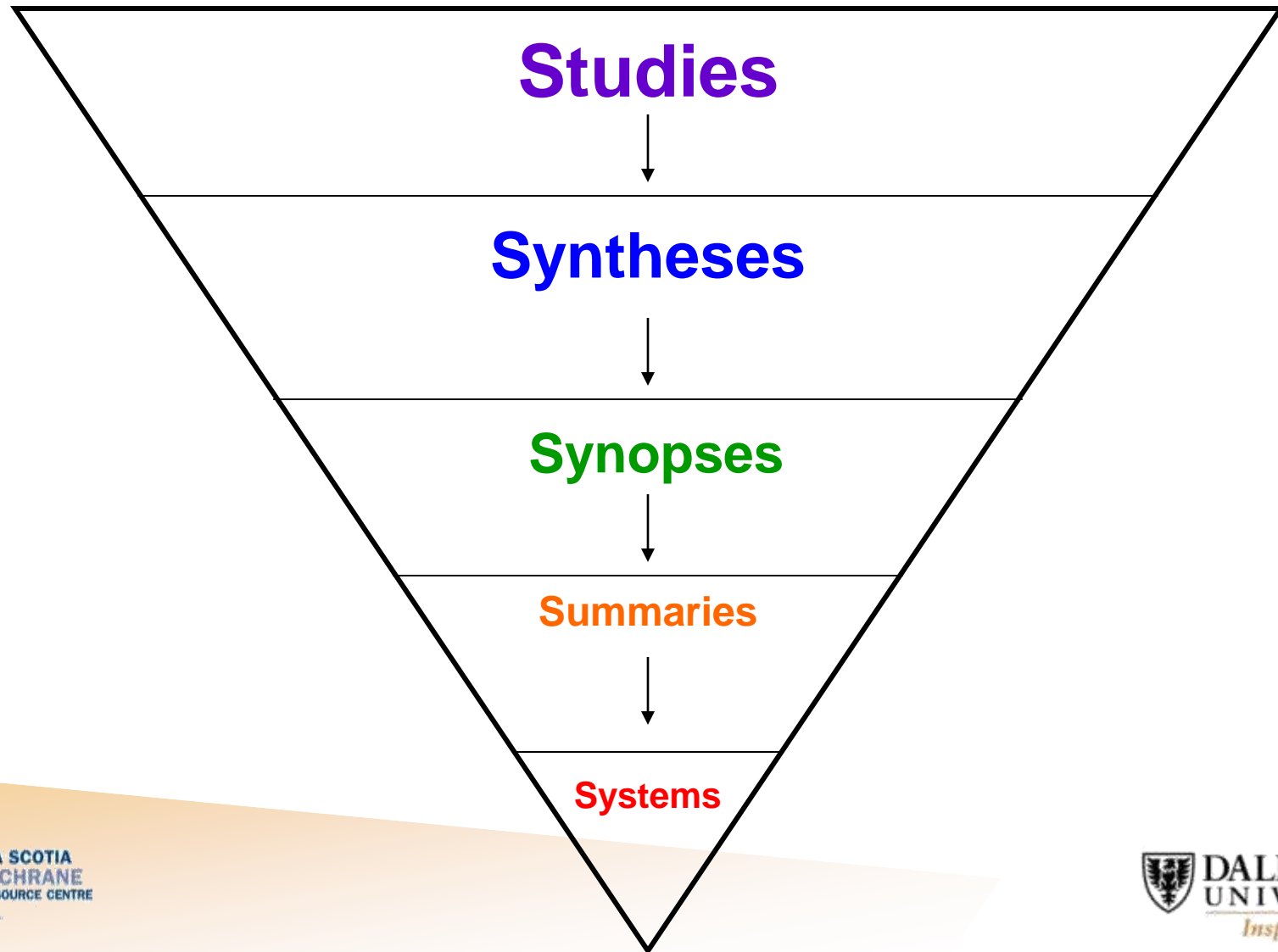
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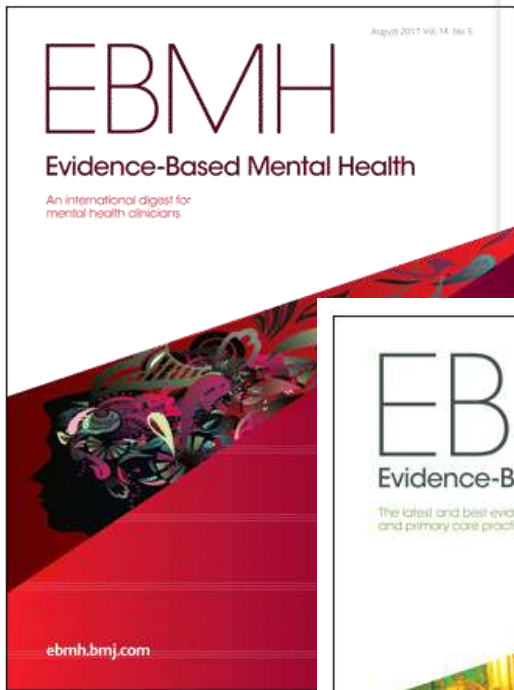
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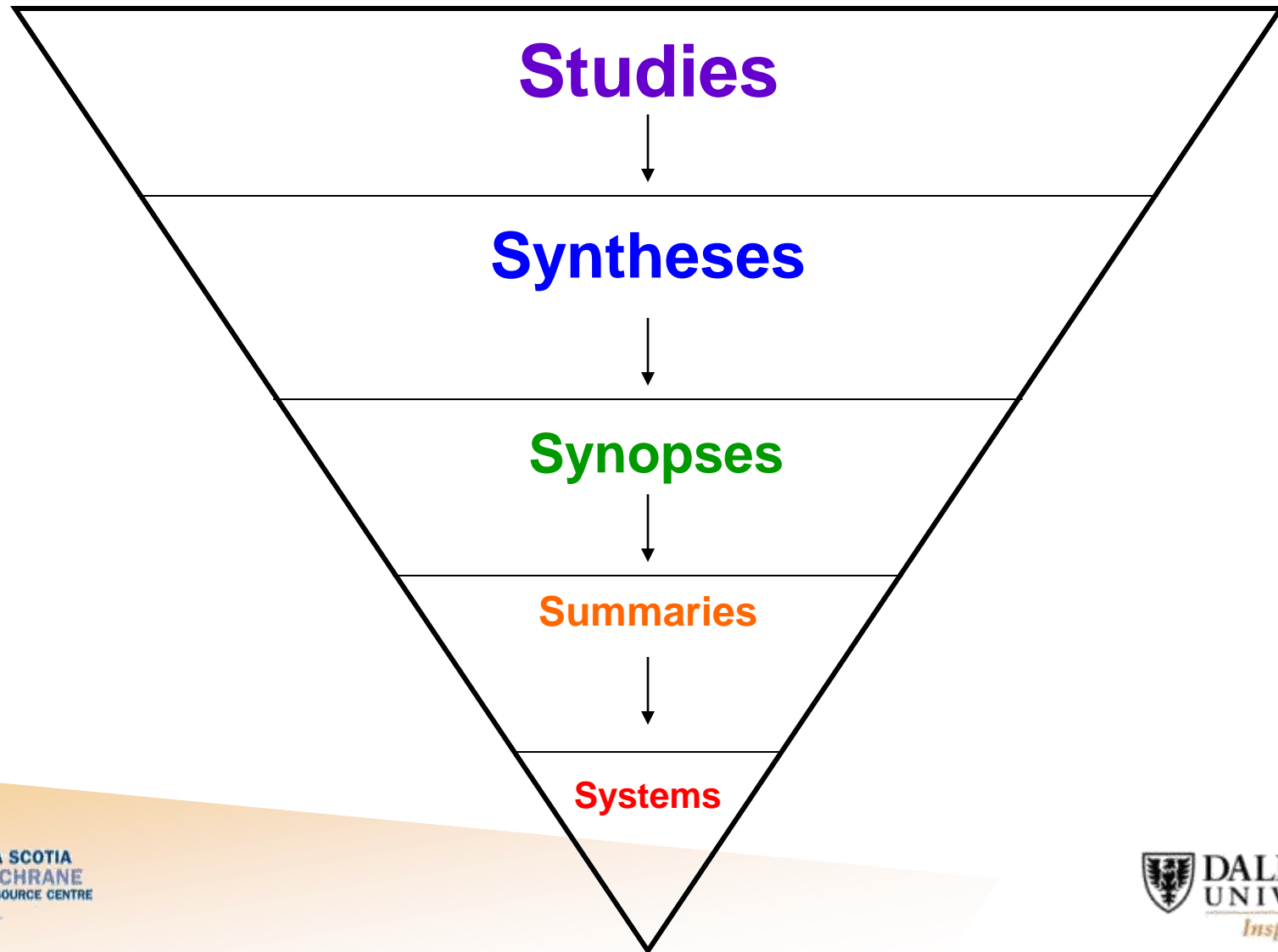
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## Low back pain (chronic)

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Here is a list of clinical questions we have addressed in this review.

- [What are the effects of oral drug treatments for people with chronic low back pain?](#)
- [What are the effects of injection therapy for people with chronic low back pain?](#)
- [What are the effects of non-drug treatments for people with chronic low back pain?](#)
- [What are the effects of non-surgical treatments for chronic low back pain?](#)
- [What are the effects of surgical treatments for chronic low back pain?](#)

### What are the effects of oral drug treatments for people with chronic low back pain?

|                                      |  |                                                                                                                           |
|--------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------|
| Trade off between benefits and harms |  | <ul style="list-style-type: none"> <li>• <a href="#">Muscle relaxants</a></li> <li>• <a href="#">NSAIDs</a></li> </ul>    |
| Unknown effectiveness                |  | <ul style="list-style-type: none"> <li>• <a href="#">Analgesics</a></li> <li>• <a href="#">Antidepressants</a></li> </ul> |

### Drug safety alert

FDA issues [drug safety alert](#) on increased suicidal behaviour with antidepressants (July 2005). FDA issues [drug safety alert](#) on major congenital malformations with paroxetine (September 2005).

### Updates (new)

We provide [up-to-the-minute updates](#) for this review so you always have the latest evidence.

### Related BMJ Journal articles

- [BMJ](#)  
[Randomised controlled trial of integrated care to reduce disability from chronic low back pain in working and private life](#)
- [BMJ](#)  
[Survival \(time to event\) data II](#)

[BMJ](#)

# Summaries: DynaMed



low back pain

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## Spotlight

- DynaMed shown to be THE MOST CURRENT point-of-care reference (BMJ 2011 Sep 23)
- DynaMed 7-Step Evidence-Based Methodology
- Introducing Practice Changing Updates
- View the DynaMed Tutorial
- Acute coronary syndrome updated with ACC/AHA 2011 guideline and ticagrelor (Brilinta) FDA approval
- Antiplatelet and anticoagulant drugs for acute coronary syndrome updated with ACC/AHA 2011 guideline and ticagrelor (Brilinta) FDA approval
- DYNAMED WEEKLY UPDATE: Noninvasive Ventilation Reduces Mortality and Need for Intubation in Elderly Patients

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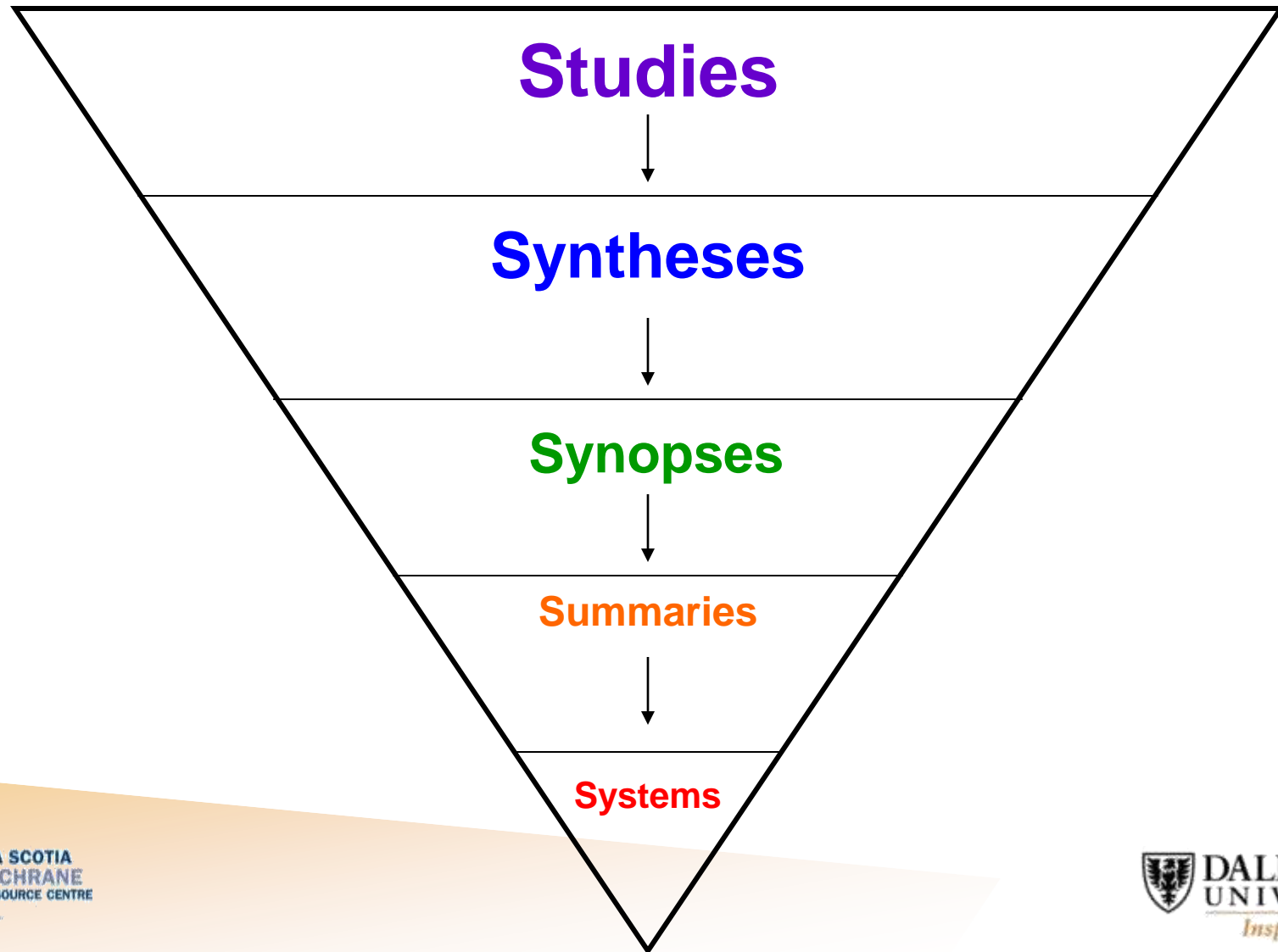


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# Summaries: UpToDate

The image shows a screenshot of the UpToDate website. At the top left is the UpToDate logo with the version number 19.2. To the right of the logo is a search bar with a 'Search' button. Further right are links for 'Contact us', 'About UpToDate', and 'Help'. Below the logo is a horizontal navigation menu with tabs for 'About UpToDate', 'For Clinicians', 'For Patients', 'For Institutions', 'For Educators', and 'Subscribe/Renew'. On the far right of this menu are 'Demo' and 'Log In' links. The main content area is titled 'For Clinicians' and features a sidebar on the left with a list of medical specialties: 'Adult and Pediatric Emergency Medicine', 'Adult Primary Care and Internal Medicine', 'Allergy and Immunology', 'Cardiovascular Medicine', 'Dermatology', 'Endocrinology and Diabetes', 'Family Medicine', 'Gastroenterology and Hepatology', 'Geriatrics', and 'Hematology'. The main content area has a large heading: 'The clinical answers you need - anytime, anywhere'. Below this heading is a paragraph describing UpToDate as a service available through the web and mobile devices, combining recent evidence with expert physician experience. To the right of this paragraph is a callout box titled 'UpToDate Mobile Access' with a link to learn more. Below the main text are three call-to-action buttons: 'Special Trainee Rate', 'Read our Editorial Policy', and 'Read Sample Topics'. At the bottom of the page, there is a URL: <http://dynamed.ebscohost.com>.

# Haynes 5S Model: Evidence for Decision-Making



# Applicability of Knowledge Syntheses and Tools

- Clinical perspective
  - ▶ Are patients represented in primary studies
  - ▶ Consistency of results across patient subgroups & settings
  - ▶ Reasons why results may not apply to my patient
- Evidence informed decision making requires consideration of:
  - ▶ High quality research evidence
  - ▶ Experience
  - ▶ Values and preferences

# Summary: Using Evidence in Practice

- Diverse sources of research evidence are available
- Individual studies rarely provide sufficient evidence
- Syntheses, Synopses & Summary tools
- Decision-makers need to be informed consumers

***Thank you!***

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