Systematic review, meta-analysis and qualitative meta-synthesis

facilitated by Dr Richard Cooke*, Dr Wendy Hardeman° & Dr Rachel Shaw*

September 18th - 20th
Crete, Greece

more information will be available on:
www.ehps.net/create

*Aston University
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CREATE workshop
Systematic review, meta-analysis
and qualitative meta-synthesis

Dr Richard Cooke, Aston University, UK
Dr Wendy Hardeman, University of Cambridge, UK
Dr Rachel Shaw, Aston University, UK
SUNDAY 18th Sept

Introduction, review protocol, identifying evidence
Welcome/introductions
Overview of the workshop
(Sunday 9.30-10 am)

Richard Cooke
Welcome/introductions

- Facilitators.
- Practical information.
- Participants: introductions and expectations.
Aims and objectives.

1. To understand the steps involved in conducting a systematic review and writing up for publication.
2. To gain first-hand experience of designing and running a search strategy using a bibliographic database (PubMed).
3. To understand the steps involved in running meta-analysis and writing up results for publication.
4. To practise the key steps in running a meta-analysis.
5. To understand the steps and principles involved in conducting a meta-synthesis of qualitative evidence.
6. To practise the key steps of carrying out a meta-synthesis, e.g. appraising the quality of qualitative studies using quality criteria and initial thematic analysis of an example data-set of primary studies.
Workshop Content

- Day 1: Introduction, review protocol, identifying evidence
- Day 2: Study selection, data extraction, quality assessment, data synthesis
- Day 3: Data synthesis, writing up and dissemination
Workshop Format

• Mixture of lectures and group tasks

• Aim is build your skills at reviewing literature

• Ask lots of questions!
Systematic reviews: an introduction
(Sunday 10-10.30 am)

Wendy Hardeman
The future?
Topics

- History
- What is a systematic review?
- Why do one? Why not?
- Types of questions
- Key sources for guidance
James Lind (1716-1794)

“Indeed, before the subject could be set in clear and proper light, it was necessary to remove a great deal of rubbish.” Lind 1753, p viii
The first clinical trial: treatment of scurvy

After 2 months at sea, 12 scorbutic sailors were divided into 6 groups:

- Cider
- Elixir vitriol
- Vinegar
- Sea water (½ pint per day)
- Two oranges and one lemon each day
- Laxative made from garlic, mustard and horseradish
Evidence movement

• Called for organisation of knowledge into a useable and reliable format
• Critical appraisal and systematic evidence formally named for first time in 1975: 'meta analysis'
Evidence Favoring the Use of Anticoagulants in the Hospital Phase of Acute Myocardial Infarction

Thomas C. Chalmers, M.D., Raymond J. Matta, M.D., Harry Smith, Jr., Ph.D., and Anne-Marie Kunzler, M.A.

Abstract
Since the last comprehensive review of anticoagulation in acute myocardial infarction four additional randomized control trials have been reported. The overwhelming majority of all trials favored anticoagulation. Rates of thromboembolism were higher in the control, and hemorrhagic complications in the anticoagulated group. Pooling of all randomized control trials gives mean case fatality rates of 19.6 per cent for the control and 15.4 per cent for the anticoagulated group, a relative reduction of 21 per cent (P<0.05 or <0.001, depending on the analytic method). Five of six randomized control trials reported "no effect" because the difference favoring anticoagulation was not statistically significant. However, sample sizes in these "negative" papers were too small to protect against missing a 21 per cent reduction in true case fatality rate due to anticoagulation (β<0.10). All patients who present no specific contraindication should receive anticoagulants during hospitalization for infarction. (N Engl J Med 297:1091-1096, 1977)
Evidence-based medicine

“Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research”

"I think you should be more explicit here in step two."
Archie Cochrane (1909-1988)

- British epidemiologist
- Advocated randomised controlled trials as a means of reliably informing healthcare practice in the context of limited resources
- "It is surely a great criticism of our profession that we have not organised a critical summary, by specialty or subspecialty, adapted periodically, of all relevant randomised controlled trials" (1979)
Cochrane collaboration

• Established in 1992
• International, independent, not-for-profit organisation of > 28,000 contributors from > 100 countries
• Makes up-to-date, accurate information about the effects of health care readily available worldwide

Archie Cochrane
Cardiff University Library,
Cochrane Archive,
University Hospital Llandough
What is The Cochrane Collaboration?

Hear Cochrane contributors and staff discuss the Collaboration's work and impact, in a series of 2006 interviews.
EPPI Centre: beyond effectiveness

• Conducts systematic reviews and develops review methods in social science and public policy
• Offers support and expertise to systematic reviewers
• On-line resources for methods, tools and databases

http://eppi.ioe.ac.uk/cms/
Campbell Collaboration: beyond medicine

• International research network that produces systematic reviews of the effects of social interventions
• Based on voluntary cooperation among researchers of a range of backgrounds
• On-line library of systematic reviews

http://www.campbellcollaboration.org/
What is a systematic review?

A systematic review attempts to collate all empirical evidence that fits pre-specified eligibility criteria in order to answer a specific research question. It uses explicit, systematic methods that are selected with a view to minimizing bias, thus providing more reliable findings from which conclusions can be drawn and decisions made.

The Cochrane Collaboration

Systematic reviews aim to find as much as possible of the research relevant to particular research questions, and use explicit methods to identify what can reliably be said on the basis of these studies. Methods should not only be explicit but systematic with the aim of producing reliable results.

EPPI-Centre
Why do one?

- Objective appraisal of evidence
- More precise estimate of association or effect
- Timely introduction of effective treatments
- Identify promising research questions
- Gain important skills
Why not?

- A systematic review is already published or underway
- Time and resources
- Is your planned review publishable?
Scope of systematic reviews

• Health interventions, clinical tests, public health interventions, adverse effects, and economic evaluations

• Conducted in medicine, psychology, nursing, physical therapy, educational research, sociology and business management

CRD, York 2008
Health Care Efficiency

A Systematic Review of Health Care Efficiency Measures

Peter S. Hussey, Han de Vries, John Romley, Margaret C. Wang, Susan S. Chen, Paul G. Shekelle, and Elizabeth A. McGlynn

Parenting interventions: a systematic review of the economic evidence

J. M. Charles, * T. Bywater† and R. T. Edwards*

*Centre for Economics and Policy in Health, Institute of Medical and Social Care Research, Bangor University, and
†School of Psychology, Bangor University, Bangor, UK

Accepted for publication 19 December 2010

A systematic review of population and community dietary interventions to prevent cancer

Margaret Thorogood *, Iveta Simera†, Elizabeth Dowler‡, Carolyn Summerbell† and Eric Brunner§
Systematic reviews in health psychology

- Correlates of behaviour
- Measurement
- Theories
- Intervention packages
- Diagnostic tools
A systematic review of environmental correlates of obesity-related dietary behaviors in youth

Klazina van der Horst, A. Oenema, I. Ferreira, W. Wendel-Vos, K. Giskes, F. van Lenbeek, and J. Brug

A systematic review of motivational interviewing in physical health care settings

K. M. Knight, L. McGowan, C. Dickens and C. Bundy
University of Manchester, UK

APPLICATION OF THE THEORY OF PLANNED BEHAVIOUR IN BEHAVIOUR CHANGE INTERVENTIONS: A SYSTEMATIC REVIEW

Wendy HardeMAN, Marie Johnston, Derek W. Johnston, Debbie Bonetti, Nicholas J. Wareham, and Ann Louise Kinmonth

A META-ANALYTIC REVIEW OF THE COMMON-SENSE MODEL OF ILLNESS REPRESENTATIONS

Martin S. Hagger and Sheina Orbell
Department of Psychology, University of Essex, Wivenhoe Park, Colchester, Essex CO4 3SQ
Health Psychology Review

• EHPS journal
• First volume in 2007
• Presentation and Q&A session by Martin Hagger (Editor) on Tuesday
Key sources for guidance

- The Cochrane Collaboration [www.cochrane.org](http://www.cochrane.org)
- The Cochrane Library [www.thecochranelibrary.com](http://www.thecochranelibrary.com)
- Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre) [http://eppi.ioe.ac.uk](http://eppi.ioe.ac.uk)
- CRD Databases (DARE) [www.crd.york.ac.uk](http://www.crd.york.ac.uk)
- CRD systematic review guidance [www.york.ac.uk/inst/crd/pdf/Systematic_Reviews.pdf](http://www.york.ac.uk/inst/crd/pdf/Systematic_Reviews.pdf)
Exercise

Compare a traditional and systematic review

(Sunday 10.30-11 am)

Wendy Hardeman
Task

• Divide in pairs
• Compare the reviews by Dunn (1996) and Ogilvie et al (2007) focusing on:
  - research questions
  - methods
  - presentation of results
• Materials: two reviews
• 20 minutes for task, 5 minutes plenary discussion
Traditional reviews

- Usually examine only a small part of available evidence
- Methods are not transparent
- Claims of authors taken at face value
- Reproducibility of results unclear
- No quantitative summary
- Uncertainty remains
Systematic review

- Clearly formulated research questions, objectives and pre-defined eligibility criteria
- Explicit, reproducible methodology
- Systematic search that attempts to identify all studies meeting eligibility criteria
- Assessment of the validity of the findings of included studies (risk of bias)
- Systematic presentation and synthesis of the characteristics and findings of included studies
Coffee Break
(Sunday 11-11.30 am)
Quantitative & qualitative evidence synthesis

(Sunday 11.30-12 noon)

Rachel Shaw
Evidence-based health care

• is the conscientious use of current best evidence in making decisions about the care of individual patients or the delivery of health services. Current best evidence is up-to-date information from relevant, valid research about the effects of different forms of health care, the potential for harm from exposure to particular agents, the accuracy of diagnostic tests, and the predictive power of prognostic factors

• (Cochrane: http://www.cochrane.org/about-us/evidence-based-health-care)
Implications of this definition

- Identification of best, most up-to-date evidence
- From relevant, valid research
- Consider care of individual patients AND delivery of health care services en masse
- To inform risk of harm, accuracy of diagnostic tests & predictive power of prognostic factors
- To inform decision-making process between practitioners and patients
What do we need to achieve this?

- Evidence of efficacy of diagnostic tests, prognostic factors ~ biomedical evidence
  - Patient perceptions of risk, understanding of diagnosis/prognosis, ways of coping with diagnosis, adherence to medication ~ behavioural & social science evidence, qualitative evidence

- Population level studies of utility of services, cost of services ~ survey, statistical evidence
  - Reasons for non-attendance, understanding of information given, ability to make informed decisions about health management long-term ~ behavioural & social science evidence, qualitative evidence
What do we need to achieve this?

• Evidence about decision-making processes between practitioners & patients ~ statistical evidence on practitioners’ performance
  – Nature of consultations, relationship between practitioners & patients, patient understanding of information, lifestyle factors of patients, family/social context of patients ~ behavioural & social science evidence, qualitative evidence
Need for heterogeneous evidence, yet...

- NICE: Context-sensitive evidence complements context-free evidence (Lomas et al., 2005) but led by biomedical evidence
- SIGN: qualitative evidence used in initial scoping exercise but not part of systematic review
- Cochrane resists inclusion of qualitative evidence & other non-trial based evidence
- Need for development of methods for systematically reviewing qualitative evidence
Meta-synthesis

• Research of research (Paterson et al., 2001)
• Existing research used as primary data
• Many synthesis methods follow principles of primary qualitative research
  – Text as data ~ data + findings
  – Thematic
  – Cross-case comparison
  – Development of hierarchical structure of themes
Methods for synthesizing qualitative evidence

<table>
<thead>
<tr>
<th>Integrative/aggregative</th>
<th>Interpretative</th>
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<tbody>
<tr>
<td>• Meta-summary</td>
<td>• Meta-ethnography</td>
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<tr>
<td>• Meta-study</td>
<td>• Cross-case analysis</td>
</tr>
<tr>
<td>• Content analysis</td>
<td>• Critical interpretive synthesis</td>
</tr>
<tr>
<td></td>
<td>• Framework synthesis</td>
</tr>
</tbody>
</table>

Summarising data Concepts (or variables) under which data are to be summarised are assumed to be largely secure and well specified ~ largely quantitative

Development of concepts Development and specification of theories that integrate those concepts ~ largely qualitative

Dixon-Woods et al. (2005)
Methods for synthesizing qualitative and quantitative evidence

• Meta-summary
• Meta-study
• Content analysis
• Bayesian synthesis
• ....very few workable models
What works for you?

- What is your review question?
- Do you want to know what works?
- Do you want to know why something works?
- Is it an exploration of an under researched area?
The review protocol: a bird’s eye view

(Sunday 12-12.30)

Key sources: Cochrane handbook; EPPI website; CRD guidance
Why a protocol?

- Specifies the methods in advance
- Saves time and trouble later on
- Reduces risk of bias
- Iterative process: reviewers, funder, representatives of patients and public
Interventions for recruiting smokers into cessation programs
(Protocol)

Brusamento S, Cerretelli F, Car J

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 DECLARATIONS OF INTEREST ..................................... 6
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Has a review been done?


CRD: http://www.crd.york.ac.uk/CMS2Web/

DARE, Prospero

NICE: http://guidance.nice.org.uk/

Other databases e.g., PubMed: http://www.ncbi.nlm.nih.gov/pubmed/
Review team

- Day-to-day conduct of the review
- May come from a range of backgrounds:
  - expertise in the content area
  - expertise in review methodology
Advisory team

- Range of expertise
- Range of potential users of the review
- Can help make difficult decisions
Protocol content

- Background
- Review question
- Inclusion and exclusion criteria
- Identifying research evidence
- Study selection
- Data extraction
- Quality assessment
- Data synthesis
- Dissemination plan

CRD Guidance 2009
Background

• Why is the review needed?
• Rationale for inclusion criteria
• Rationale for focus of research question
Review question

• Clear questions
• May be broad or specific
• May frame question in terms of PICOS, CHIP, SPICE
• Make any underlying assumptions and conceptual framework explicit
Inclusion and exclusion criteria

• Set boundaries for research question
• Specify nature of interventions
• Clarify any definitions (e.g., ‘education’)
• Criteria need to be practical
Inclusion and exclusion criteria

• Methodological quality affects reliability of findings and conclusions
  - randomised controlled trials (RCTs)
  - quasi-experimental studies
  - observational studies
Hierarchy of evidence

Inclusion and exclusion criteria

• Language
• Publication type and status
Identifying research evidence

- Include preliminary search strategy
- Specify databases, search terms
- Ask for advice from librarian if available
- Details on software to manage references
- Current awareness searches
## Appendix 1 Search terms (ti=title, ab=abstract)

<table>
<thead>
<tr>
<th>Medline</th>
<th>PsychLit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Exp Family/all subheadings</td>
<td>1. Exp Placebo</td>
</tr>
<tr>
<td>2. (family or families or mother* or father* or sibling* or spouse* or partner* or couple* or husband* or wife or wives or household* or generation) in ti,ab</td>
<td>2. Exp Program-Evaluation</td>
</tr>
<tr>
<td>3. (home* not ((nursing or residential) and home)) in ti,ab</td>
<td>3. Exp Behavior-Modification</td>
</tr>
<tr>
<td>4. (parent* not parenteral) in ti,ab</td>
<td>4. Exp Persuasive-Communication</td>
</tr>
<tr>
<td>5. &quot;Family-Therapy&quot;/all subheadings</td>
<td>5. Exp Messages</td>
</tr>
<tr>
<td>8. (social support) in ti,ab</td>
<td>8. Exp Lifestyle-Changes</td>
</tr>
<tr>
<td>9. &quot;Body-Mass-Index&quot;</td>
<td>9. (singl* or doubt* or trebl* or tripl*) near (blind* or mask*) in ti,ab</td>
</tr>
<tr>
<td>10. &quot;Obesity&quot;/diet-therapy, diagnosis, genetics, history, prevention-and-control, psychology, therapy</td>
<td>10. random* in ti,ab</td>
</tr>
<tr>
<td>11. &quot;Skinfold-Thickness&quot;</td>
<td>11. (clin* near trial*) in ti,ab</td>
</tr>
<tr>
<td>12. ((weight gain) near (prevent* or control*)) in ti,ab</td>
<td>12. (experimental near group) in ti,ab</td>
</tr>
<tr>
<td>13. ((body mass index) or waist) in ti,ab</td>
<td>13. Exp Family</td>
</tr>
<tr>
<td>14. (obesity near (prevent* or control*)) in ti,ab</td>
<td>14. Exp Parent-Child-Relations</td>
</tr>
<tr>
<td>15. (body fat) in ti,ab</td>
<td>15. Exp Family-Relationships</td>
</tr>
<tr>
<td>17. (overweight near (prevent* or control*)) in ti,ab</td>
<td>17. (family or families or mother* or father* or sibling* or spouse* or partner* or couple* or husband* or wife or wives or household* or generation*) in ti,ab</td>
</tr>
<tr>
<td>18. (home* not ((nursing or residential) and home*)) in ti,ab</td>
<td>18. (home* not ((nursing or residential) and home*)) in ti,ab</td>
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<td>19. (parent* not parenteral) in ti,ab</td>
<td>19. (parent* not parenteral) in ti,ab</td>
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<tr>
<td>21. (social support) in ti,ab</td>
<td>21. (social support) in ti,ab</td>
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<tr>
<td>22. (skinfold thickness) in ti,ab</td>
<td>22. Exp Preventive-Medicine</td>
</tr>
<tr>
<td>23. weight near2 (control* or maint* or loss* or reduce*) in ti,ab</td>
<td>23. Exp Medical-Treatment-General</td>
</tr>
<tr>
<td>25. &quot;Weight-Loss/&quot; without subheadings, genetics</td>
<td>25. Exp Cross-Cultural-Treatment</td>
</tr>
<tr>
<td>27. (control group) in ti,ab</td>
<td>27. (control group) in ti,ab</td>
</tr>
<tr>
<td>28. (controlled near trial) in ti,ab</td>
<td>28. (controlled near trial) in ti,ab</td>
</tr>
<tr>
<td>29. Controls in ti,ab</td>
<td>29. Controls in ti,ab</td>
</tr>
<tr>
<td>30. Exp Primary-Health-Care</td>
<td>30. Exp Primary-Health-Care</td>
</tr>
<tr>
<td>31. Exp Weight-Control</td>
<td>31. Exp Weight-Control</td>
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<tr>
<td>33. Exp Obesity</td>
<td>33. Exp Obesity</td>
</tr>
<tr>
<td>34. Exp Weight-Perception</td>
<td>34. Exp Weight-Perception</td>
</tr>
<tr>
<td>35. ((weight gain) near (prevent* or control*)) in ti,ab</td>
<td>35. ((weight gain) near (prevent* or control*)) in ti,ab</td>
</tr>
<tr>
<td>36. (body mass index) in ti,ab</td>
<td>36. (body mass index) in ti,ab</td>
</tr>
<tr>
<td>37. waist in ti,ab</td>
<td>37. waist in ti,ab</td>
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<tr>
<td>38. (obesity near (prevent* or control*)) in ti,ab</td>
<td>38. (obesity near (prevent* or control*)) in ti,ab</td>
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<tr>
<td>39. (body fat) in ti,ab</td>
<td>39. (body fat) in ti,ab</td>
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<tr>
<td>40. (overweight near (prevent* or control*)) in ti,ab</td>
<td>40. (overweight near (prevent* or control*)) in ti,ab</td>
</tr>
<tr>
<td>41. (skinfold thickness) in ti,ab</td>
<td>41. (skinfold thickness) in ti,ab</td>
</tr>
<tr>
<td>42. (fat adj (content or distribution)) in ti,ab</td>
<td>42. (fat adj (content or distribution)) in ti,ab</td>
</tr>
<tr>
<td>43. &quot;Body-Weight&quot;</td>
<td>43. &quot;Body-Weight&quot;</td>
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<tr>
<td>44. (weight near (control* or maint* or loss* or reduce*)) in ti,ab</td>
<td>44. (weight near (control* or maint* or loss* or reduce*)) in ti,ab</td>
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</table>

McLean et al. 2003
Study selection

Two stages:
1. Screening of abstracts and titles against inclusion criteria
2. Screening of full papers identified as possibly relevant

- Specify how decisions will be made
- Number of researchers involved and how disagreements will be resolved
Data extraction

• Specify information to be extracted from included studies
• Details of software for recording data
• Procedure for data extraction: number of researchers, resolving discrepancies
• Contacting authors for additional information
Quality assessment

- Methods of study appraisal
- Examples of quality criteria
- Use of appraisal, e.g., sensitivity analysis
- Procedure: number of researchers, resolving discrepancies
Data synthesis

• As far as possible
• Is meta-analysis pre-planned?
• Criteria for when meta-analysis be will done, fixed or random effects model
• Approach to narrative synthesis
• Planned sensitivity analyses and tests for publication bias
Documenting the process

- Managing references
- Decisions about including and excluding papers
- Managing data extracted from studies
- Data analysis
- Data reporting
Dissemination plan

- Target groups: researchers, practitioners, policy makers, commissioners of research and services, guideline issuing bodies, patients, general public etc!
- How will you reach each group?
- What will you disseminate?
- Involve stakeholders at early stage
Public involvement

• Involvement: active partnership between the public and researchers in the research process
• Public: patients, users of health services, informal carers, relatives, members of the public who receive health promotion interventions, organisations representing people who use services
Why public involvement?

- Different perspective
- Importance and relevance of the review question
- Outcomes that matter to users of interventions and health services
- Help with dissemination of review findings

http://www.invo.org.uk/
Register your review

• PROSPERO: international prospective register of systematic reviews
• Launched Feb 2011
• Registration free and open to anyone undertaking systematic reviews of the effects of interventions and strategies to prevent, diagnose, treat, and monitor health conditions, for which there is a health related outcome
• Register your review when the review protocol (or equivalent) has been completed but before screening studies for inclusion
PROSPERO

http://www.crd.york.ac.uk/prospero/
Amendments in the protocol

• If too rigid then review may not be useful to end users
• Clearly documented and justified
• Consider the implications for time and resources e.g., re-doing data extraction
Formulating a research question

(Sunday 12.30-1 pm)

Richard Cooke, Rachel Shaw
PICOS

- PICOS = framework to make the process of defining and delivering a research question easier
- P = population, patient
- I = intervention
- C = comparison
- O = outcome
- S = study design
Population, patient

- When specifying search terms you might focus on
- Gender
- Country
- Age
- Diagnosis
- If you exclude certain populations (e.g., people who are not overweight) this will narrow your search
Intervention

• In systematic reviews & meta-analyses of experimental data it is crucial to report on:
  • Duration of intervention
  • Intensity of intervention
  • Frequency of intervention
  • Type of intervention (can use the Behaviour Change taxonomy, Abraham & Michie, 2008, to classify different types of intervention)
Comparison

• Control/comparison group received
  – No treatment
  – Standard care (information, treatment etc.)
  – Placebo
  – Alternative treatment
  – Passive vs. active control groups (Armitage, 2009)
Outcome

• Specify the outcome you are interested in
• Blood pressure
• Quality Adjusted Life Years
• WHOQoL
• Screening attendance

• Often considerable variation in outcomes used across studies
Types of study design

- (Interrupted) time series: A research design that collects observations at multiple timepoints before & after intervention (interruption).
- Case-Control study: A study that compares people with a specific disease or outcome of interest (cases) to people from the same population without that disease or outcome (controls)
Types of Study Design (2)

• Cohort study: An observational study in which a defined group (cohort) is followed over time. Outcomes of people in subsets are compared to examine effects of exposure to intervention or other factors (e.g., smoking)

• RCT: An experiment where two or more interventions, possibly a control or no treatment group, are compared by being randomly assigned to participants
PICOS: Bringing ideas together

• By following the PICOS framework you should end up with a clear research question that will lead to precise search terms

• For example, you could review RCTs comparing the impact of 12 month lifestyle change programmes with no treatment on weight loss (in kgs) in overweight populations

• More guidance on PICO can be found at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2233974/
### Tools for formulating search strategy

<table>
<thead>
<tr>
<th>Qualitative research</th>
<th>Social science research</th>
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<tbody>
<tr>
<td>• Context</td>
<td>• Setting</td>
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<tr>
<td>• How</td>
<td>• Perspective</td>
</tr>
<tr>
<td>• Issues of interest</td>
<td>• Intervention/exposure/interest</td>
</tr>
<tr>
<td>• Population</td>
<td>• Comparison</td>
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<td></td>
<td>• Evaluation</td>
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# CHIP/SPICE example

<table>
<thead>
<tr>
<th>CHIP</th>
<th>SPICE</th>
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<tr>
<td><strong>Context</strong></td>
<td><strong>Setting</strong></td>
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<tr>
<td>Paediatric intensive care</td>
<td>Paediatric intensive care</td>
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<tr>
<td><strong>How</strong></td>
<td><strong>Perspective</strong></td>
</tr>
<tr>
<td>Qualitative, intervention study, survey</td>
<td>Nurses &amp; doctors</td>
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<tr>
<td><strong>Issues of interest</strong></td>
<td><strong>Intervention</strong></td>
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<tr>
<td>Preparing nurses for ALTE*</td>
<td>Prepare nurses for ALTE</td>
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<tr>
<td><strong>Population</strong></td>
<td><strong>Comparison</strong></td>
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<td>Nurses &amp; doctors</td>
<td>Emergency services</td>
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<td><strong>Evaluation</strong></td>
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<td></td>
<td>Impact on nurses’ professional performance &amp; well-being</td>
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</table>

*ALTE: Acute Life Threatening Event*
## CHIP/SPICE example

<table>
<thead>
<tr>
<th>CHIP</th>
<th>SPICE</th>
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<tbody>
<tr>
<td><strong>Context</strong></td>
<td>Community /outpatients clinic</td>
</tr>
<tr>
<td><strong>How</strong></td>
<td>Qualitative/quality of life studies</td>
</tr>
<tr>
<td><strong>Issues of interest</strong></td>
<td>Diagnosis and management of AMD*</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>Patients</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPICE</th>
<th>CHIP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Setting</strong></td>
<td>Community /outpatients clinic</td>
</tr>
<tr>
<td><strong>Perspective</strong></td>
<td>Patients</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Comparison</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Evaluation</strong></td>
<td>Impact on patients’ well-being, understanding &amp; management of AMD</td>
</tr>
</tbody>
</table>

*AMD: Age-related Macular Degeneration*
Lunch
(Sunday 1-2 pm)
Undertaking the review

(Sunday 2-3 pm)

Richard Cooke, Rachel Shaw
Designing your search strategy

• Search bibliographic databases systematically
• Search for existing reviews in topic area
• Adapt existing search strategy
• Use keywords or MeSH headings (MEDLINE)
• Tools to help:
  – PICO ~ health services research (Population-Intervention-Comparison-Outcome)
  – CHIP ~ qualitative research
  – SPICE ~ social science research
Finding qualitative studies

• Medical Subject Headings (MeSH) on MEDLINE:
  – Qualitative Research, Interview
  – Few qualitative methodology subject headings on most bibliographic databases

• Use free-text terms:
  – (biographical method), (grounded theory), (social construct$), ethnograph$, field adj. (study or studies)

• Broad-based qualitative research search filter (Grant, 2000) as successful
  – findings, interview$, qualitative

Shaw et al. (2004)
Testing your search strategy

• Add methodology filter to your topic based search terms if you are searching for studies using particular methods, e.g. qualitative methods

• Group your search terms logically – add/remove to test precision & recall

• Use broad-based qualitative methodology filter for identifying qualitative research
  – Remove to identify studies using any method
  – Other methodology filters are available
Screening studies against inclusion criteria

- Trade-off between recall (comprehensiveness) & precision (accuracy):
  - **Recall**: potential relevant studies ~ tested positive
  - **Precision**: actually relevant studies ~ diagnosed positive

- Particularly with qualitative evidence due to lack of subject headings in bibliographic databases

- More authors of qualitative studies now include method as keyword ~ can be helpful when reviewing, especially if looking for certain types of qualitative research

Shaw et al. (2004)
Tea

(Sunday 3-3.30 pm)
Exercise

Design a simple search strategy
(Sunday 3.30-4.30 pm)

Richard Cooke, Rachel Shaw
Simple Search Strategy

• Key terms

• Electronic Databases

• Search Results

• Revise Search Strategy
Simple Search Strategy: TPB applied to physical activity/exercise

- Key terms = TPB, theory of planned behavio*/behaviour, physical activity, exercise

- Electronic Databases: For Health Psychology topics, Web of Knowledge and PubMed are good databases to use

- Initially you want to know how many papers exist, to see if a review is feasible
Task

• Run the following searches in PubMed
• Theory of Planned Behaviour Exercise
• Theory of Planned Behaviour Physical Activity
• TPB Exercise
• TPB Physical Activity
• After each search, note down how many results you get
Task

• Which search yielded the most results?
  • Theory of Planned Behaviour Exercise
  • Theory of Planned Behaviour Physical Activity
  • TPB Exercise
  • TPB Physical Activity
  • Why?
• Next run the following searches
  • Theory of Planned Behaviour (Exercise OR Physical Activity)
  • TPB (Exercise OR Physical Activity)
• How many results do you get?
Simple Search Strategy

- Search Results: After completing your search, look through the results and see if you found
  - (i) papers you know about
  - (ii) papers that look relevant
  - (iii) papers that look irrelevant

- Revise Search Strategy: Revise your search strategy if
  - you are getting too many or too few results
  - your search strategy does you identify papers you know about
Task 2

• Search PubMed for papers on a topic you are interested in
MONDAY 19th Sept
Study selection, data extraction, quality assessment, data synthesis
Undertaking the review - continued
(Monday 9.30-9.45 am)

Richard Cooke
Study Selection

• Having performed your search strategy, you need to decide which studies to include and which to exclude

• Likely you will end up with more studies than you want to review in detail!

• Best to create inclusion criteria when formulating search strategy
Figure taken from Ward et al. (2005)
## Cooke & French (2008) Inclusion Criteria

<table>
<thead>
<tr>
<th></th>
<th>Inclusion</th>
<th>Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td>Studies that report data on ‘screening’ attendance or intention</td>
<td>Studies that report data on other types of attendance or intention</td>
</tr>
<tr>
<td><strong>Theoretical</strong></td>
<td>Include at least attitudes and subjective norms as predictors of intention (i.e., test the TRA)</td>
<td>Do not include at least attitudes and subjective norms as predictors of intention (i.e., not testing the TRA)</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td>Report a bivariate correlation between variables</td>
<td>Do not report a bivariate correlation between variables</td>
</tr>
</tbody>
</table>
Included papers

- After conducting our search strategy, found 156 independent papers. Screened papers using inclusion criteria.

- Several papers did not test TPB (e.g., just examined attitude-intention relationship).

- Some papers not about screening (keywords can be unhelpful).

- Not all papers included correlations, however we obtained correlations by contacting authors.

- Final sample of $K = 33$ studies.
Data Extraction: What to extract?

- For **correlational** data you need the sample size and the correlation between variables ($r$).
- For **experimental** data you need the sample size for each group (e.g., control vs. intervention) and the effect size difference ($d$); not all papers report $d$, so you might have to calculate this yourself (see later).
- Useful to note down other study characteristics—study country, age of participants etc.—because these variables may moderate the effect size.
- You may need to code study characteristics.
Process of Data Extraction

1. Create a folder containing a pdf version of papers
2. Create a table in Word or Excel containing information for each study

---

Table 1. Studies included in the meta-analysis, with correlation coefficients between motivational variables (attitude, subjective norm, and perceived behavioural control) and intention.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample</th>
<th>Country</th>
<th>Behaviour</th>
<th>N</th>
<th>A</th>
<th>SN</th>
<th>PBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armitage, Norman and Conner (2002)</td>
<td>Men/women (31-42)</td>
<td>UK</td>
<td>Health check</td>
<td>201</td>
<td>0.46</td>
<td>0.26</td>
<td>0.33</td>
</tr>
<tr>
<td>Barling and Moore (1996)</td>
<td>Women (18-63)</td>
<td>Australia</td>
<td>Cervical smear</td>
<td>72</td>
<td>0.49</td>
<td>0.57</td>
<td></td>
</tr>
<tr>
<td>Bish, Sutton and Golombok (2000)</td>
<td>Women*</td>
<td>UK</td>
<td>Cervical smear</td>
<td>142</td>
<td>0.67</td>
<td>0.54</td>
<td>0.13</td>
</tr>
<tr>
<td>Braithwaite et al. (2002)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast cancer</td>
<td>Women (18-60)</td>
<td>UK</td>
<td>Genetic test</td>
<td>124</td>
<td>0.71</td>
<td>0.48</td>
<td></td>
</tr>
<tr>
<td>Colon cancer</td>
<td>Men/women (18-60)</td>
<td>UK</td>
<td>Genetic test</td>
<td>168</td>
<td>0.67</td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>Conner, Sheeran Norman and Armitage (2000)</td>
<td>Men/women (31-42)</td>
<td>UK</td>
<td>Health check</td>
<td>201</td>
<td>0.60</td>
<td>0.67</td>
<td>0.33</td>
</tr>
<tr>
<td>DeVellis, Blalock and Sandler (1990)</td>
<td>Men/women (40-75)</td>
<td>United States</td>
<td>Colorectal screen</td>
<td>96</td>
<td>0.36</td>
<td>0.18</td>
<td>0.35</td>
</tr>
<tr>
<td>High-risk sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low-risk sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 from Cooke & French (2008)
Process of Data Extraction (2)

• As mentioned before, not all papers report the effect size difference (d) statistic

• Two options
  – Comprehensive meta-analysis allows you to enter different types of data. For example, you could enter the mean and SD for control and intervention, and CMA will work out (d)
  – If using META, then you can work out (d) using the following formula
Calculating (d)

1. Subtract control mean from experimental mean
2. Add the control and experimental SDs together
3. Divide the result of 2. by 2
4. Square root the result of 3 (Steps 2-4 are equivalent to calculating the Pooled SD)
5. Divide the result of 1 by the result of 4
Extracting the content of behaviour change interventions
(Monday 9.45-10.30 am)

Wendy Hardeman
Methods for strengthening evaluation and implementation: specifying components of behaviour change interventions (2010-2013)

Investigators: Susan Michie (PI), Marie Johnston, Charles Abraham, Jill Francis, Wendy Hardeman, Martin Eccles

Researcher: Michelle Richardson
Administrator: Felicity Roberts

http://www.ucl.ac.uk/health-psychology/BCTtaxonomy/index.php
Two landmark trials in the prevention of Type 2 diabetes

The subjects in the intervention group were given detailed advice about how to achieve the goals of the intervention, which were a reduction in weight of 5 percent or more, in total intake of fat to less than 30 percent of energy consumed, and in intake of saturated fat to less than 10 percent of energy consumed; an increase in fiber intake to at least 15 g per 1000 kcal; and moderate exercise for at least 30 minutes per day. Frequent ingestion of whole-grain products, vegetables, fruits, low-fat milk and meat products, soft margarines, and vegetable oils rich in monounsaturated fatty acids was recommended. The dietary advice was tailored to each subject on the basis of three-day food records completed four times per year.

The goals for the participants assigned to the intensive lifestyle intervention were to achieve and maintain a weight reduction of at least 7 percent of initial body weight through a healthy low-calorie, low-fat diet and to engage in physical activity of moderate intensity, such as brisk walking, for at least 150 minutes per week. A 16-lesson curriculum covering diet, exercise, and behavior modification was designed to help the participants achieve these goals.
Rationale

• No shared language about the content of behaviour change interventions
• Hampers evidence synthesis and reporting
• Behaviour change techniques (BCTs) are active ingredients of interventions
• Reliable and valid BCT taxonomy might help advance the science of behaviour change
Characteristics of behaviour change techniques (BCTs)

- Are proposed "active ingredients" of interventions
- Aim to change behaviour
- Are the smallest components compatible with retaining the proposed active ingredients
- Can be used alone or in combination with other BCTs
- Are observable and replicable
- Can have a measurable effect on a specified behaviour/s
- May or may not have an established empirical evidence base
BCT taxonomy study: Aims

• Develop a reliable and generalisable taxonomy of BCTs as a method for specifying, evaluating and implementing behaviour change interventions
• Achieve multidisciplinary and international acceptance and use to allow for continuous development
Strengthening evaluation and implementation by specifying components of behaviour change interventions: a study protocol

Susan Michie 1, Charles Abraham 2, Martin P Eccles 3, Jill J Francis 4, Wendy Hardeman 5, Marie Johnston 1

Abstract

Background: The importance of behaviour change in improving health is illustrated by the increasing investment by funding bodies in the development and evaluation of complex interventions to change population, patient, and practitioner behaviours. The development of effective interventions is hampered by the absence of a nomenclature to specify and report their content. This limits the possibility of replicating effective interventions, synthesising evidence, and understanding the causal mechanisms underlying behaviour change. In contrast, biomedical interventions are precisely specified (e.g., the pharmacological 'ingredients' of prescribed drugs, their dose and frequency of administration). For most complex interventions, the precise 'ingredients' are unknown; descriptions (e.g., 'behavioural counseling') can mean different things to different researchers or implementers. The lack of a method for specifying complex interventions undermines the precision of evidence syntheses of effectiveness, posing a problem for secondary, as well as primary, research.

We aim to develop a reliable method of specifying intervention components (techniques) aimed at changing behaviour.

Methods/Design: The research will be conducted in three phases. The first phase will develop the nomenclature. We will refine a preliminary list of techniques and definitions. Using a formal consensus method, experts will then define the key attributes of each technique and how it relates to, and differs from, others. They will evaluate the techniques and their definitions until they achieve an agreed-upon list of clearly defined, nonredundant techniques. The second phase will test the nomenclature. Trained experts (primary researchers and systematic reviewers), equipped with a coding manual and guidance, will use the nomenclature to code published descriptions of complex interventions. Reliability between experts, over time, and across types of users will be assessed. We will assess whether using the nomenclature to write intervention descriptions enhances the clarity and replicability of interventions. The third phase will develop a web-based users' resource of clearly specified and nonredundant techniques, which will aid the scientific understanding of, and development of, effective complex interventions. Dissemination throughout the project will be through stakeholder meetings, targeted multidisciplinary workshops, conference presentation, journal publication, and publication in an interactive web-based platform (a Wiki).

Discussion: The development of a reliable method of specifying intervention components aimed at changing behaviour will strengthen the scientific basis for developing, evaluating, and reporting complex interventions. It will improve the precision of evidence syntheses of effectiveness, thus enhancing secondary, as well as primary, research.
Task

- Divide in pairs
- Each person reads the intervention description and uses the list of BCTs to identify BCTs in the description (see instructions)
- Underline relevant text and write BCT number in the margin
- Compare your scores with the other person
- Note any discrepancies and reasons, and your experiences of doing the task
- Materials: intervention description, BCT list
- 15 mins for coding, 10 mins comparing scores, 5 mins plenary discussion
Qualitative data extraction
(Monday 10.30-11.15 am)

Rachel Shaw
Challenges of data extraction in qualitative meta-synthesis

- Extract honestly & consistently
  - Use of multiple extractors can help with this
- When to stop screening & start data extraction
  - Most irrelevant studies screened out but there may be some excluded based on quality or extent to which methods are qualitative
- Blurring the divide between data extraction and assessment of quality
  - Should quality be used to determine inclusion/exclusion?
Extracting study characteristics

- Research question
- Study location (country, setting)
- Time frame (when conducted)
- Population (number, age, gender, ethnicity; how recruited)
- Study type
  - Theoretical framework
  - Data collection methods
  - Methods of analysis
- Researcher (disciplinary background, source of funding, demographic data)
Extracting study findings

• Findings or data?
• Findings: “the data-driven and integrated discoveries, judgments, and/or pronouncements researchers offer about the phenomena, events, or cases under investigation”
• Data: “case descriptions or histories, quotes, incident, and stories obtained from participant” ~ empirical material presented
• (Sandelowski & Barroso, 2003)
Data extraction forms

• You need to balance detail with utility
  – Too much detail can be difficult to make sense of
  – Too little & you’ll need to refer back to original papers
Coffee Break

(Monday 11.15-11.45 am)
Quality assessment
(Monday 11.45 am - 1 pm)

Richard Cooke
Quality Assessment

• What is quality?
• Quality hard to define: Jadad (1996) viewed it as ‘the likelihood of the trial design to generate unbiased results’
• This covers internal validity, but does not account for external validity or statistical considerations (Verhagen et al., 1998)
• Several checklists allow you to assess study quality
Checklists

• Assessing RCTs for systematic review/meta-analysis
  – Sign 50
• Assessing quality of measurement properties
  – COSMIN (Mokkink et al., 2010)
## Jadad Scale

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was the study described as random?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Was the randomisation described and appropriate?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Was the study described as double blind?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Was the method of double blinding appropriate?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Was there a description of dropouts and withdrawals</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

### Range of score

<table>
<thead>
<tr>
<th>Range of score</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>Low</td>
</tr>
<tr>
<td>3-5</td>
<td>High</td>
</tr>
<tr>
<td>Section 1: Internal validity</td>
<td>In this study this criterion is:</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>In a well conducted RCT study...</td>
<td></td>
</tr>
</tbody>
</table>
| 1.1 The study addresses an appropriate and clearly focused question. | Well covered  
Adequately addressed  
Poorly addressed  
Not addressed  
Not reported  
Not applicable |
| 1.2 The assignment of subjects to treatment groups is randomised | Well covered  
Adequately addressed  
Poorly addressed  
Not addressed  
Not reported  
Not applicable |
| 1.3 An adequate concealment method is used | Well covered  
Adequately addressed  
Poorly addressed  
Not addressed  
Not reported  
Not applicable |
| 1.4 Subjects and investigators are kept 'blind' about treatment allocation | Well covered  
Adequately addressed  
Poorly addressed  
Not addressed  
Not reported  
Not applicable |
| 1.5 The treatment and control groups are similar at the start of the trial | Well covered  
Adequately addressed  
Poorly addressed  
Not addressed  
Not reported  
Not applicable |
| 1.6 The only difference between groups is the treatment under investigation | Well covered  
Adequately addressed  
Poorly addressed  
Not addressed  
Not reported  
Not applicable |
| 1.7 All relevant outcomes are measured in a standard, valid and reliable way | Well covered  
Adequately addressed  
Poorly addressed  
Not addressed  
Not reported  
Not applicable |
| 1.8 What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed? | Well covered  
Adequately addressed  
Poorly addressed  
Not addressed  
Not reported  
Not applicable |
| 1.9 All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis) | Well covered  
Adequately addressed  
Poorly addressed  
Not addressed  
Not reported  
Not applicable |
| 1.10 Where the study is carried out at more than one site, results are comparable for all sites | Well covered  
Adequately addressed  
Poorly addressed  
Not addressed  
Not reported  
Not applicable |

**Section 2: OVERALL ASSESSMENT OF THE STUDY**

<table>
<thead>
<tr>
<th>2.1 How well was the study done to minimise bias? Code ++, +, or</th>
<th></th>
</tr>
</thead>
</table>
COSMIN checklist

<table>
<thead>
<tr>
<th>Box A. Internal consistency</th>
<th>yes</th>
<th>no</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Does the scale consist of effect indicators, i.e. is it based on a reflective model?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2  Was the percentage of missing items given?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3  Was there a description of how missing items were handled?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4  Was the sample size included in the internal consistency analysis adequate?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5  Was the unidimensionality of the scale checked? i.e. was factor analysis or IRT model applied?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6  Was the sample size included in the unidimensionality analysis adequate?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7  Was an internal consistency statistic calculated for each (unidimensional) (sub)scale separately?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8  Were there any important flaws in the design or methods of the study?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statistical methods</td>
<td>yes</td>
<td>no</td>
<td>NA</td>
</tr>
<tr>
<td>9  for Classical Test Theory (CTT): Was Cronbach's alpha calculated?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 for dichotomous scores: Was Cronbach's alpha or KR-20 calculated?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 for IRT: Was a goodness of fit statistic at a global level calculated? e.g. $\chi^2$, reliability coefficient of estimated latent trait value (index of (subject or item) separation)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Process of Quality Assessment

• Typically two researchers use a quality assessment form (e.g., Jadad) to independently code the quality of the studies included in the review.

• Researchers should report % agreement on assessments and it is helpful to report the quality scores for each study in a table.
Sensitivity Analysis

• Sensitivity analysis = ‘Are the findings robust to the method used to obtain them?’
• Compare two different meta-analyses based on different assumptions
• For example, if most study correlations are between $0.30 < r < 0.50$, what happens to the overall $r+$ if we remove a correlation of 0.10?
• Could also remove poor quality studies and see what happens
Lunch
(Monday 1-2 pm)
Qualitative evidence appraisal and exercise (Monday 2-2.15 and 2.15-3 pm)

Rachel Shaw
Appraising qualitative research

- Debate: different criteria for appraising qualitative research or an end to criteriology/methodolatry?

- Guba & Lincoln (1985)
  - Trustworthiness: credibility, transferability, dependability, confirmability

- Yardley (2000)
  - Sensitivity to context, commitment & rigour, transparency & coherence, impact & importance
Example guidance for appraising qualitative research

- Critical Appraisal Skills Programme tool for appraising qualitative research (CASP)
- National Centre for Social Research Quality Framework for assessing the quality of qualitative evaluations
- Prompts for appraising qualitative research (Dixon-Woods et al, 2004)
What happens after appraisal?

- Studies included but where quality is poor data are used with caution, reflectively
- Studies categorized according to quality

<table>
<thead>
<tr>
<th>Key</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KP</td>
<td>Key paper</td>
<td>To be included</td>
</tr>
<tr>
<td>SAT</td>
<td>Satisfactory paper</td>
<td>To be included</td>
</tr>
<tr>
<td>?</td>
<td>Unsure</td>
<td>Unsure whether paper should be included</td>
</tr>
<tr>
<td>FF</td>
<td>Fatally flawed</td>
<td>Paper to be excluded on grounds of being fatally flawed</td>
</tr>
<tr>
<td>IRR</td>
<td>Irrelevant</td>
<td>Paper to be excluded on grounds that it is irrelevant (not qualitative; not topic related)</td>
</tr>
</tbody>
</table>

Dixon-Woods, Sutton, Shaw et al. (2007)
Narrative synthesis
(Monday 3-3.30 pm)

Wendy Hardeman
Narrative synthesis

“An approach to the synthesis of evidence relevant to a wide range of questions including but not restricted to effectiveness [that] relies primarily on the use of words and text to summarise and explain – to ‘tell the story’ - of the findings of multiple studies. Narrative synthesis can involve the manipulation of statistical data”.

French et al; http://www.campbellcollaboration.org/
Narrative synthesis

- An analysis of relationships between and within studies and overall assessment of robustness of the evidence
- Not to be confused with narrative review
- Systematic, based on review question and protocol
- Meta-analysis not always possible or sensible
- Even with meta-analysis some narrative synthesis is needed
Narrative synthesis guidance

• Variability in practice
• Lack of transparency and replicability
• Guidance (‘toolkit’) for narrative synthesis published in 2006
• Specific approach depends on types of research and study characteristics
• 19 tools and techniques identified through systematic search of methodological literature

http://www.lancs.ac.uk/shm/research/nssr/; CRD guidance
Testing methodological developments in the conduct of narrative synthesis: a demonstration review of research on the implementation of smoke alarm interventions

Lisa Arai, Nicky Britten, Jennie Popay, Helen Roberts, Mark Petticrew, Mark Rodgers and Amanda Sowden
Framework elements

- Develop theory of how the intervention works, why and for whom
- Develop preliminary synthesis of findings of included studies
- Explore relationships between and within studies
- Assess robustness of evidence

Developing theory

• Theory of how the intervention works, why and for whom
• May be explicit or implicit
• Consider early in review process
• Could display emerging theory
Table IV. ProActive causal model: application to a population (30-50 years old) at risk of type 2 diabetes, due to family history and physical inactivity

<table>
<thead>
<tr>
<th>Intervention points and behaviour change techniques</th>
<th>Causal model</th>
<th>Measures for evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 1</td>
<td>Past behaviour</td>
<td>Physical Activity Questionnaire (baseline, past year) (Wareham et al., 2002)</td>
</tr>
<tr>
<td>Information about disease risk and preventive behaviour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifying salient beliefs towards behaviour change</td>
<td>Attitude towards behaviour Subjective norm Perceived behavioural control Theory of Planned Behaviour Questionnaire (Sutton et al., 2003)</td>
<td></td>
</tr>
<tr>
<td>Reinforcing positive beliefs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem solving in relation to negative beliefs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting achievable goals</td>
<td>Behavioural intention</td>
<td>Theory of Planned Behaviour Questionnaire</td>
</tr>
<tr>
<td>Action planning (prompts, social support)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-monitoring</td>
<td>Specific behaviours to increase physical activity</td>
<td>Physical Activity Questionnaire (1 yr follow-up, past year)</td>
</tr>
<tr>
<td>Self-reinforcement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goal review</td>
<td>LEVEL 2</td>
<td></td>
</tr>
<tr>
<td>Building new habits</td>
<td>Specific behaviours to increase physical activity</td>
<td>Physical Activity Questionnaire (1 yr follow-up, past year)</td>
</tr>
<tr>
<td>Preparing for and dealing with setbacks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hardeman et al., 2005
Preliminary synthesis

• Organise findings to give initial description of patterns across included studies

• Tools include:
  - textual description of each study
  - tabulation
  - grouping studies
  - thematic analysis
Exploring relationships

• Within studies: characteristics related findings
• Across studies: pattern of findings
• Tools include:
  – conceptual mapping
  – translation
  – tabulation
  – subgroup analysis
Assess robustness

• Relates to methodological quality of studies and the credibility of the product of the synthesis process
• Weigh studies according to quality
• Tools include:
  - grading system
  - critical reflection on appraisal process
  - check synthesis with authors
  - compare with earlier related reviews
Tea

(Monday 3.30-3.45 pm)
Qualitative data synthesis
(Monday 3.45-4.45 pm)

Rachel Shaw
Process of synthesis

1. **Read & re-read your data extraction tables**, i.e. primary data (*1*<sup>st</sup> order constructs) & authors’ commentary on them (*2*<sup>nd</sup> order constructs) making notes of anything which seems significant as you go.

2. **Compile a matrix of *1*<sup>st</sup> & *2*<sup>nd</sup> order constructs**, i.e., raw data from original papers & comments about them.

3. **Conceptual maps** may be useful to illustrate how the major *2*<sup>nd</sup> order constructs are related to each other. Ensure you preserve the contextual meanings of original studies by staying close to the data, i.e. *1*<sup>st</sup> order constructs.
Process of synthesis

4. Translating studies into one another/cross-case comparison. Using your matrix of 1\textsuperscript{st} + 2\textsuperscript{nd} order constructs (referring back to data extraction tables if necessary) compare conceptual terms across studies. This involves an interpretative reading of meaning but not further conceptual development.

5. Create a list of key conceptual terms with definitions, annotate your matrix, & code the data according to concepts identified. Make notes of any methodological/quality issues highlighted in your quality appraisal.
Process of synthesis

6. Synthesizing translations/developing 3rd order constructs. Using your annotated matrix think about how best to present the synthesis:

a. Group 1st + 2nd order constructs around key concepts across papers & examine them in turn, eg Taylor et al (in press)

b. Split whole papers into groups around key concepts & examine them in turn, eg Malpass et al (2009)
7. Reciprocal synthesis/line of argument synthesis. Look at annotated matrix & groupings of concepts/papers & develop an argument for each, ie a narrative that tells the story of the evidence synthesized.

a. During this process ask: what does this concept mean & how does it help us understand the phenomenon?

b. Create a list of themes, 3rd order constructs, to be presented as the results of your synthesis.

c. Identify extracts from papers, 1st + 2nd order constructs, to include under each 3rd order construct created & decide on the order of presentation.
Papers were read and re-read, basic study information was recorded on a data extraction form.

First and second order constructs were identified and recorded on the data extraction form for each paper.

Third order interpretations (themes) were identified as codes within the data extraction forms using thematic analysis.

Thematic analysis of the data extraction forms was repeated incorporating themes found in previous forms.

Once all themes were identified a shared theme table was produced detailing which theme was present in each paper.

Data extracted:
- Title, author names, research questions,
  population characteristics, recruitment strategies,
  analysis methods

Working definition of 1\textsuperscript{st}, 2\textsuperscript{nd} and 3\textsuperscript{rd} order constructs (Malpass et al., 2009)
- 1\textsuperscript{st} order: Participants’ views, accounts and interpretations of their experiences.
- 2\textsuperscript{nd} order: The authors’ views and interpretations of participants’ views.
- 3\textsuperscript{rd} order: The views and interpretations of the synthesist.

Data extraction forms were re coded to include themes identified in subsequent data extraction forms.

New themes were identified in data extraction forms.

Quotes from relevant papers were included in the table to illustrate the themes.
<table>
<thead>
<tr>
<th>Papers Themes</th>
<th>Eborall</th>
<th>Goyder</th>
<th>Troughton</th>
<th>Nielsen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial stages of screening process</td>
<td>Different types of invitation &amp; patient understanding of information</td>
<td>Seriousness of diagnosis</td>
<td>Awakening</td>
<td></td>
</tr>
<tr>
<td>Prediagnostic test expectations</td>
<td>Patients’ perceptions of information provided</td>
<td>Taking action</td>
<td>Action</td>
<td></td>
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<tr>
<td>Reactions after diagnosis</td>
<td></td>
<td></td>
<td>The pain limit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>When low priority is given to a high risk</td>
<td></td>
</tr>
</tbody>
</table>
Questions and answers
(Monday 4.45-5 pm)
TUESDAY 20\textsuperscript{th} Sept

Data synthesis, writing up and dissemination
Quantitative data synthesis
(Tuesday 9.30-10.15 am)

Richard Cooke
Quantitative Synthesis

- Quantitative synthesis brings together statistical results across a research literature. It allows researchers:
  - To compare research done in the same area
  - To ensure that future research is better than existing research
  - To make an evidence-based decision on treatments offered to patients
Quantitative Synthesis

- Quantitative synthesis brings together statistical results across a research literature. It allows researchers:
  - To compare research done in the same area
  - To ensure that future research is better than existing research
  - To make an evidence-based decision on treatments offered to patients
Types of Quantitative Synthesis

• Head count: How many studies support/reject intervention?
• Average effect size: What is the average effect size across studies?
• Meta-analysis: What is the sample-weighted average effect size across studies?
• What is a limitation of using the average effect size?
Meta-analysis of correlational data

- Meta-analysis allows researchers to pool results across studies to try and get a better estimate of the ‘true’ size of the correlation.

- For example, Cooke & French (2008) investigated the size of relationships within theory of planned behaviour for screening.
  - Average attitude-intention correlation \( r_+ = .51 \)
  - Average SN-intention correlation \( r_+ = .41 \)
  - Average PBC-intention correlation \( r_+ = .46 \)
Meta-analysis of correlational data

• Theoretically, it is extremely useful to compare correlations with the same outcome variable, for studies conducted on the same behaviour; it allows researchers to focus on the most important variables

• Practically, it also suggests which theoretical variables should be targeted in interventions
Meta-analysis of experimental data

• A limitation of correlational data is that it is impossible to draw conclusions about causality

• In contrast, experimental data allows for discussion of causation, and meta-analysis helps by bringing results together

• Gollwitzer & Sheeran (2006) tested the effect of forming implementation intentions on goal achievement
  – Average effect size difference for implementation intentions was $d+ 0.65$
Exercise
Run a meta-analysis
(Tuesday 10.15-11 am)

Richard Cooke
Running meta-analysis using correlational data

• Software Packages for meta-analysis
  – Comprehensive Meta-analysis (CMA)
  – META

• Data entry and analysis

• Data interpretation
Software packages for meta-analysis

Comprehensive Meta Analysis (Biostat)

- Get 10 day trial copy from

- $795 for perpetual license
- $395 for perpetual student licence
- $195 for annual student licence

- Software like Excel
Software packages for meta-analysis

META

• Free software created by Prof Ralf Schwarzer
  – Free download, + useful manual, from
  – http://userpage.fu-berlin.de/~health/meta_e.htm

• Dos program; type in commands to run analysis

• Program does not provide Forest Plots, which help interpreting data, and can be unwieldy

• However, it has a certain charm!
Comprehensive Meta-analysis (Biostat): Step by step: correlations
**Step 1: Go to Insert and select Column for Study Names**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>26</td>
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</tr>
</tbody>
</table>
Step 2: Go to Insert and enter Column for Effect size data.
Step 3: Click Show common formats only and click next.
Step 4: Click next, click correlation, computed effect sizes and finally correlation and sample size. Then hit Finish.
Create your own meta-analysis (Step 4)

• In your groups, create a new data file using the slides you have just seen
• Enter author names, sample size & correlations for each study

Table I. Studies included in the meta-analysis, with correlation coefficients between motivational variables (attitude, subjective norms, and perceived behavioural control) and intention.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample</th>
<th>Country</th>
<th>Behaviour</th>
<th>N</th>
<th>A</th>
<th>SN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armitage, Norman and Conner (2002)</td>
<td>Men/women (31–42)</td>
<td>UK</td>
<td>Health check</td>
<td>201</td>
<td>0.46</td>
<td>0.26</td>
</tr>
<tr>
<td>Barling and Moore (1996)</td>
<td>Women (18–63)</td>
<td>Australia</td>
<td>Cervical smear</td>
<td>72</td>
<td>0.49</td>
<td>0.57</td>
</tr>
<tr>
<td>Bish, Sutton and Golombok (2000)</td>
<td>Women</td>
<td>UK</td>
<td>Cervical smear</td>
<td>142</td>
<td>0.67</td>
<td>0.54</td>
</tr>
<tr>
<td>Braithwaite et al. (2002)</td>
<td>Women (18–60)</td>
<td>UK</td>
<td>Genetic test</td>
<td>124</td>
<td>0.71</td>
<td>0.48</td>
</tr>
<tr>
<td>Colon cancer</td>
<td>Men/women (18–60)</td>
<td>UK</td>
<td>Genetic test</td>
<td>168</td>
<td>0.67</td>
<td>0.55</td>
</tr>
<tr>
<td>Conner, Sheeran Norman and Armitage (2000)</td>
<td>Men/women (31–42)</td>
<td>UK</td>
<td>Health check</td>
<td>201</td>
<td>0.60</td>
<td>0.67</td>
</tr>
<tr>
<td>DeVellis, Blalock and Sandler (1990)</td>
<td>Men/women (40–75)</td>
<td>United States</td>
<td>Colorectal screen</td>
<td>96</td>
<td>0.36</td>
<td>0.18</td>
</tr>
<tr>
<td>High-risk sample</td>
<td>Men/women (40–75)</td>
<td>United States</td>
<td>Colorectal screen</td>
<td>144</td>
<td>0.42</td>
<td>0.36</td>
</tr>
</tbody>
</table>

Go to next slide for an example
Step 5: Enter the data as below; click on effect direction and select Positive.

<table>
<thead>
<tr>
<th>Study name</th>
<th>Correlation</th>
<th>Sample size</th>
<th>Effect direction</th>
<th>Correlation</th>
<th>Std Err</th>
<th>Fisher's Z</th>
<th>Std Err</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ammitage et al.</td>
<td>0.260</td>
<td>201</td>
<td>Positive</td>
<td>0.260</td>
<td>0.066</td>
<td>0.266</td>
<td>0.071</td>
</tr>
</tbody>
</table>
Step 6: Finished datafile should look like this; click the run analyses button to perform meta-analysis.
• This is the output you get when you run the meta-analysis it shows:
• The overall effect size (Fixed correlation, 0.47)
• The individual correlations for each study
• The forest plot showing the different correlations on a scale from -1 to 1, including 95% confidence intervals
Congratulations! You have just completed your first meta-analysis!
Any Questions???
Data interpretation: What does the data tell us?
Meta-Analysis: Interpreting Results

- Cohen (1992) provides guidelines for assessing the size of correlations and effect sizes;

  - For correlations
    - Small = \( r (.10 \text{ to } .29) \)
    - Medium = \( r (.30 \text{ to } .49) \)
    - Large = \( r (\geq .50) \)

  - For effect sizes
    - Small = \( d (.20 \text{ to } .49) \)
    - Medium = \( d (.50 \text{ to } .79) \)
    - Large = \( d (\geq .80) \)
This is the output you get when you run the meta-analysis it shows
The overall effect size (Fixed correlation, 0.47)
The individual correlations for each study
The forest plot showing the different correlations on a scale from -1 to 1, including 95% confidence intervals
What can we get out of the output?

- $r_+ = .47$, a *medium*-sized relationship (cf. Cohen, 1992)

- Narrow confidence intervals (0.43 to 0.52) show the average correlation reflects study correlations

However, also have variation in correlations, reflected in a significant Q value, which tests homogeneity of correlations
How do we report the results?

- Meta-analysis was performed using 8 datasets measuring subjective norm-intention correlations for screening studies, with a total sample size of 1148. The sample-weighted average correlation between subjective norms and intentions was $r_+ = .47$, which indicates a medium-sized relationship in Cohen’s (1992) terms.

- However, there was significant heterogeneity in the results ($\chi^2 = 46.67$, $p < .001$), encouraging a search for moderator variables.
SN-INT (Your meta vs. Godin & Kok, 1996)

• Your meta (2011) $r_+ = .47$, based on 8 studies

• Godin & Kok (1996) $r_+ = .33$, based on 8 studies

• Both medium-sized relationships; can you think of reasons why the values differ?
Coffee

(Tuesday 11-11.30 am)
Writing up/dissemination
(Tuesday 11.30-12.30)

Wendy Hardeman, Richard Cooke, Rachel Shaw
Prisma statement

• Evidence-based minimum set of items for reporting in systematic reviews and meta-analyses
• Focused on RCTs initially
• 27-item checklist
• Four-phase flow diagram

http://www.prisma-statement.org/
Prisma checklist

Moher et al., The PRISMA Group (2009).

<table>
<thead>
<tr>
<th>Section/Topic</th>
<th>#</th>
<th>Checklist Item</th>
<th>Reported on Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>1</td>
<td>Identify the report as a systematic review, meta-analysis, or both.</td>
<td></td>
</tr>
<tr>
<td>ABSTRACT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structured summary</td>
<td>2</td>
<td>Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.</td>
<td></td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rationale</td>
<td>3</td>
<td>Describe the rationale for the review in the context of what is already known.</td>
<td></td>
</tr>
<tr>
<td>Objectives</td>
<td>4</td>
<td>Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design</td>
<td></td>
</tr>
<tr>
<td>METHODS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocol and registration</td>
<td>5</td>
<td>Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.</td>
<td></td>
</tr>
<tr>
<td>Eligibility criteria</td>
<td>6</td>
<td>Specify study characteristics (e.g., PICOS, length of follow-up and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.</td>
<td></td>
</tr>
<tr>
<td>Information sources</td>
<td>7</td>
<td>Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.</td>
<td></td>
</tr>
<tr>
<td>Search</td>
<td>8</td>
<td>Present full electronic search strategy for at least one database, including any limits used, such that it could be replicated.</td>
<td></td>
</tr>
<tr>
<td>Study selection</td>
<td>9</td>
<td>State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).</td>
<td></td>
</tr>
<tr>
<td>Data collection process</td>
<td>10</td>
<td>Describe methods of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.</td>
<td></td>
</tr>
<tr>
<td>Data items</td>
<td>11</td>
<td>List and define variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.</td>
<td></td>
</tr>
<tr>
<td>Risk of bias in individual studies</td>
<td>12</td>
<td>Describe methods for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.</td>
<td></td>
</tr>
<tr>
<td>Summarize measures</td>
<td>13</td>
<td>State the principal summary measures (e.g., risk ratio, difference in means).</td>
<td></td>
</tr>
<tr>
<td>Summary of synthesis</td>
<td>14</td>
<td>Describe the methods of handling and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.</td>
<td></td>
</tr>
<tr>
<td>Risk of bias across studies</td>
<td>15</td>
<td>Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).</td>
<td></td>
</tr>
<tr>
<td>Additional analyses</td>
<td>16</td>
<td>Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.</td>
<td></td>
</tr>
<tr>
<td>RESULTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study selection</td>
<td>17</td>
<td>Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.</td>
<td></td>
</tr>
<tr>
<td>Study characteristics</td>
<td>18</td>
<td>For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.</td>
<td></td>
</tr>
<tr>
<td>Risk of bias within studies</td>
<td>19</td>
<td>Present data on risk of bias of each study and, if available, any outcome-level assessment (see item 12).</td>
<td></td>
</tr>
<tr>
<td>Results of individual studies</td>
<td>20</td>
<td>For all outcomes considered (benefit or harms), present, for each study (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot.</td>
<td></td>
</tr>
<tr>
<td>Synthesis of results</td>
<td>21</td>
<td>Present results of each meta-analysis done, including confidence intervals and measures of consistency.</td>
<td></td>
</tr>
<tr>
<td>Risk of bias across studies</td>
<td>22</td>
<td>Present results of any assessment of risk of bias across studies (see item 15).</td>
<td></td>
</tr>
<tr>
<td>Additional analysis</td>
<td>23</td>
<td>Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression) (see item 16).</td>
<td></td>
</tr>
<tr>
<td>DISCUSSION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary of evidence</td>
<td>24</td>
<td>Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., health care providers, users, and policy makers).</td>
<td></td>
</tr>
<tr>
<td>Limitations</td>
<td>25</td>
<td>Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias).</td>
<td></td>
</tr>
<tr>
<td>Conclusions</td>
<td>26</td>
<td>Provide a general interpretation of the results in the context of other evidence, and implications for future research.</td>
<td></td>
</tr>
<tr>
<td>FUNDING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Funding</td>
<td>27</td>
<td>Describe sources of funding for the systematic review and other support (e.g., supply of data) role of funders for the systematic review.</td>
<td></td>
</tr>
</tbody>
</table>

doi:10.1371/journal.pmed.1000097.001
Prisma flow diagram

Writing up a meta-analysis

• Always include a table of studies; might need to put online rather than in the paper (depending on journal space restrictions)
• Conduct moderator analyses, these help understand what the overall results mean
• Use Cohen’s (1992) guidelines
• Put forward new ideas: meta-analysis results are more robust than individual studies, so if something occurs to you discuss it!
Writing up a meta-synthesis

• There’s an argument for keeping close to the structure of traditional systematic review
  – Maintain transparency, rigour
  – Makes it accessible for the same audience
  – Enables its use in evidence based health care

• Results sections often mirror those in primary qualitative research studies
  – Themes ($3^{rd}$ order constructs) with data extracts ($1^{st} + 2^{nd}$ order constructs)

• Journals with space for additional online resources/documents are useful
  – Submit search strategy, tables, matrices, diagrams to ensure transparency
Writing up a meta-synthesis

• Trustworthiness/validity are essential
• Coherent author voice ~ comes from a clear line of argument/narrative to be presented in synthesis
  – It’s your synthesis & not a repeat of the original authors’ work
• A critical review
  – Be mindful of your quality appraisal & include any concerns in your discussion of findings (1\textsuperscript{st} + 2\textsuperscript{nd} order constructs)
• Recommendations for policy/practice
  – Ensure your paper clearly outlines how it can be used within an evidence based health care model
Dissemination

- Produce tailored communication for each target group
- Work with representatives of the public and patients
Publishing in *Health Psychology Review* (Tuesday 12.30-1.15 pm)

Martin Hagger

Editor of Health Psychology Review
Evaluation and Feedback
(Tuesday 1.15-1.30 pm)