Using Evidence Synthesis in Your Practice in Chronic Pain

Jill Hayden, DC PhD
Assistant Professor & CCRF Research Professor
Dept. of Community Health & Epidemiology
Dalhousie University

JHayden@Dal.ca

NOVA SCOTIA COCHRANE RESOURCE CENTRE

Capital Health

DALHOUSIE UNIVERSITY *Inspiring Minds*

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

NOVA SCOTIA COCHRANE RESOURCE CENTRE

DALHOUSIE UNIVERSITY
Inspiring Minds

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.[5]

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.

Department of Obstetrics and Gynaecology, Cambridge University, Cambridge CB2 2QQ
Gordon C S Smith *professor*
Department of Public Health, Greater Glasgow NHS Board, Glasgow G3 8YU
Jill P Pell *consultant*
Correspondence to: G C S Smith gcs21@cam.ac.uk

BMJ 2003;327:1459–61

Smith GC, Pell JP. BMJ. 2003 Dec 20;327(7429):1459-61.

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.

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.[6]

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.

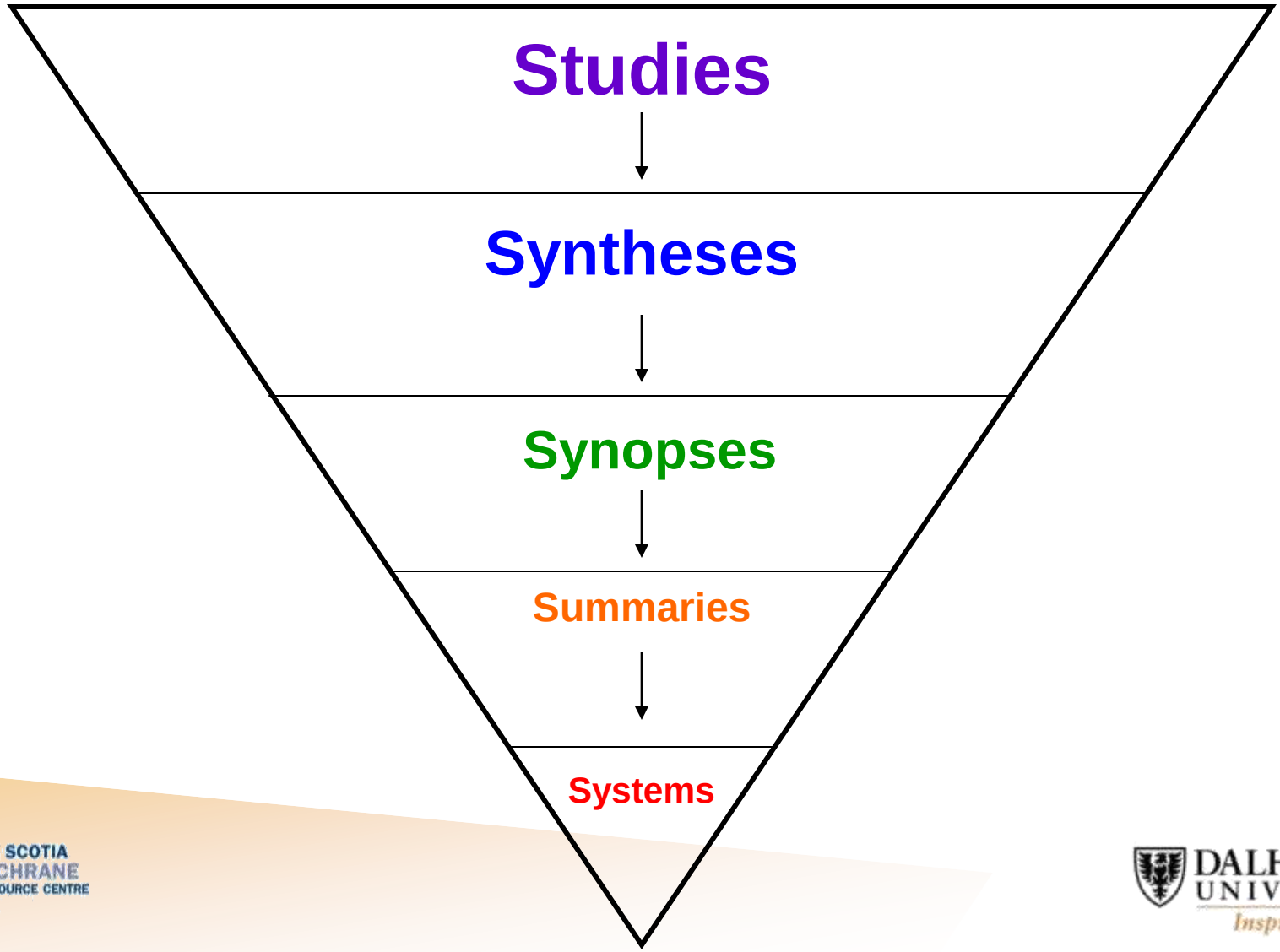
Department of Obstetrics and Gynaecology, Cambridge University, Cambridge CB2 2QQ
Gordon C S Smith *professor*
Department of Public Health, Greater Glasgow NHS Board, Glasgow G3 8YU
Jill P Pell *consultant*
Correspondence to: G C S Smith gcss2@cam.ac.uk

BMJ 2003;327:1459–61

Introduction

Smith GC, Pell JP. BMJ. 2003 Dec 20;327(7429):1459-61.

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

- **P**opulation(s)
- **I**ntervention (Exposure)
- **C**omparison
- **O**utcome

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?

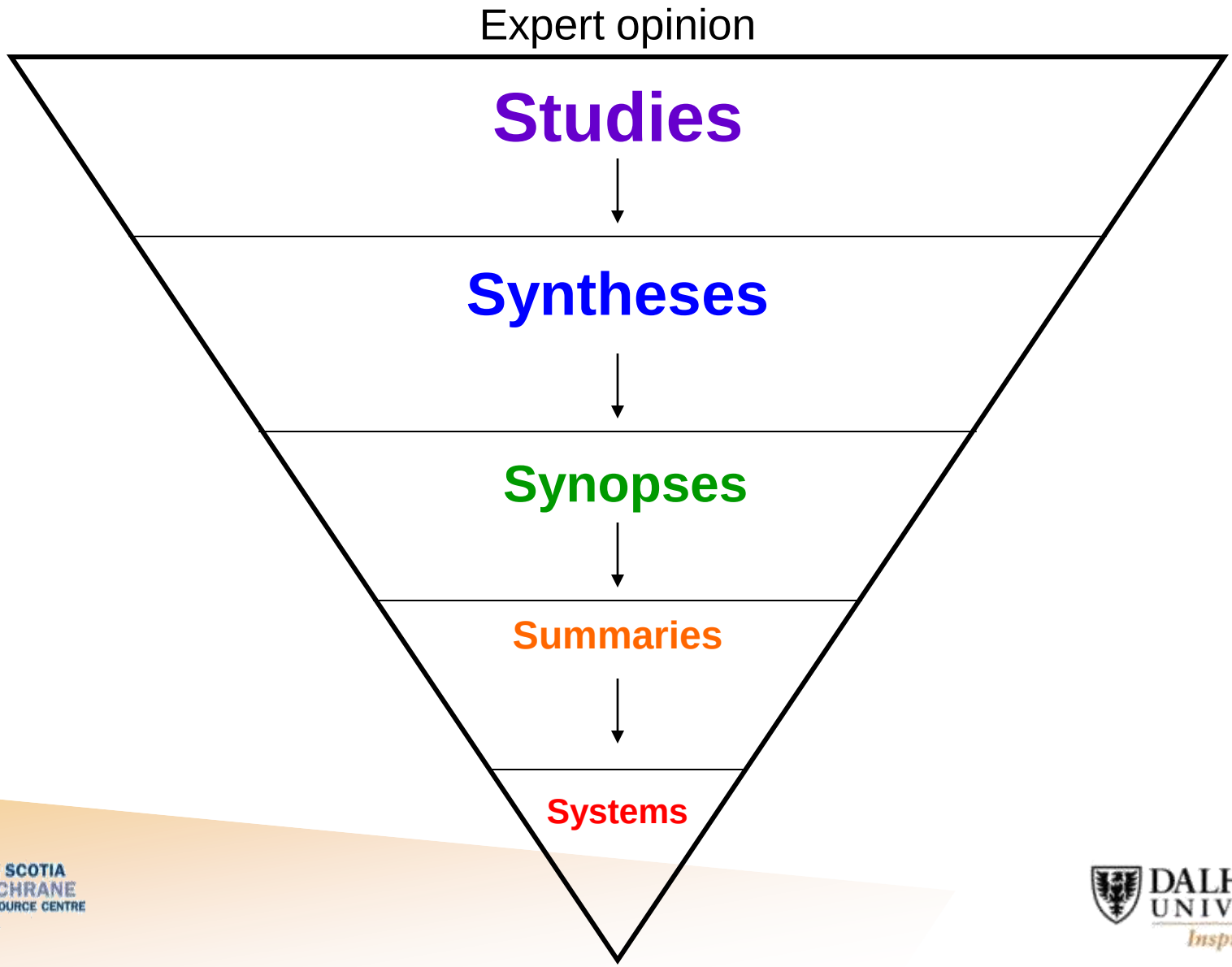
Consider your last clinical question…

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

NOVA SCOTIA COCHRANE RESOURCE CENTRE

DALHOUSIE UNIVERSITY
Inspiring Minds

Haynes 5S Model: Evidence for Decision-Making



NOVA SCOTIA COCHRANE RESOURCE CENTRE

DALHOUSIE UNIVERSITY Inspiring Minds

Hierarchy of Study Designs

Evidence for Decision-making

NOVA SCOTIA COCHRANE RESOURCE CENTRE

DALHOUSIE UNIVERSITY
Inspiring Minds

Contradicted and Initially Stronger Effects in Highly Cited Clinical Research

John P. A. Ioannidis, MD

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[illegible] citations may provoke contradictions [illegible]

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]

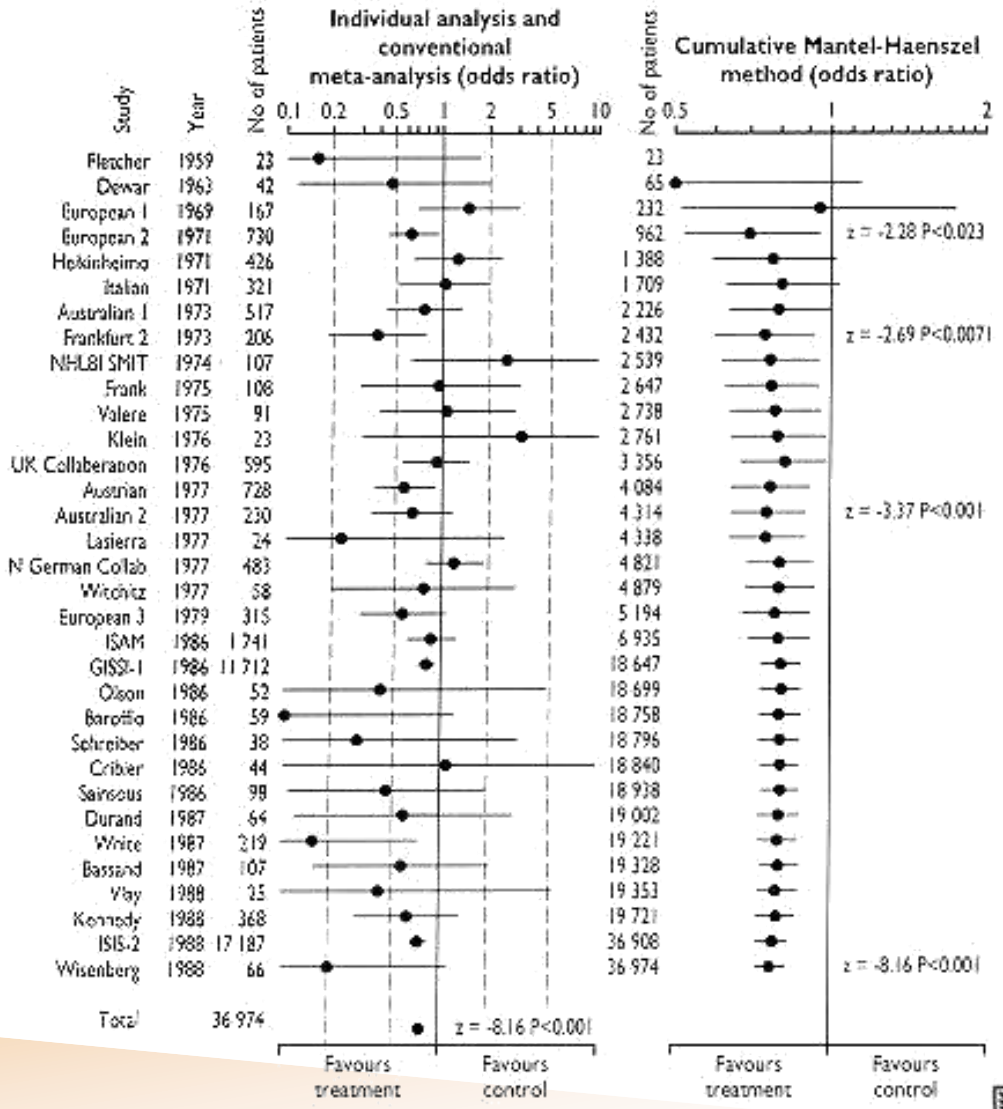
Similarly, there is some evidence on disagreements between epidemiological studies and randomized trials.[3-5] Prior investigations have focused on a variety of studies without any particular attention to their relative importance and scientific impact. Yet, most

Source: Ioannidis JP. JAMA 2005;294-228

Literature Reviews

Classic example:

IV Streptokinase vs. placebo in patients hospitalized for acute MI

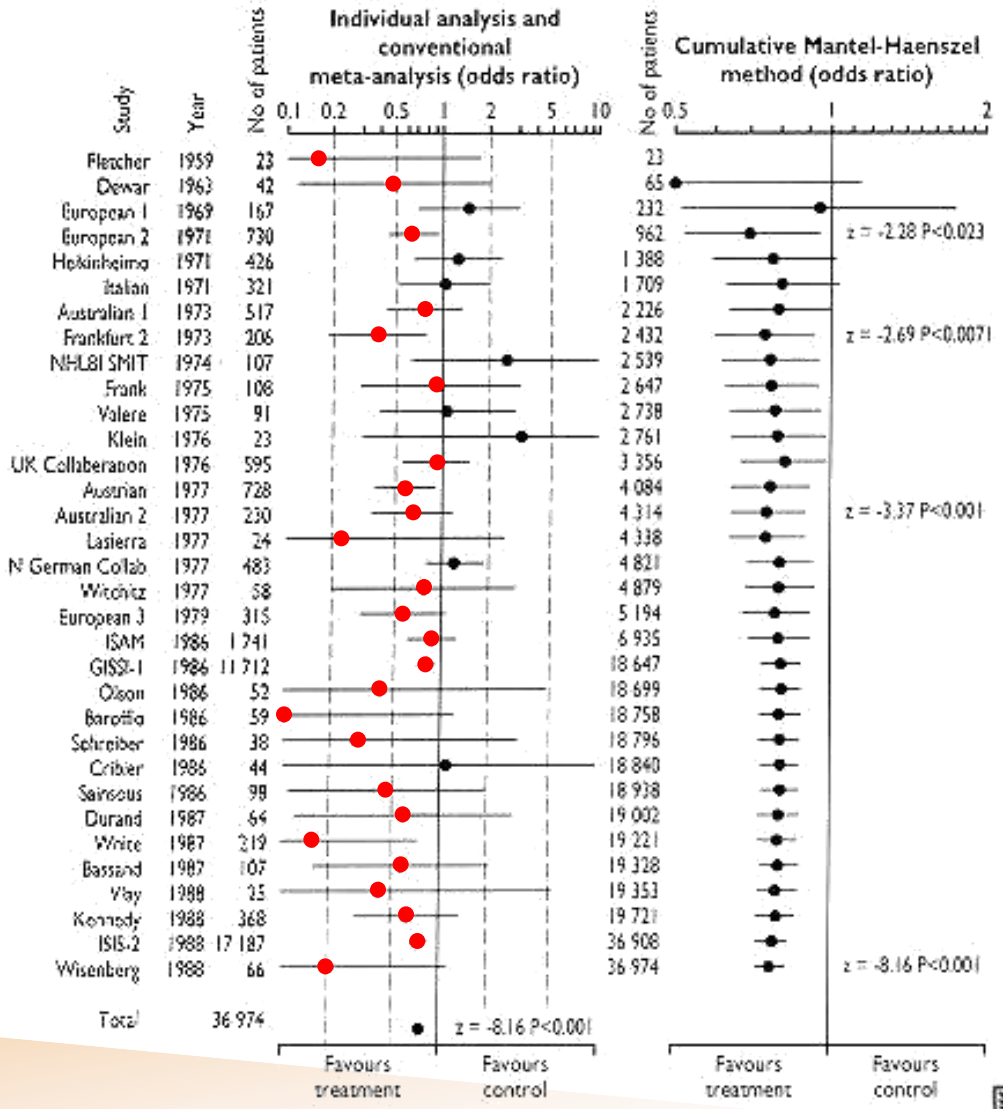


Source: Mulrow, C D. BMJ 1994;309:597-599

Literature Reviews

Classic example:

IV Streptokinase vs. placebo in patients hospitalized for acute MI

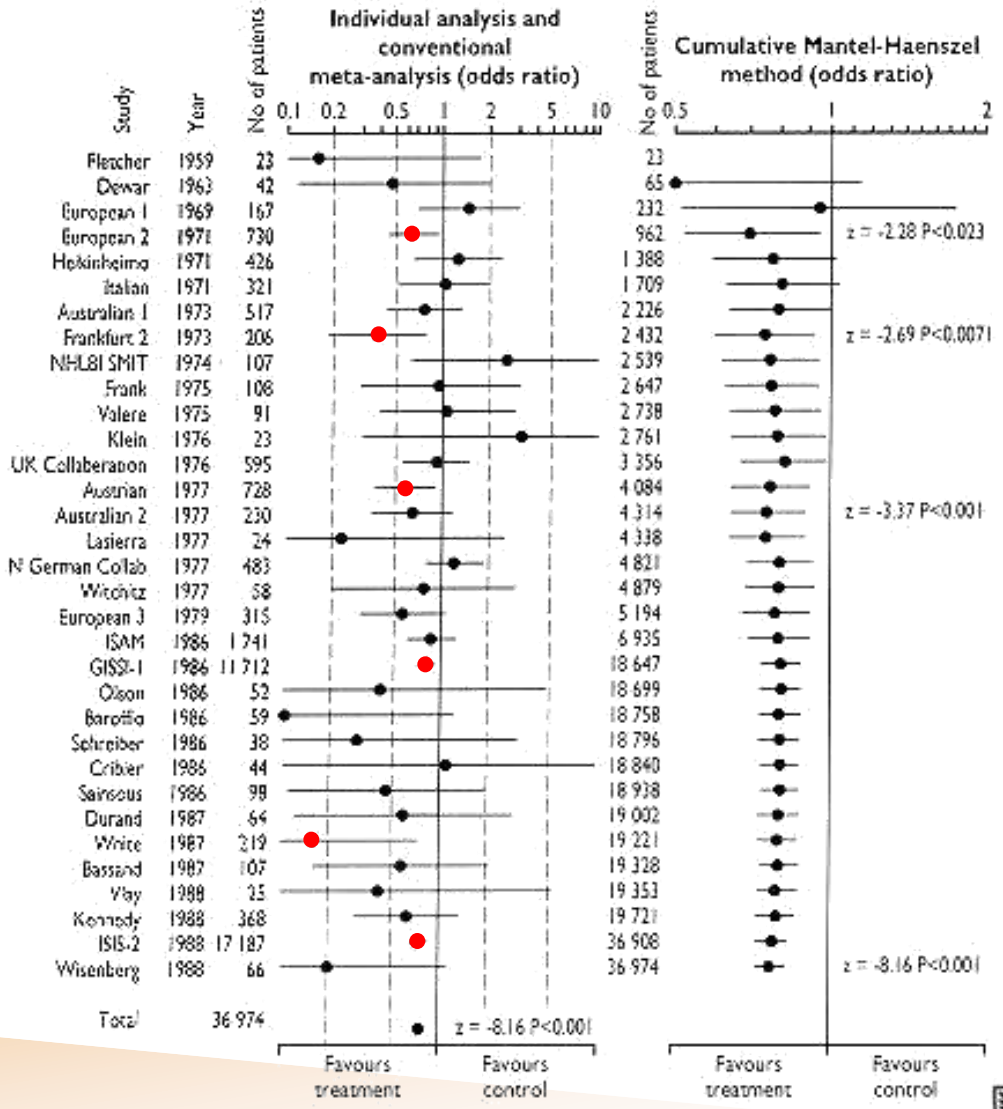


Source: Mulrow, C D. BMJ 1994;309:597-599

Literature Reviews

Classic example:

IV Streptokinase vs. placebo in patients hospitalized for acute MI

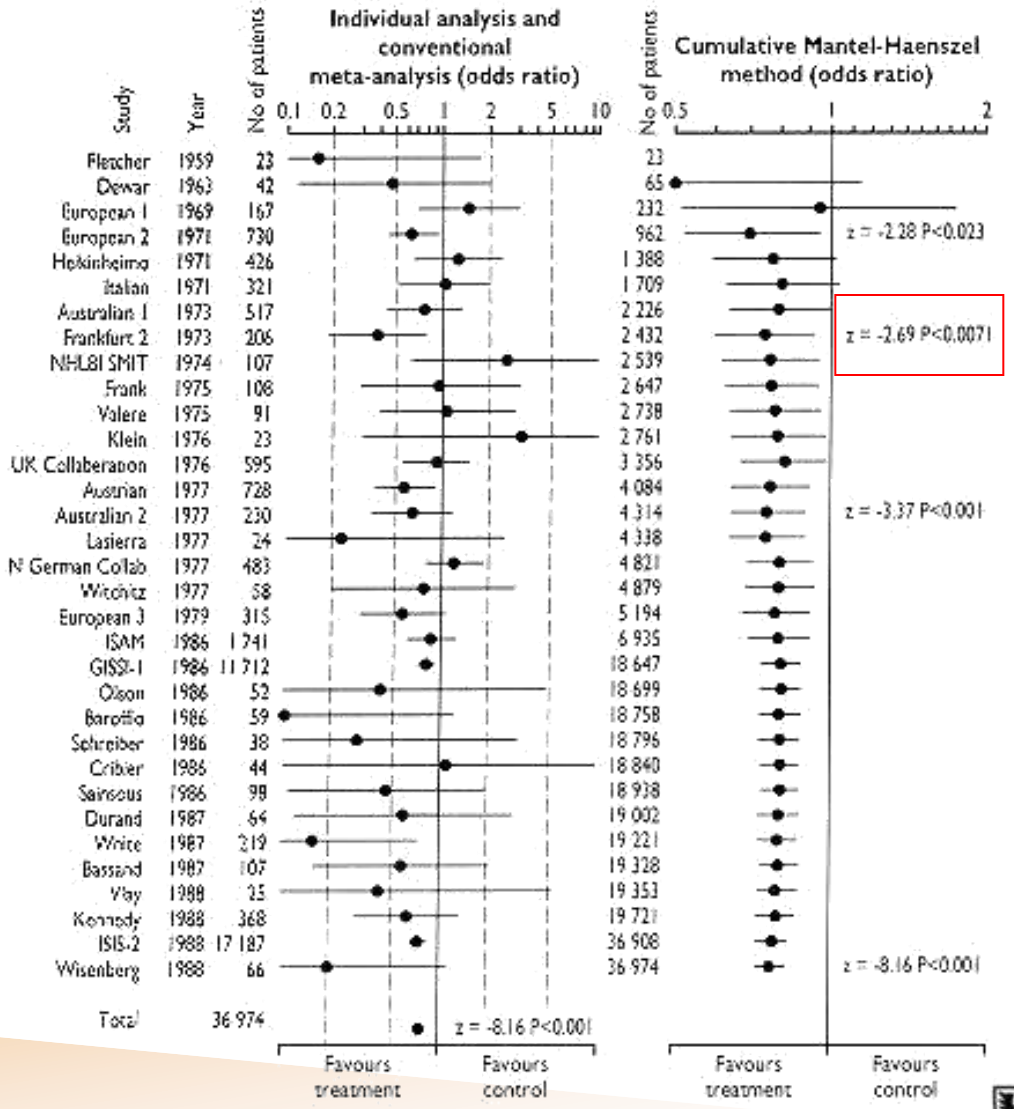


Source: Mulrow, C D. BMJ 1994;309:597-599

Literature Reviews

Classic example:

IV Streptokinase vs. placebo in patients hospitalized for acute MI



1973

Source: Mulrow, C D. BMJ 1994;309:597-599

Types of Literature Reviews

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

The Cochrane Collaboration

- International Organization
- Not for profit
- Registered as a charity in the U.K.
- Aims:
  - Produce, maintain & disseminate systematic reviews of healthcare interventions
  - Facilitate well-informed decisions about health care

THE COCHRANE LIBRARY

Independent high-quality evidence for health care decision making

SEARCH THE COCHRANE LIBRARY

Title, Abstract or Keywords

chronic back pain

GO

or try an Advanced Search

HOME | SIGN UP | LEARN

BROWSE COCHRANE DATABASE OF SYSTEMATIC REVIEWS

Issue 9 of 12, Sept 2011

- Anaesthesia & pain control (168)
- Blood disorders (108)
- Cancer (358)
- Child health (1282)
- Complementary & alternative medicine

SPECIAL COLLECTIONS

Care homes for older people

International Clinical Trials Day 2011

EDITORIAL

Two new edi
Cochrane Lib

www.thecochranelibrary.com

The Cochrane Library

The Cochrane Library

- Over 3,000 Cochrane reviews of effects of health care interventions and policies
  - 30% of all reviews
  - Cochrane reviews higher quality than non Cochrane reviews
- Other evidence based resources
  - Other reviews (DARE)
  - Health Technology Assessments
  - Economic evaluations
  - Randomised trials

THE COCHRANE LIBRARY

Independent high-quality evidence for health care decision making

from The Cochrane Collaboration

SEARCH

Title, Abstract or Keywords

Advanced Search > MeSH Search >

Search History > Saved Searches >

COCHRANE REVIEWS

By Topic New Reviews Updated Reviews A-Z By Review Group

OTHER RESOURCES

Other Reviews Clinical Trials Methods Studies Technology Assessments Economic Evaluations

Search Results

Show Results in:

Cochrane Reviews [48] | Other Reviews [81] | Clinical Trials [1291] | Methods Studies [25] | Technology Assessments [22] | Economic Evaluations [26] | Cochrane Groups [0]

There are **48** results out of **6791** records for: "**chronic back pain** in **Title, Abstract or Keywords** in **Cochrane Database of Systematic Reviews**"

Save Search

Edit Search

View: **1-25** | 26-48

Export All Results

Record Information — Issue: Current | **All** — Restrict to: Reviews | Protocols — Sort by: Record Title | **Match %** | Date

- [ ] **Antidepressants for non-specific low back pain**
  Donna M Urquhart, Jan L Hoving, Willem JJ Assendelft, Martin Roland, Maurits W van Tulder
  October 2010
  Review

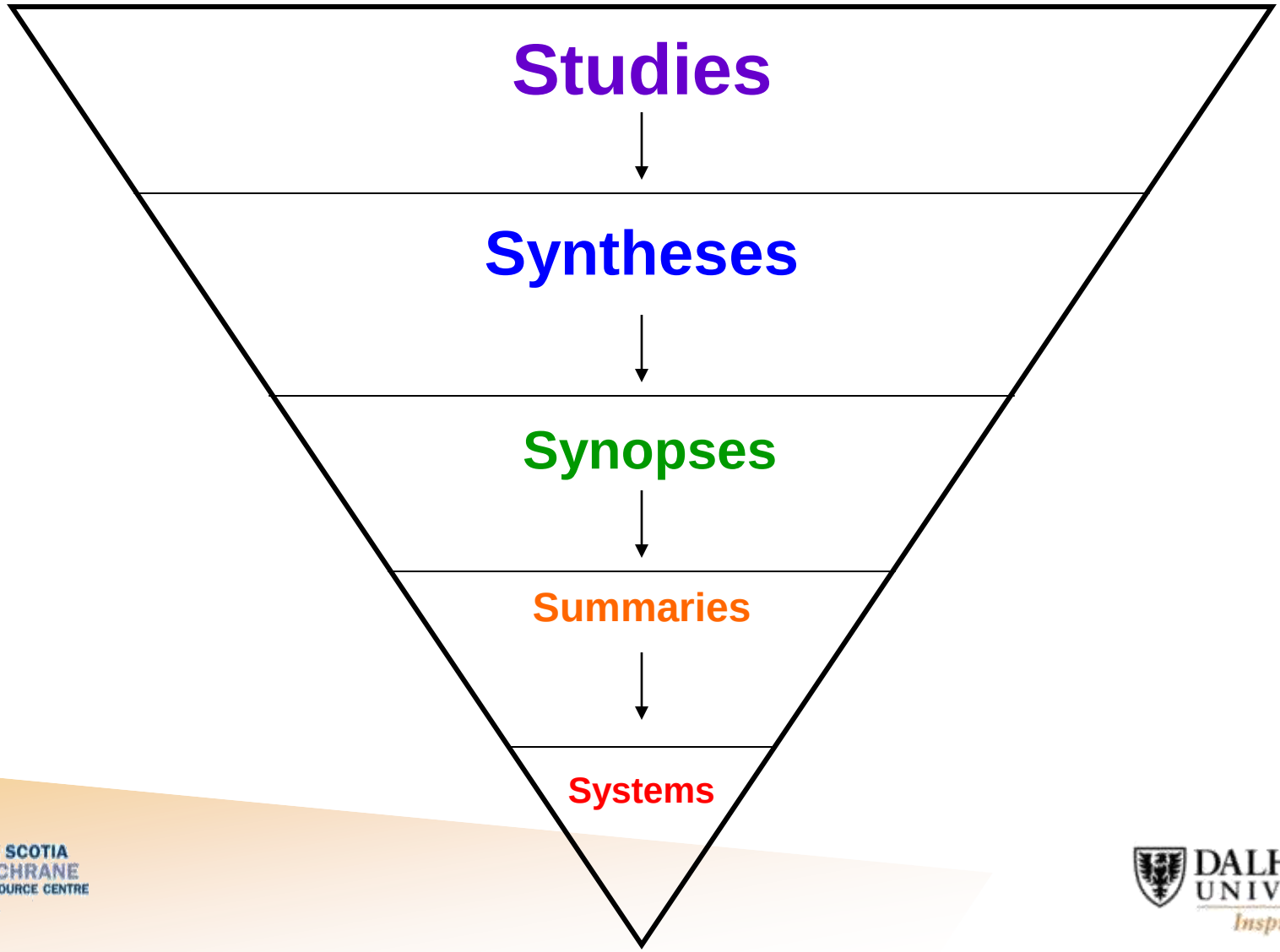
- [ ] **Lumbar supports for prevention and treatment of low back pain**
  Ingrid van Duijvenbode, Petra Jellema, Mireille van Poppel, Maurits W van Tulder
  February 2011
  Review

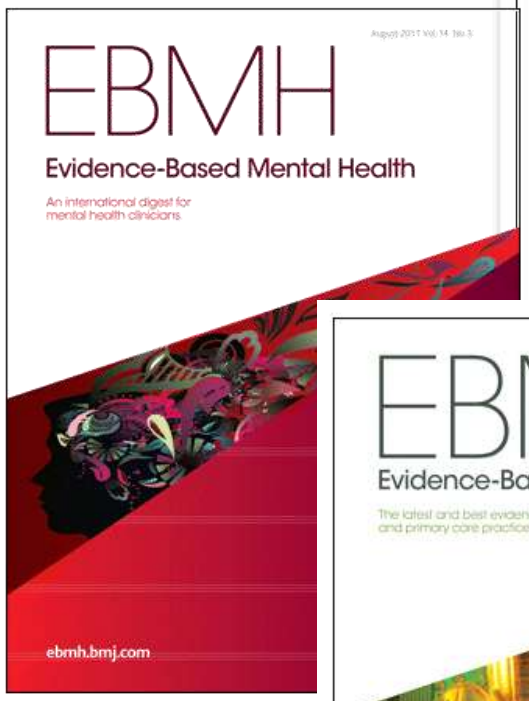
- [ ] **Prolotherapy injections for chronic low-back pain**
  Simon Dagenais, Michael J Yelland, Chris Del Mar, Mark L Schoene
  February 2010
  Review

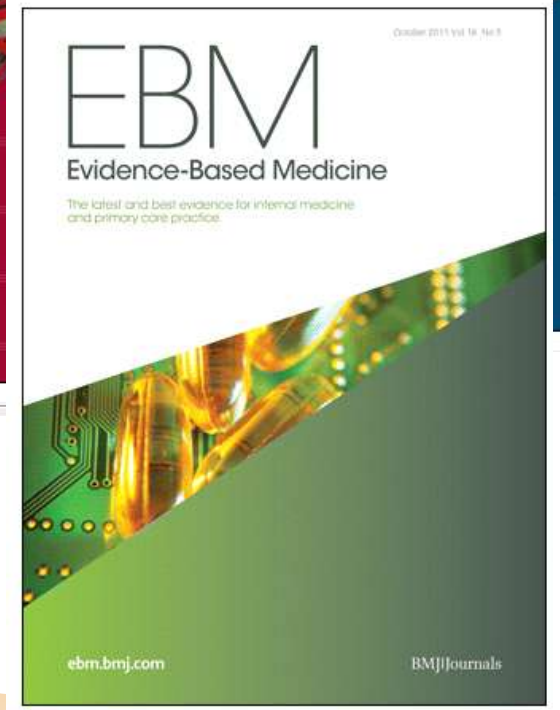
- [ ] **Manipulation or Mobilisation for Neck Pain**
  Anita Gross, Jordan Miller, Jonathan D'Sylva, Stephen J Burnie, Charles H Goldsmith, Nadine Graham, Ted Haines, Gert Brønfort, Jan L Hoving
  May 2010
  Review

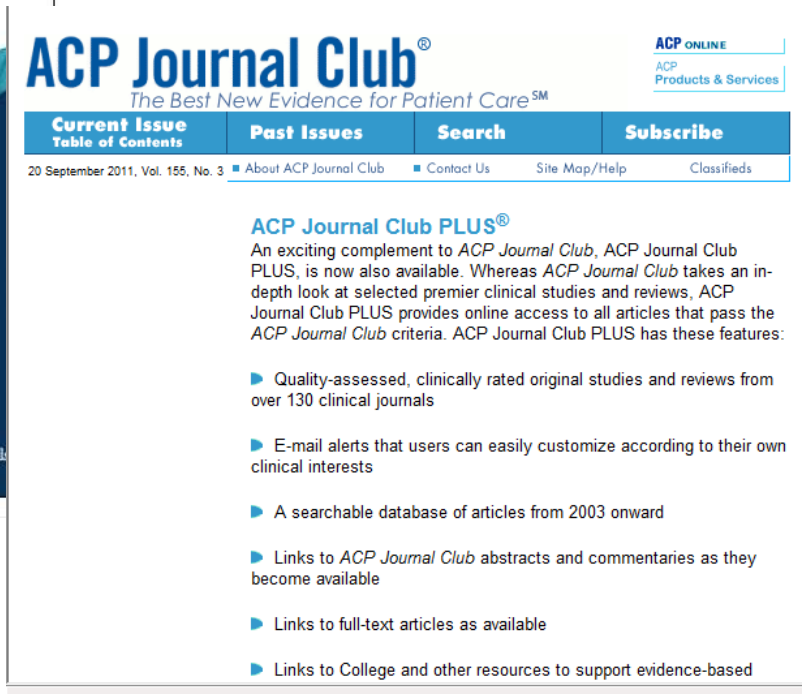
- [ ] **Spinal manipulative therapy for chronic low-back pain**

Haynes 5S Model: Evidence for Decision-Making





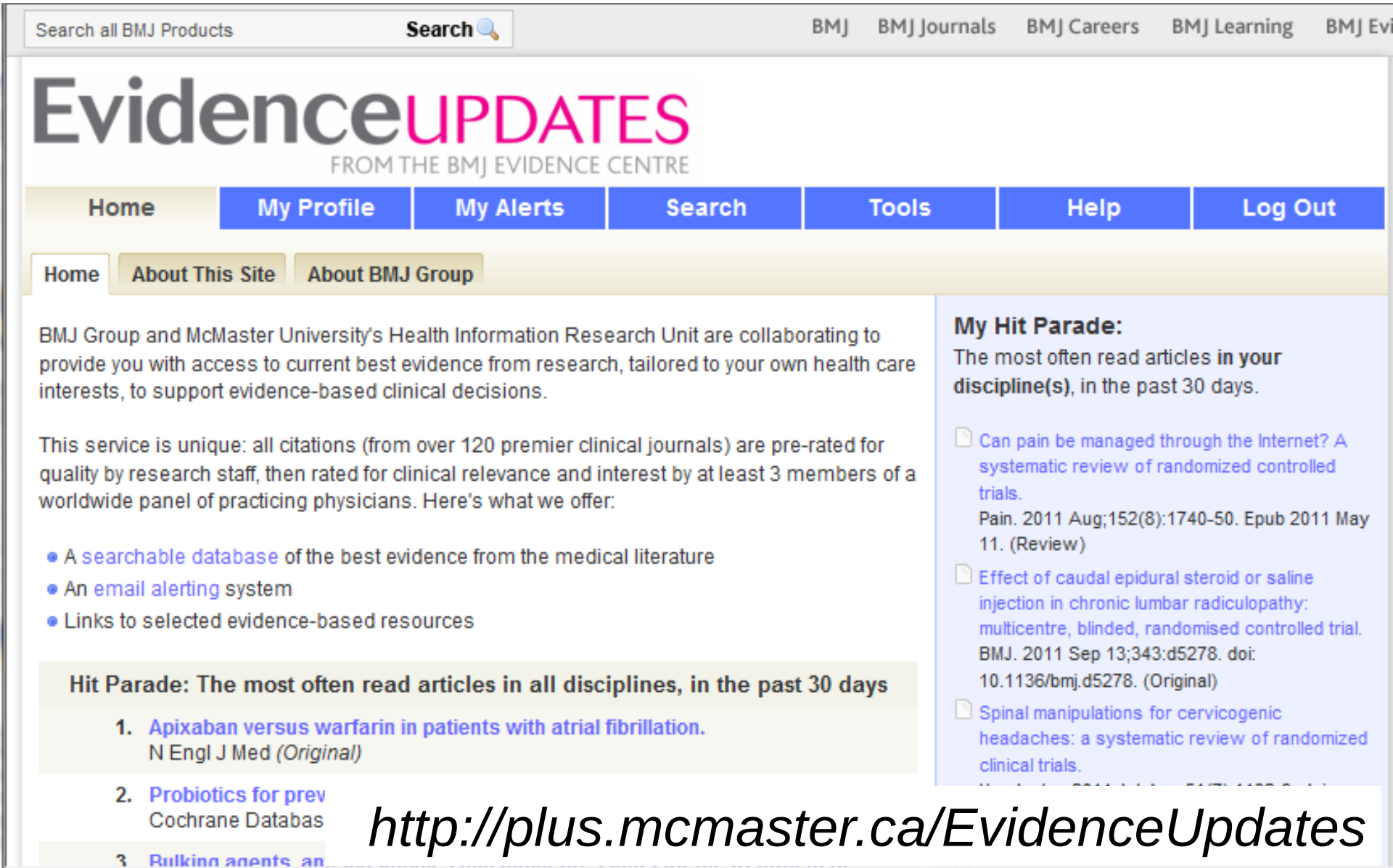




NOVA SCOTIA COCHRANE RESOURCE CENTRE

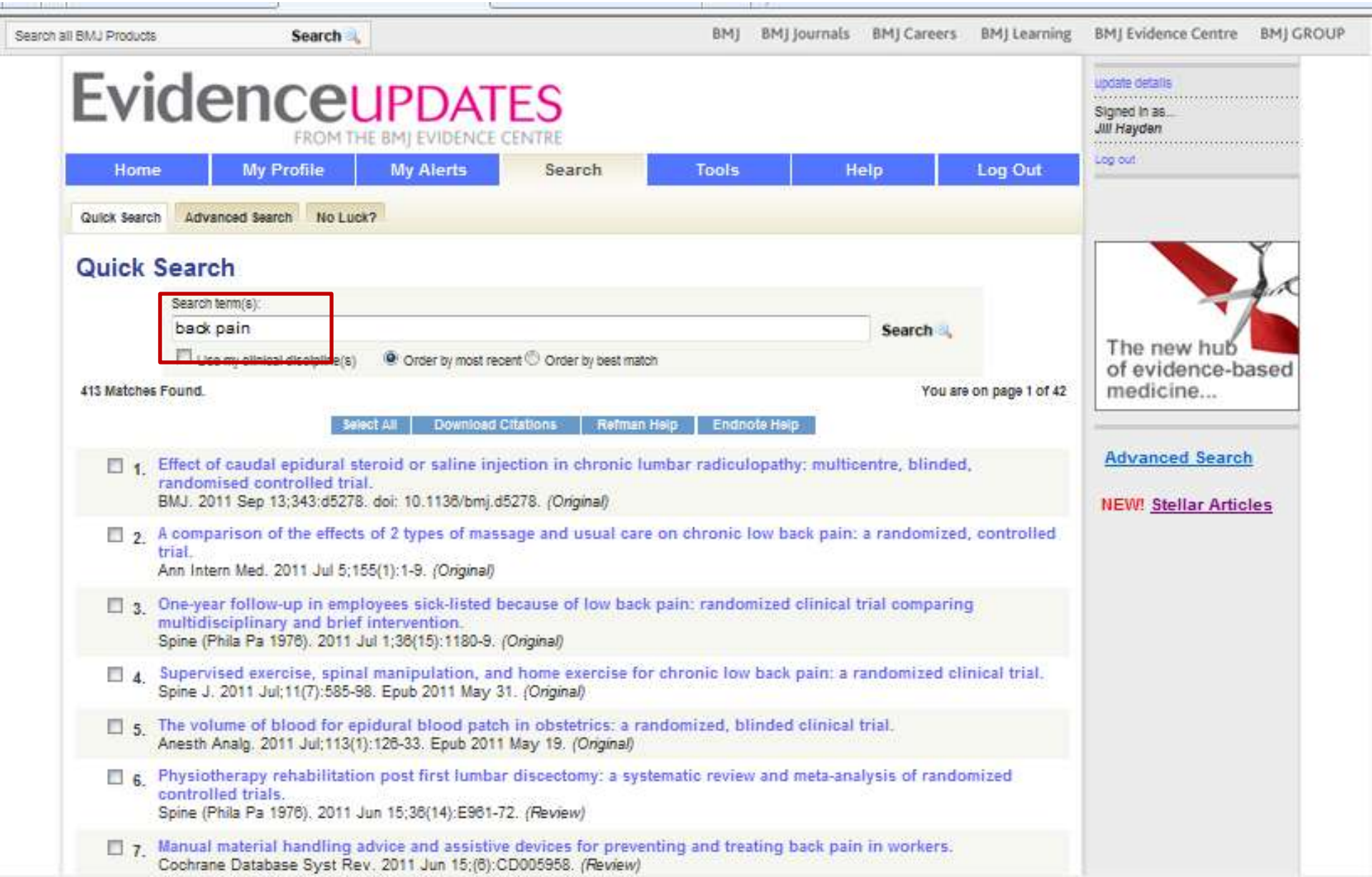
DALHOUSIE UNIVERSITY
Inspiring Minds

Synopses: Evidence Updates

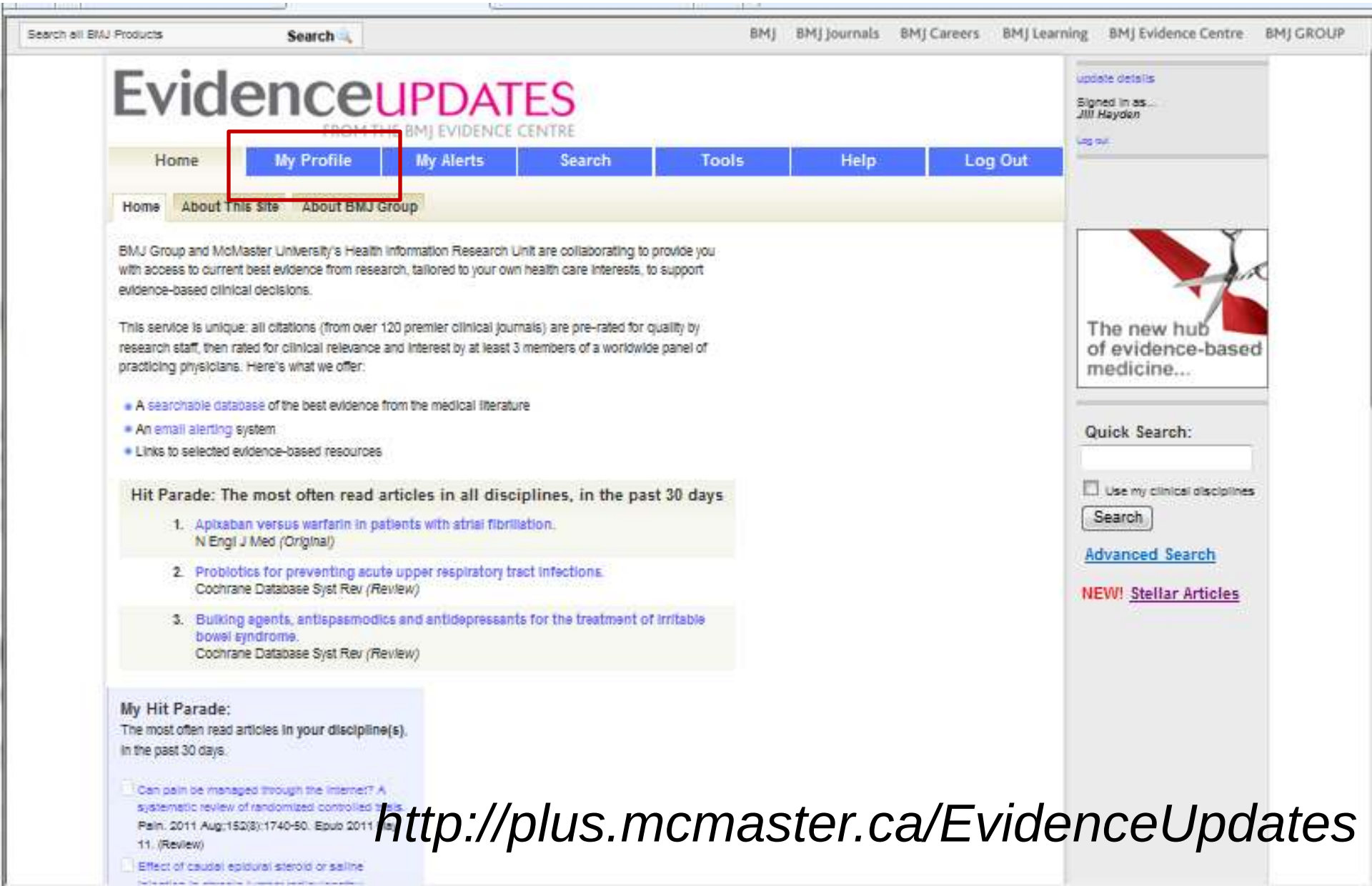


http://plus.mcmaster.ca/EvidenceUpdates

"Health Knowledge Refinery"



Alerts: Summaries of new evidence



http://plus.mcmaster.ca/EvidenceUpdates

REHAB+

McMaster PLUS

Home | Register | Disclaimer | Search | EB Links | Help

In this section:

- Home Page
- About This Site

McMaster University
School of Rehabilitation Science

McMaster Health Knowledge Refinery

Already have an account? Sign in:

Username:

Password: (forgot?)

Sign In | Register

Resources

- Evidence-Based Tools
- EvidenceUpdates
- Evidence Based

You are on: Home ➔ Home Page

Welcome

McMaster University's Health Information Research Unit is providing you with access to current best evidence from research, tailored to your own health care interests, to support evidence-based clinical decisions.

This service is unique: all citations (from over 120 premier clinical journals) are pre-rated for quality by research staff, then rated for clinical relevance and interest by at least 3 members of a worldwide panel of practicing occupational and physical therapists. Here's what we offer:

- A searchable database of the best evidence from the health care literature
- An email alerting system
- Links to selected evidence-based resources

Hit Parade: The most often read articles in all disciplines, in the past 30 days

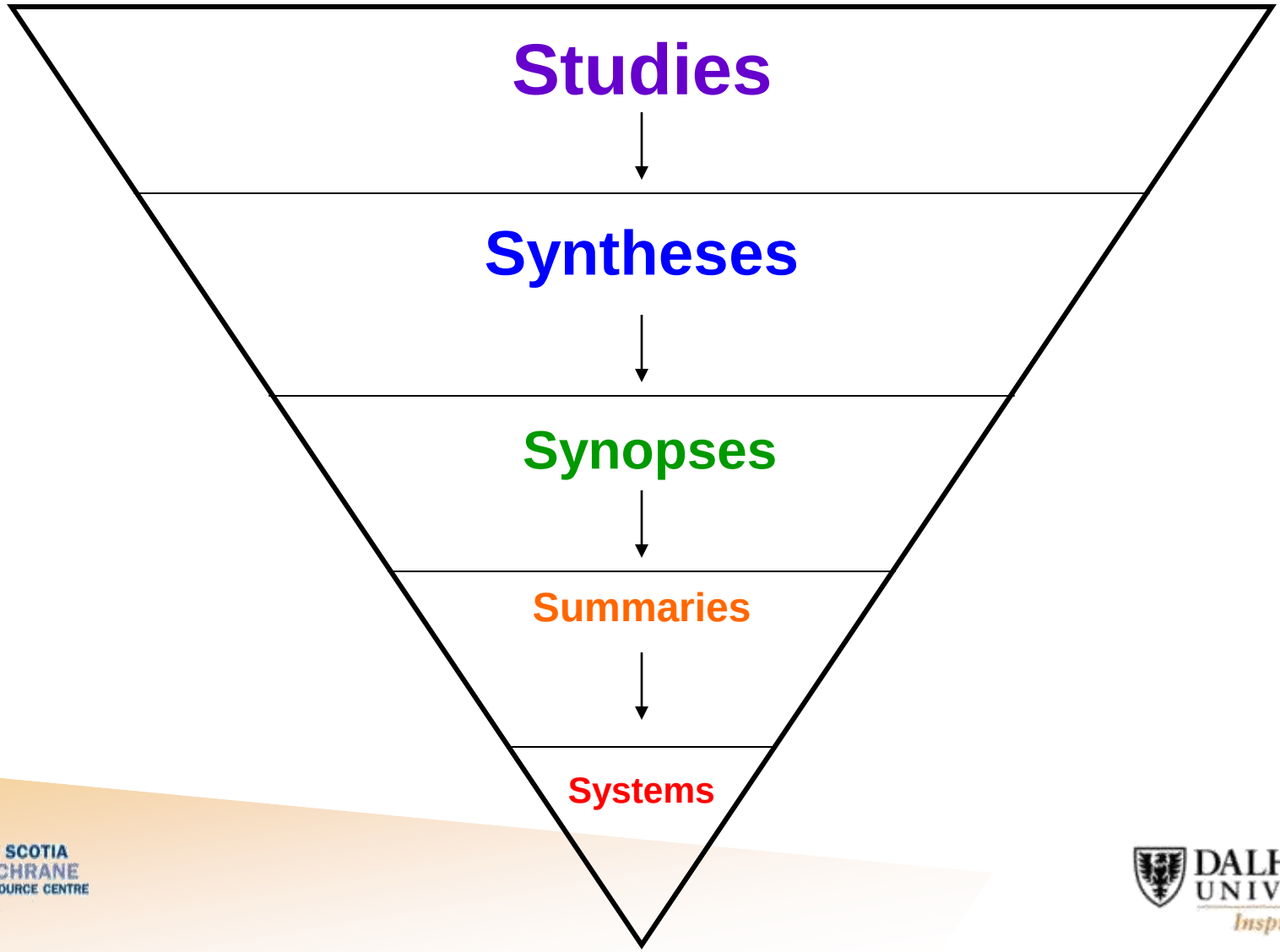
1. Supervised exercise, spinal manipulation, and home exercise for chronic low back pain: a randomized clinical trial.
   Spine J. 2011 Jul;11(7):585-98. Epub 2011 May 31. *(Original)*
2. Aerobic exercise to improve cognitive function in adults with neurological disorders: a systematic review.
   Arch Phys Med Rehabil. 2011 Jul;92(7):1044-52. *(Review)*
3. Self-efficacy and its influen… with stroke: a systematic …

News and headlines:

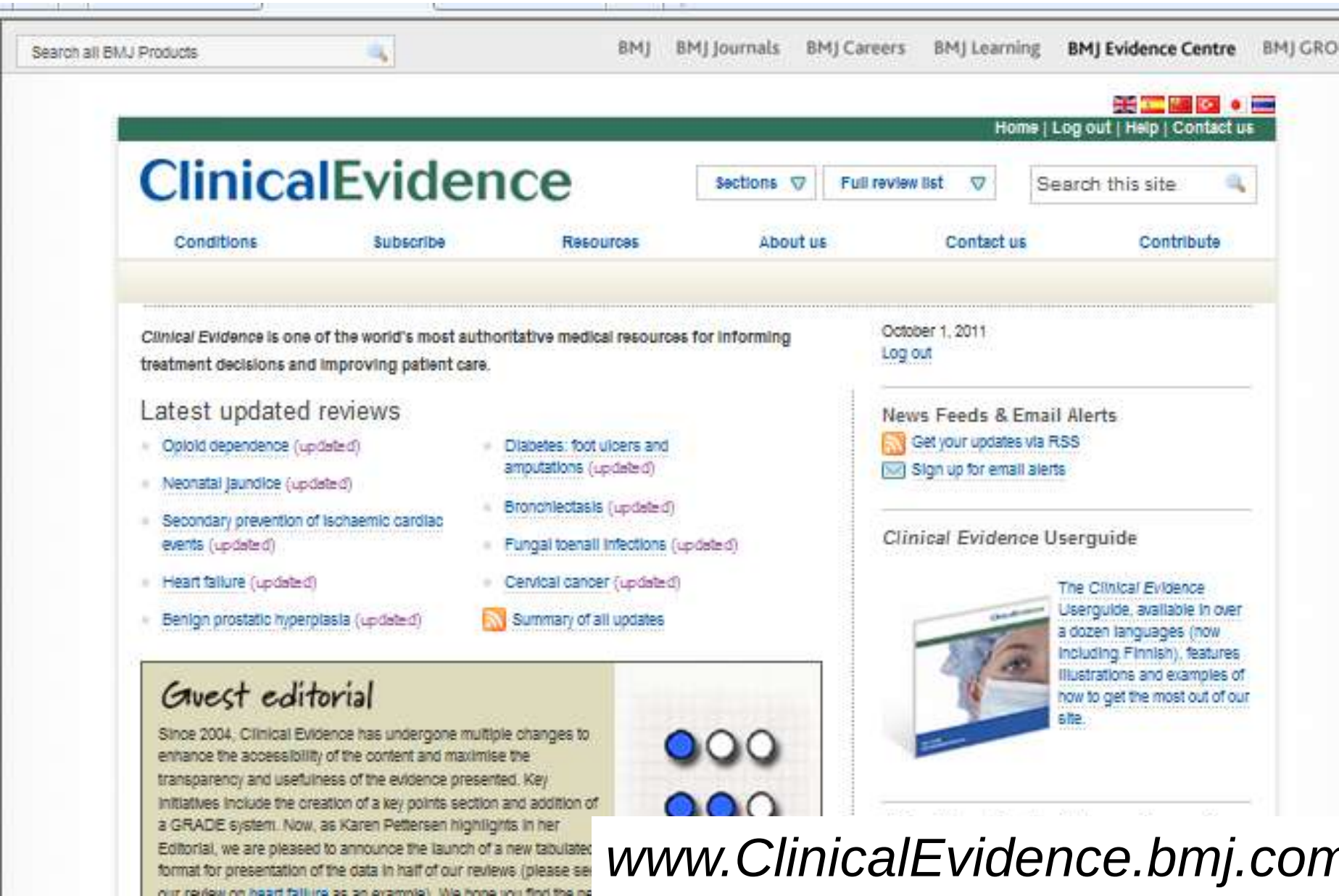
- Targeted back care 'better and cheaper'
  Fri, 30 Sep 2011 17:15:00 GMT
- Do eggs raise prostate cancer risk?
  Fri, 30 Sep 2011 12:06:00 GMT
- HIV vaccine passes phase 1 trial
  Thu, 29 Sep 2011 16:30:00 GMT
- Tabex smoking drug shows promise

http://plus.mcmaster.ca/rehab

Haynes 5S Model: Evidence for Decision-Making



Summaries: BMJ Clinical Evidence



www.ClinicalEvidence.bmj.com

ClinicalEvidence

Musculoskeletal disorders

Low back pain (chronic)

Roger Chou

You may prefer to read the key points of this review.

Print page | Download PDF

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		Muscle relaxants NSAIDs
Unknown effectiveness		Analgesics Antidepressants

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).

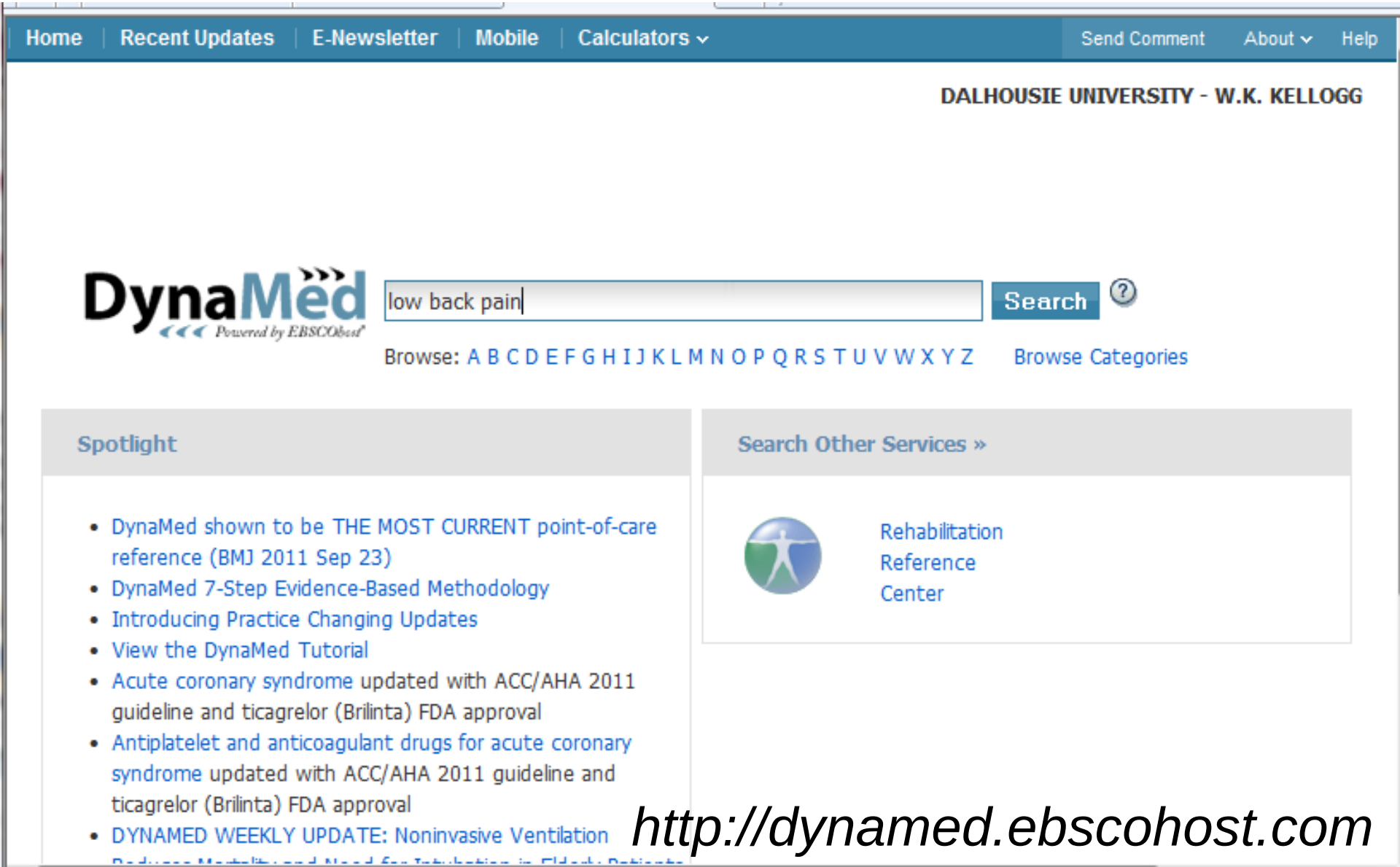
Updates (new)

We provide up-to-the-minute updates for this review so you always have the latest evidence.

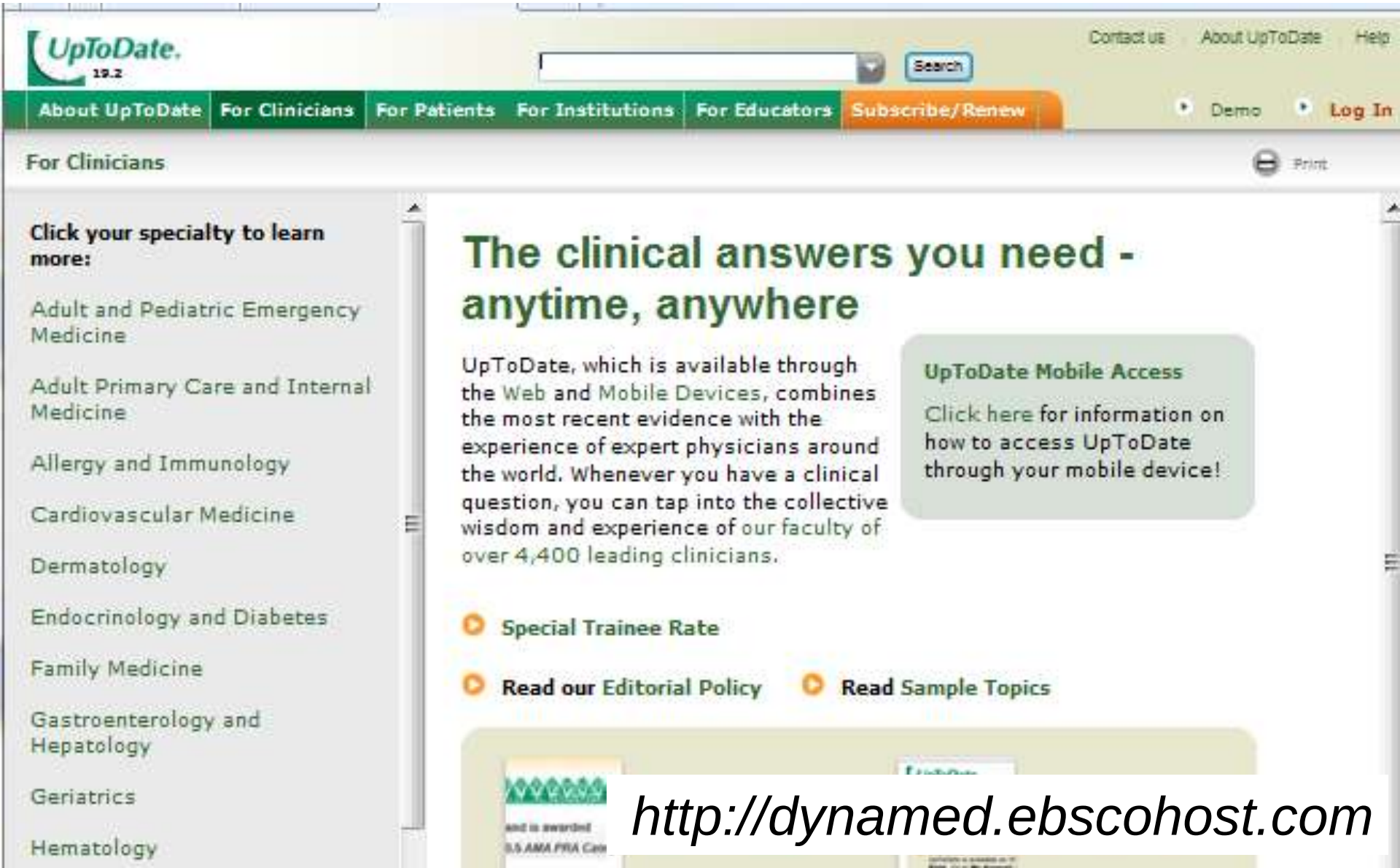
Related BMJ Journal articles

- 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

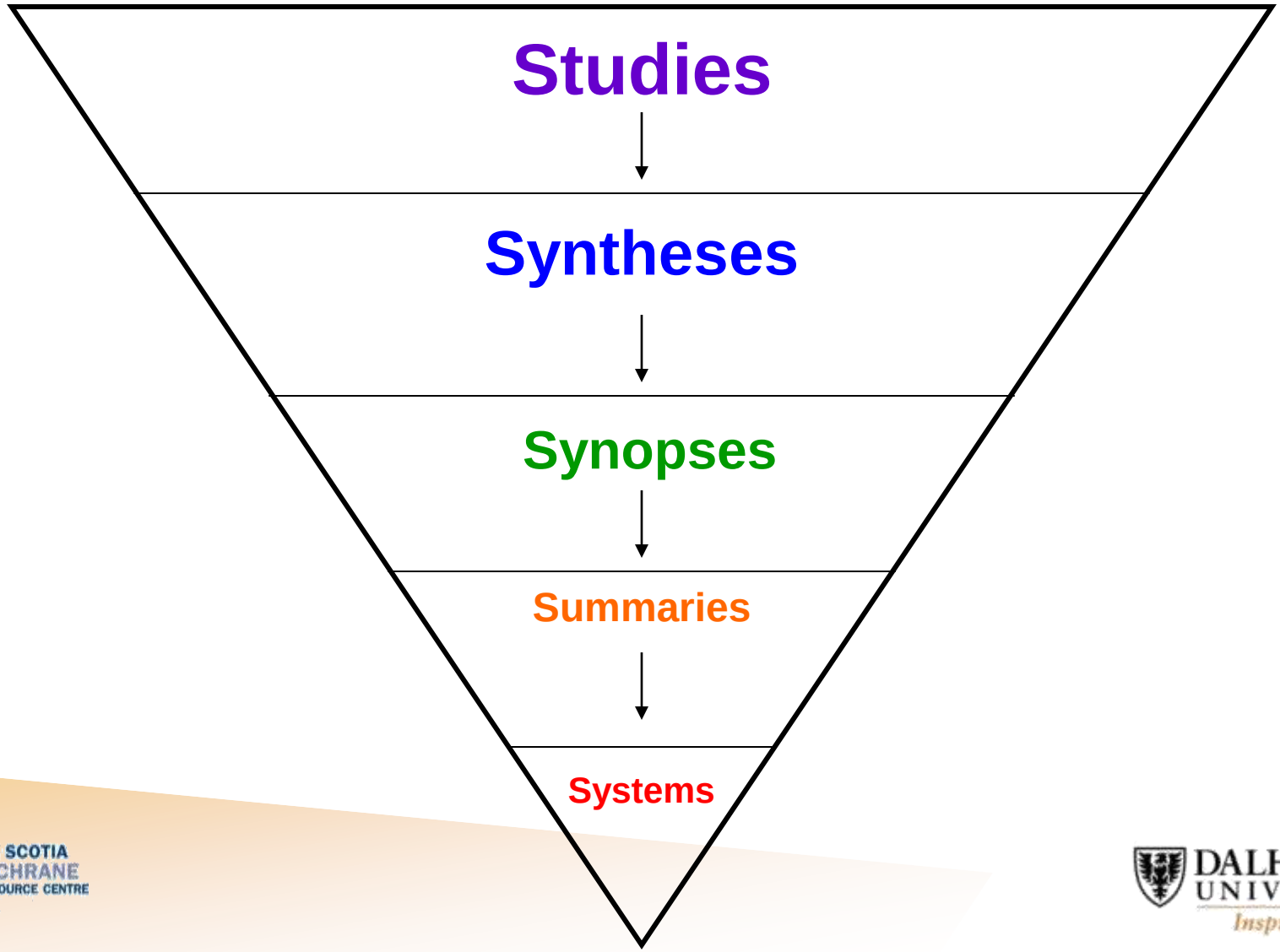
Summaries: DynaMed



Summaries: UpToDate



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!

Contact:

email: JHayden@Dal.ca

NOVA SCOTIA COCHRANE RESOURCE CENTRE

DALHOUSIE UNIVERSITY *Inspiring Minds*