Rigour, results and relevance – What there is to know about critical appraisal!

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SURE
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EAHIL Conference 2018
9–13 July 2018 , Cardiff, Wales, United Kingdom

Introductions

- Who are you?
- Where are you from?
- Why do you want learn about critical appraisal?

Agenda

- Outline of critical appraisal
  - what is meant by critical appraisal
  - why you should do it

- Overview of quantitative methods
  - study designs used in health services research
- Group work and feedback

- Introduction to qualitative research
- Overview of qualitative methods
- Group work and feedback

- Checklists and Guides

“The medical literature can be compared to a jungle. It is fast growing, full of dead wood, sprinkled with hidden treasure and infested with spiders and snakes.”

Peter Morgan, Scientific Editor,
Canadian Medical Association Journal, 1985

Background

What is Evidence-based Medicine (EBM)

- "The integration of individual clinical expertise with the best available clinical evidence from systematic research."

David L Sackett, W Scott Richardson, William Rosenberg, R Brian Haynes *Evidence Based Medicine--How to Practice and Teach EBM*, 1996

Five Steps of Evidence Based Medicine

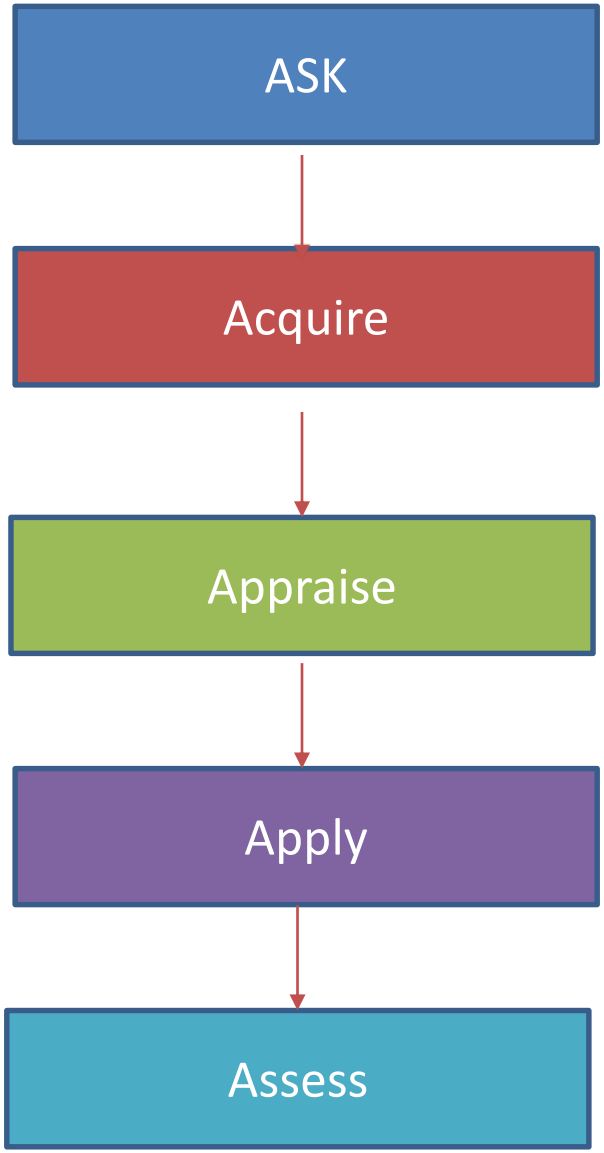
Ask: Converting the need for information into an answerable question

Acquire: Searching the best evidence with which to answer that question.

Appraise: Critically appraising the evidence for its validity impact and applicability

Apply: Integrating the evidence with our clinical expertise and patients' condition, values and circumstances.

Assess: the outcome in evaluating our effectiveness and efficiency in executing the above



Introduction to critical appraisal

Critical appraisal

"The process of systematically examining evidence to assess its validity, results and relevance before using it to inform a decision."

Cochrane Collaboration Glossary

Critical Appraisal

NOT:

- Negative dismissal of research
- Assessment of results alone
- Based on detailed statistical analysis
- Undertaken by expert researchers only

Critical Appraisal

IS:

- Balanced assessment of strengths of research against its weaknesses
- Assessment of research process and results
- Consideration of quantitative and qualitative aspects of research

Critical appraisal

"The science of 'trashing' papers" (Trish Greenhalgh)

Why Bother with critical appraisal?

- Published research (even in a peer-reviewed journal) is not always reliable or relevant.
- Increases the effectiveness of your reading enables you to exclude research studies that are too poorly designed to inform practice.
- Not difficult to develop skills - it's a common sense approach to reading papers

Which papers are worth spending more time on?

Which results are you going to trust / act upon?

"Many papers published in medical journals have potentially serious methodological flaws"

Professor of Primary Health Care and Dean for Research Impact at the Centre for Primary Care and Public Health at Queen Mary University of London.

Greenhalgh T, 1997. Getting your bearings (deciding what the paper isabout). *BMJ* 315: 243-6.

"Most research findings are false for most research designs and for most fields"

John P. A. Ioannidis
Professor of Health Research and Policy at Stanford School of Medicine

Ioannidis, J. P Why most published research findings are false *PLOS MEDICINE. 2005; 2 (8): 696-701*

Accuracy of abstracts – 1999

18-68% of abstracts in peer reviewed medical journals deficient:

- Information in the abstract not in main paper
- Abstract conclusions not substantiated in the paper

Pitkin RM *et al.* 1999

Accuracy of abstracts - 2013

164 trials of breast cancer chemotherapy:

- 33% showed bias in reporting primary endpoint (PE)
- 67% showed bias in reporting drug toxicity
- PE more likely to be reported when significant differences favoured intervention
- Positive PEs associated with under-reporting of toxicity.

Vera-Baddilo et al 2013

Reporting

"Accurate and transparent reporting is like turning the light on before you clean up a room: It doesn't clean it for you but does tell you where the problems are."

Frank Davidoff, Ann Intern Med 2000]

Critical appraisal is essential to:

- Combat information overload
- Answer questions
- Pursue research interest
- Assess health-related headlines
- Continuing Professional Development (CPD)

INDEPENDENT

MARCH 2016

Pint of beer a day could protect you from heart attacks, scientists say

Researchers found drinking around 1.4 pints of beer a day could reduce the risk of heart diseases by around 25 per cent

Samuel Osborne | @SamuelOsborne93 | Wednesday 11 May 2016 | 27 comments

8K shares

Mail Online

A beer a day keeps a at bay: Even one can risk of disease by a q

The Telegraph

Beer is good for you! A pint a day could protect your heart

share

Where did the story come from?

- The study was carried out by researchers from 10 research centres in Italy, Spain, Luxembourg and the US.
- The study was published in the peer-reviewed journal Nutrition, Metabolism and Cardiovascular Diseases.

What kind of research was this?

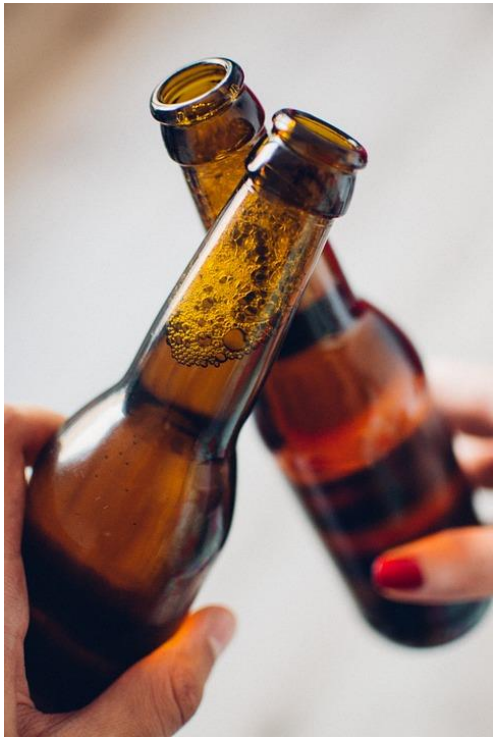
- This was a consensus document, a group of experts were brought together to review evidence on the topic and agree a statement outlining their conclusions.
- It is not clear from the document who chose the experts in the group, or whether they used standard systematic review methods to review published evidence.

What did the research involve?

- A group of doctors were asked to review the evidence on the effect of the consumption of moderate amounts of beer on human health.
- Each doctor carried out a search of the published literature before writing one section of the review, which was then shared for comments by other doctors.
- They arrived at a final version after meeting to discuss their findings.
- The researchers did ask two external experts to review the manuscript as part of the process before meeting to prepare their final version.

What were the basic results?

- Low to moderate consumption of beer seems to have the same effect of reducing the chances of cardiovascular disease as wine.
- As with all alcohol, beer increases the risk of cancer, even at low levels. The paper says that "most alcohol-related cancers (85-90%) are in fact due to heavy drinking", which they define as more than two drinks a day.



How did the researchers interpret the results?

- "Unless they are at high risk of alcohol-related cancers, there is no reason to discourage healthy adults who are already regular light-moderate beer consumers from continuing to follow the same pattern.
- "On the other hand, we do not recommend that adult life-long abstainers begin drinking for health reasons”

> If you don't drink beer, there's no reason to start – but if you're healthy and drink a small amount of beer, there's no need to stop.

Conclusion

- low to moderate drinking may have health benefits, but binge drinking or heavy drinking is very bad for your health.

If it doesn't look right…

…it probably isn't

It was funded by the Italian Association of the Beer and Malt Industries, Assobira. The researchers say Assobira had no role in designing or writing the study.

de Gaetano G, Costanzo S, Di Castelnuovo A, et al. Effects of moderate beer consumption on health and disease: A consensus document. Nutr Metab Cardiovasc Dis. 2016 Jun;26(6):443-67. doi: 10.1016/j.numecd.2016.03.007. Epub 2016 Mar 31.

NOT ALL EVIDENCE IS EQUAL

- Validity
- Reliability
- Applicability

- Internal validity how the research was performed
- External validity how the research and findings are presented

NOT ALL EVIDENCE IS EQUAL

- Validity
- **Reliability**
- Applicability

- Reliabilty is that any significant results must be more than a one-off finding and be repeatable.

- Other researchers must be able to perform exactly the same experiment, under the same conditions and generate the same results.

NOT ALL EVIDENCE IS EQUAL

- Validity
- Reliability
- Applicability

- Practitioners are not concerned with whether you can *measure* a difference

- BUT whether the chosen action **will *make*** a difference

Critical Appraisal

Validity Reliability Applicability

YES

NO

Assessing validity

"If you're going to trash a paper, you should do so before you even look at the results" Trish Greenhalgh 2013

General questions

- What is this paper about?
- Is it relevant?
- Do I trust it?
- What are the results?

Three R's

- **Rigour** - how good is the study
- **Results** - what is it actually telling us
- **Relevance** – is it relevant to our patient

Overview of Quantitative Methods

Research methods

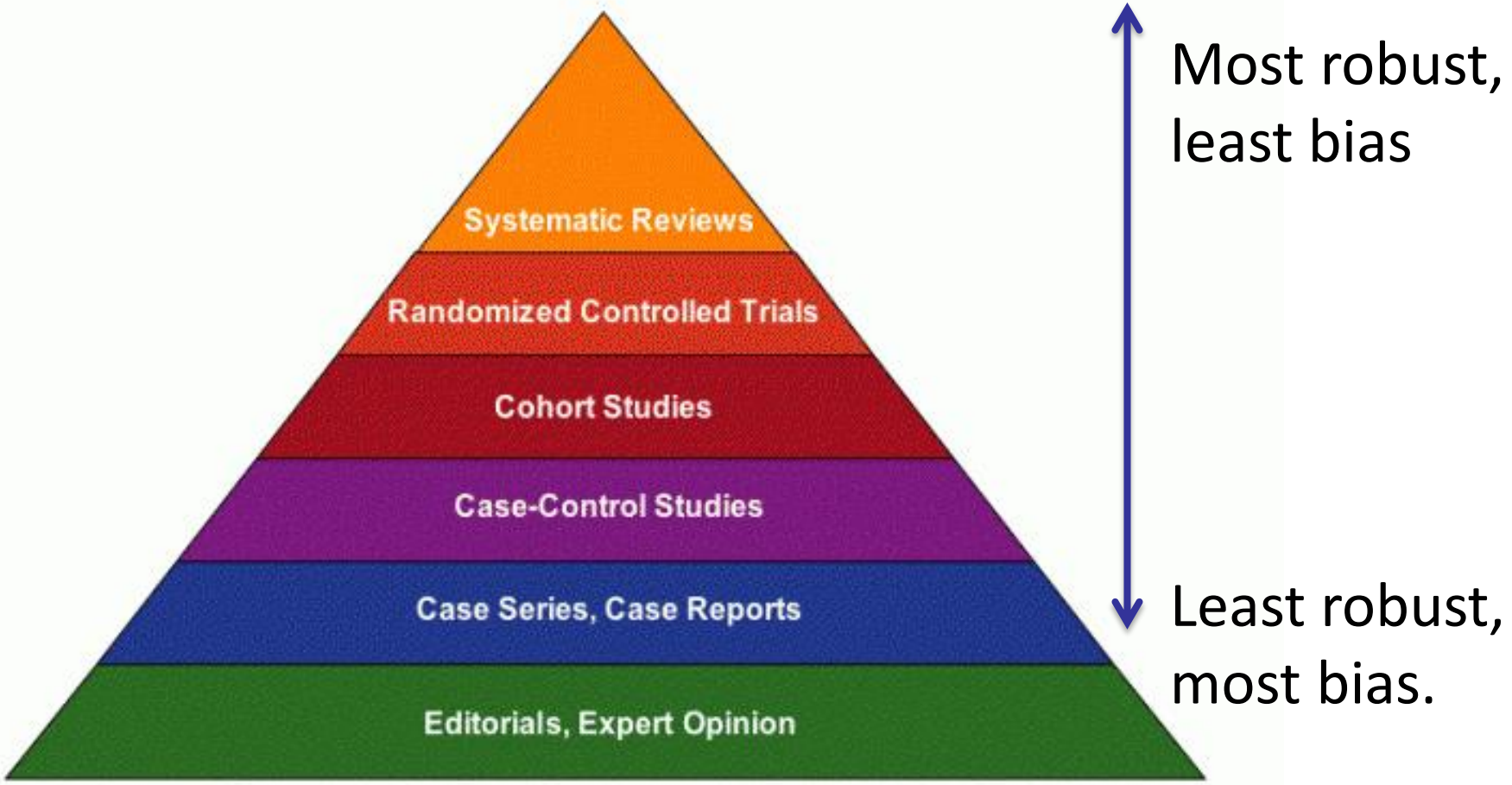
Quantitative

- Uses numbers to describe and analyse
- Useful for finding precise answers to defined questions

Qualitative

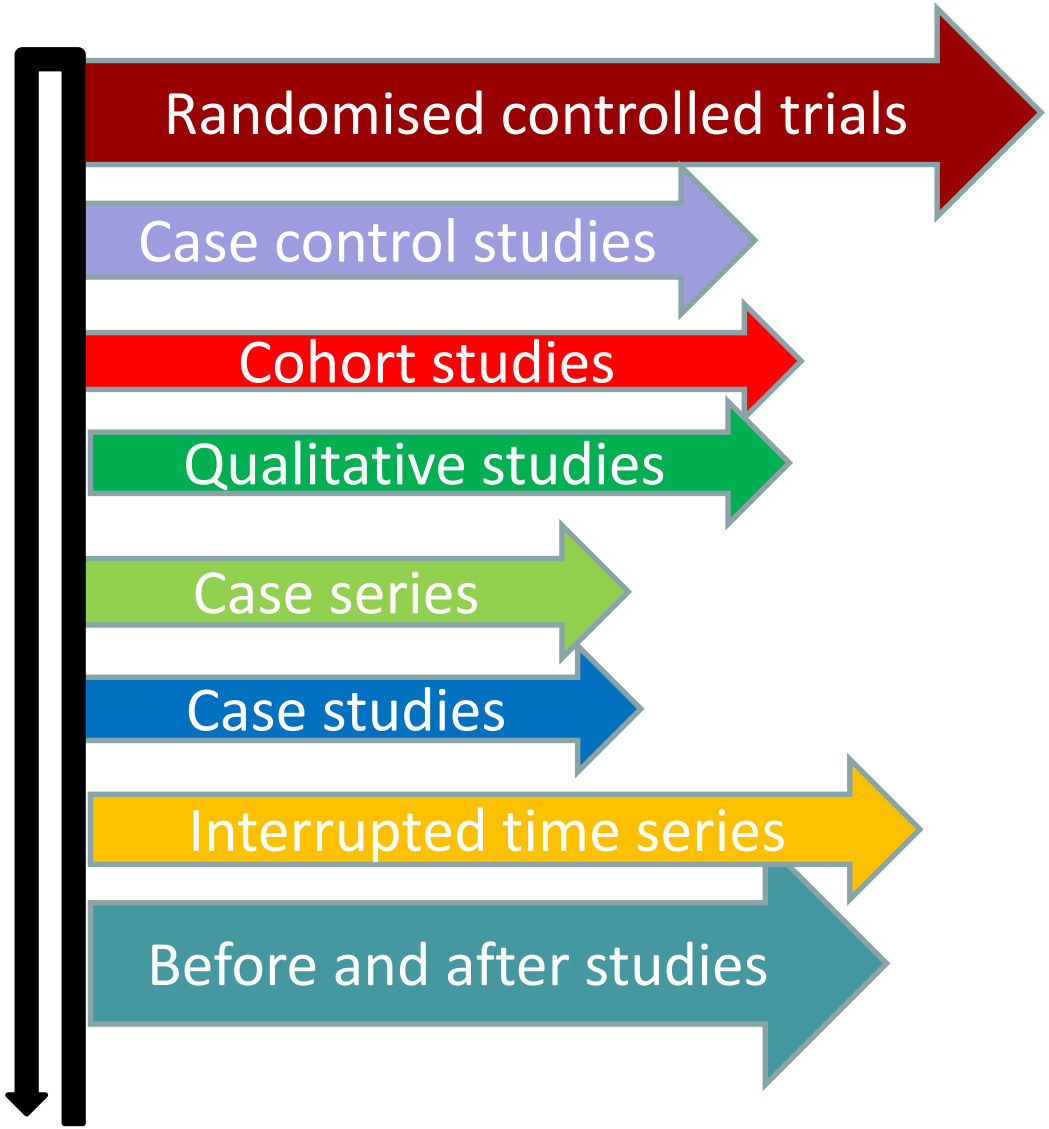
- Uses words to describe and analyse
- Useful for finding detailed information about people's perceptions and attitudes

The evidence pyramid



Guide to Research Methods: The Evidence Pyramid
http://servers.medlib.hscbklyn.edu/ebm/2100.htm

Study types


Randomised controlled trials
Case control studies
Cohort studies
Qualitative studies
Case series
Case studies
Interrupted time series
Before and after studies

Intervention	Systematic review RCT
Diagnostic test	Prospective cohort Case control
Screening	RCT Prospective cohort
Disease Epidemiology	Prospective cohort Case control
Reasons	Prospective cohort Cross-sectional survey Qualitative study

Advantages & Disadvantages

Study type	**Survey**	**Case control**	**Cohort**	**RCT**
Randomisation	no	no	no	yes
Blinding	no	no	difficult	yes
Bias	yes	yes	probably	probably not
Confounding	yes	yes	yes	no

Types of Questions

Is counselling effective in helping people lose weight?	RCT, SR
Are bisphosphonates associated with osteonecrosis of the jaw?	Case-control study
Why do people struggle to stay physically active?	Qualitative/ survey
Does smoking cause lung cancer?	Longitudinal cohort study

Study Category	Suggested Best Method of Investigation
Therapy	RCT>cohort>case control>case series
Diagnosis	prospective, blind comparison to a gold standard
Etiology/Harm	RCT>cohort>case control>case series
Prognosis	cohort>case control>case series
Prevention	RCT>cohort>case control>case series
Clinical Exam	prospective, blind comparison to a gold standard
Cost	Economic Analysis

Medical Library Association. *MLANET, Education, Web-based Learning.* Hp. Nov, 2001. Web-based Courses: EBM and the Medical Librarian. Available: http://www.mlanet.org/education/web/web_courses.html 10 Apr. 2005.

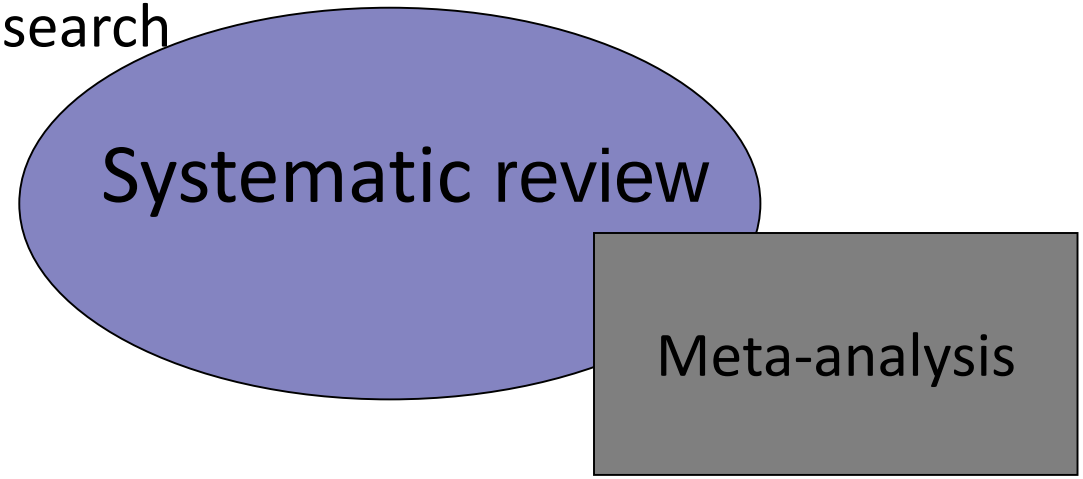
Observational Studies

Objective	Common Design
Prevalence	Cross sectional
Incidence	Cohort
Cause (in order of reliability)	Cohort, case-control, cross sectional
Prognosis	Cohort
Treatment effect	Controlled trial

Mann CJ. Observational research methods. Research design II: cohort, cross sectional, and case-control studies**.** Emerg Med J. 2003 Jan;20(1):54-60

Systematic Review & Meta-Analysis

A review of a clearly formulated question; systematic and explicit methods to identify, select, and critically appraise and summarise relevant research



statistical methods to combine results of individual studies.

http://www.cochrane.org/glossary

What are systematic reviews?

Steps of a systematic review

Step 1: Develop a question

Step 2: Identify the evidence

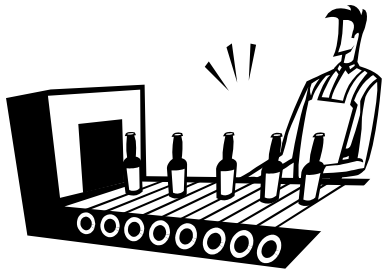
Step 3: Select studies

Step 4: Quality Assessment

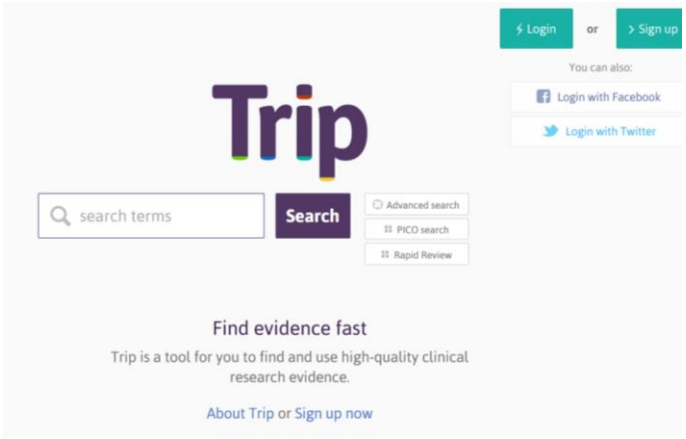
Step 5: Data extraction

Step 6: Synthesise the evidence

Step 7: Present findings



Trusted sources:



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Systematic reviews

- Overview of primary studies using clear and reproducible methods
- More trustworthy when well conducted
- Present results from **all** the relevant, reliable research
- Reliability dependent on the qu of included studies

Key Characteristics of Systematic Reviews

- Clearly stated title and objectives
- Comprehensive strategy to search for relevant studies (unpublished and published)
- Explicit inclusion or exclusion
- Clear presentation of characteristics of studies
- List of excluded studies and justification for exclusion
- Clear analysis of the results of the eligible studies
  - meta-analysis if appropriate and possible;
  - or narrative synthesis
- Structured report of the review clearly stating the aims, describing the methods and materials and reporting the results

Literature and other reviews

- **Literature** – information found in the literature
- **Scoping** - Preliminary assessment of potential size and scope of research literature
- **Rapid** - streamline traditional systematic review methods in order to synthesize evidence within a shortened timeframe.

Randomised Controlled Trials

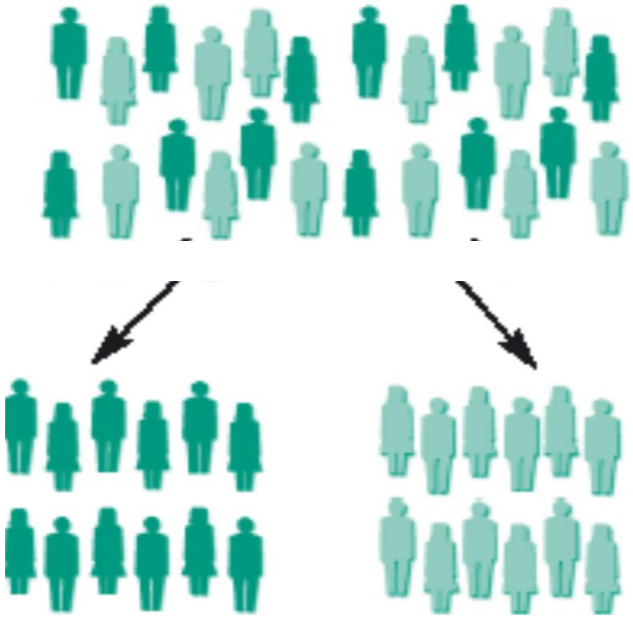
The strength of the RCT lies in the process of randomisation that is unique to this type of study design.

- Treatment group and ‘control’ group
- Random assignment to groups
- May involve ‘blinding’ of participants and researchers
- Used for therapeutic or diagnostic interventions
- Some interventions unsuitable for RCTs
- Expensive

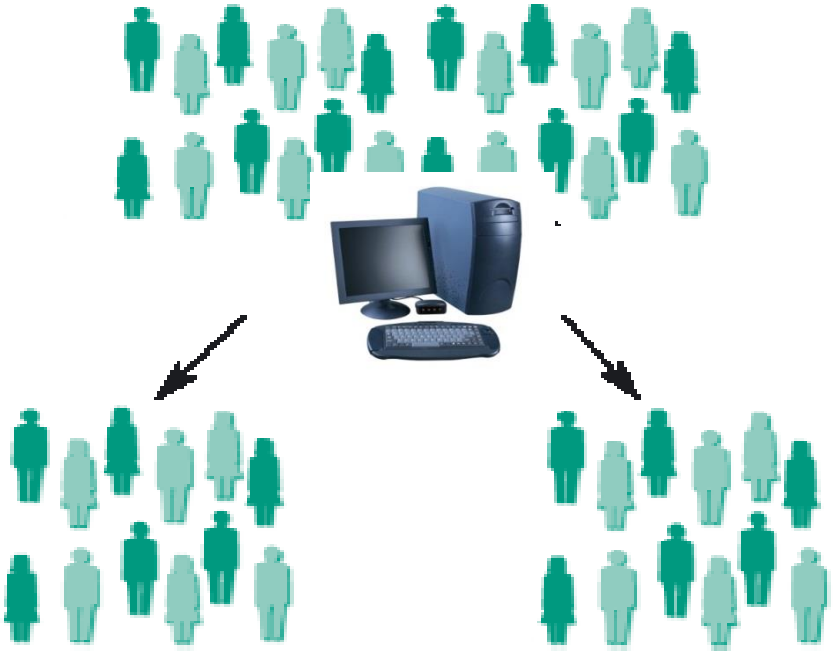
When methodologically sound…

- less possibility of introducing bias
- potential confounding factors evenly spread

Without Randomisation



With Randomisation



Cohort Study

Persons w/ and/or w/out disease are followed over time

Characteristics

- Two groups of people followed over time
- One group has received an intervention or exposure (e.g. smoking)
- Groups otherwise closely matched
- Groups followed over time

Retrospective: Refers to time of data collection

Prospective: Refers to time of data collection

Cohort Studies

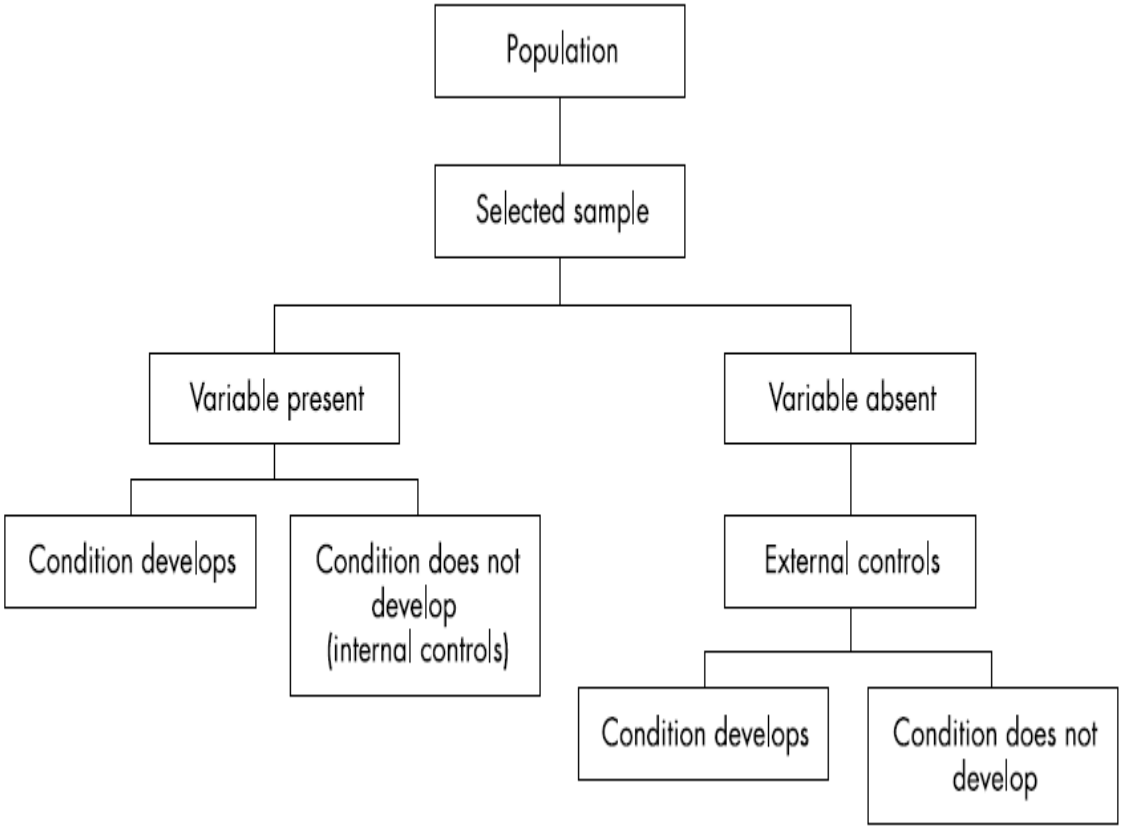


Figure 1 Study design for cohort studies.

Mann 2003

Case-Control Studies

Case Control Study: Persons w/ disease & those w/out are compared

Characteristics

- Used mainly for causation studies
- Patient with outcome matched to control
- Investigations made into possible causes in both patients
- May be only option in rare conditions

Case-Control Studies

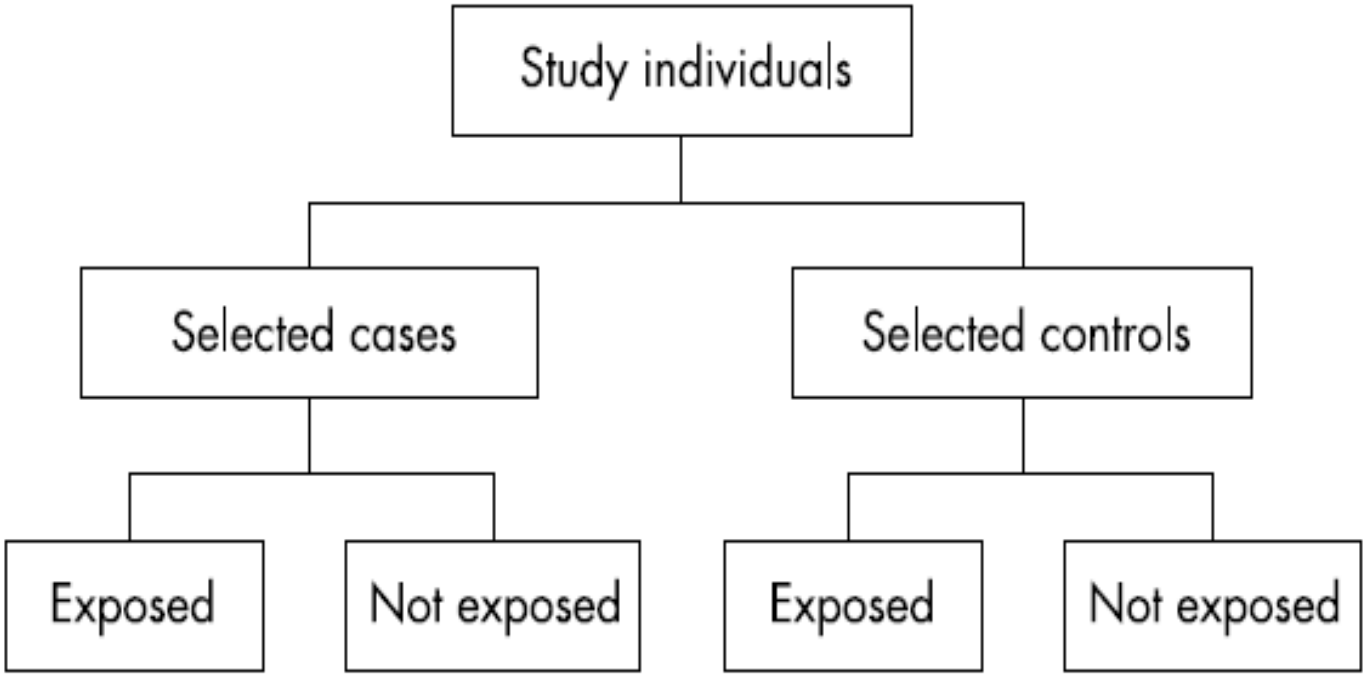


Figure 3 Study design for case-control studies.

Mann 2003

Cross-sectional Study

Cross-sectional Study: Presence or absence of exposure to possible risk factor measured at one point in time. Prevalence obtained.

- Population is screened for ‘condition’ and the ‘exposure’ at the same time
- Cases identified can be compared with “non-diseased” subjects
- Observations made at a single point in time

Cross sectional study

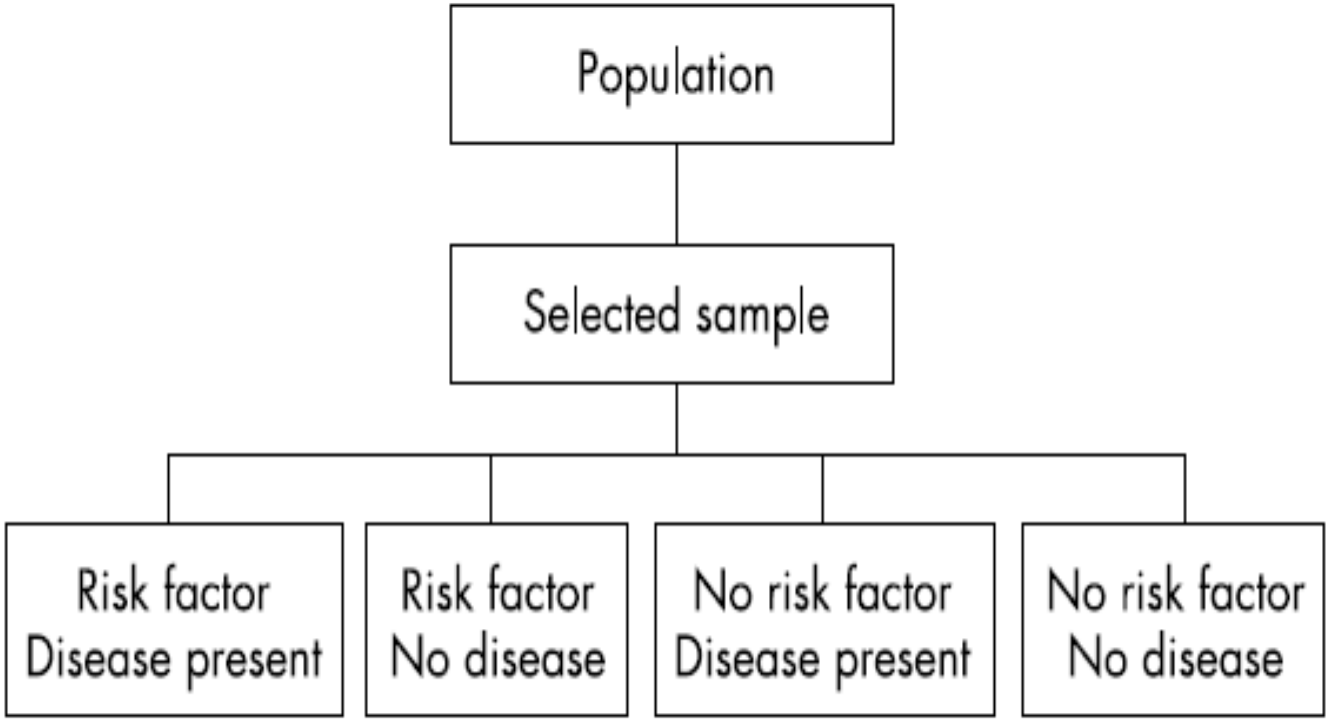
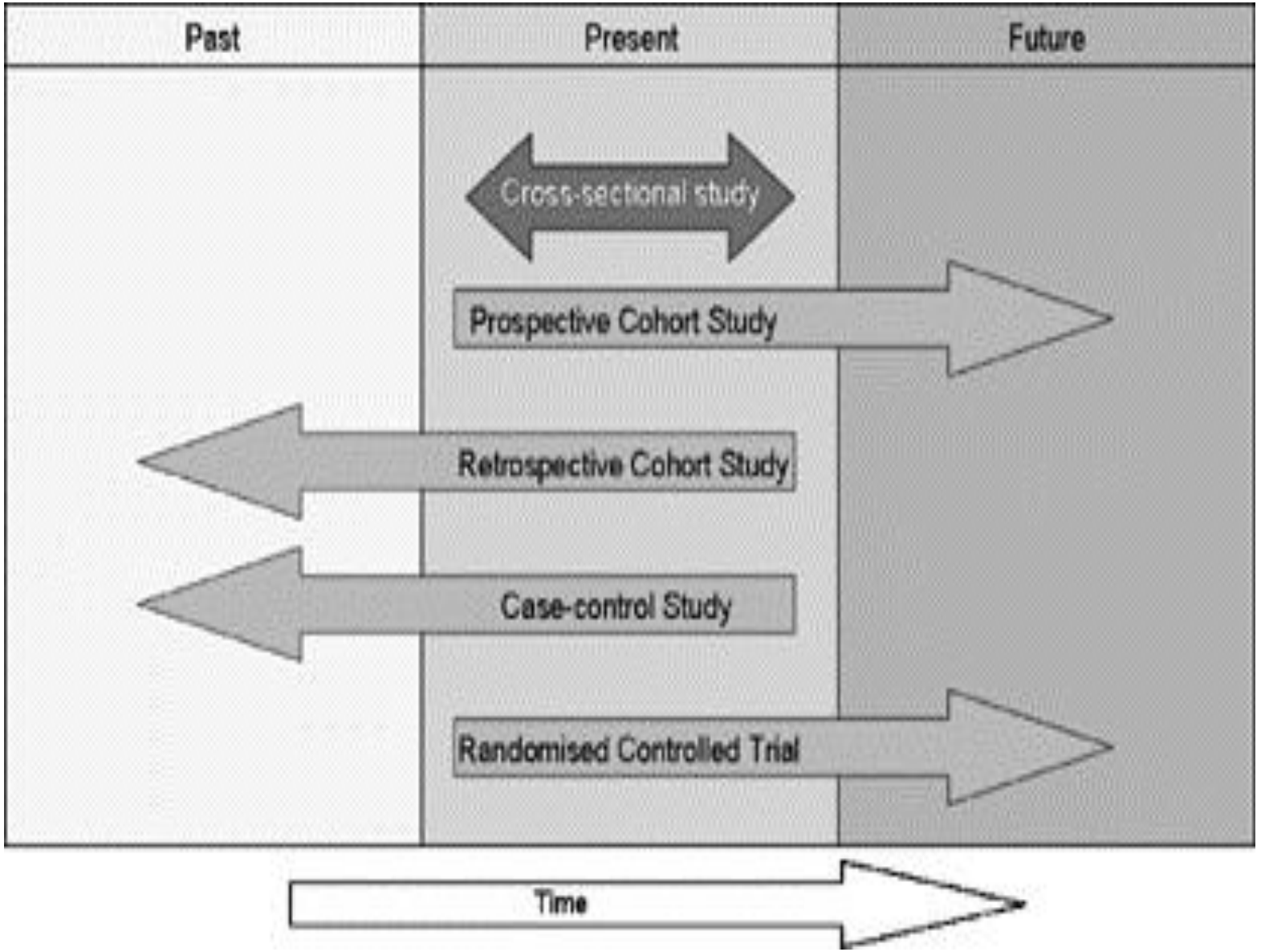


Figure 2 Study design for cross sectional studies

Mann 2003

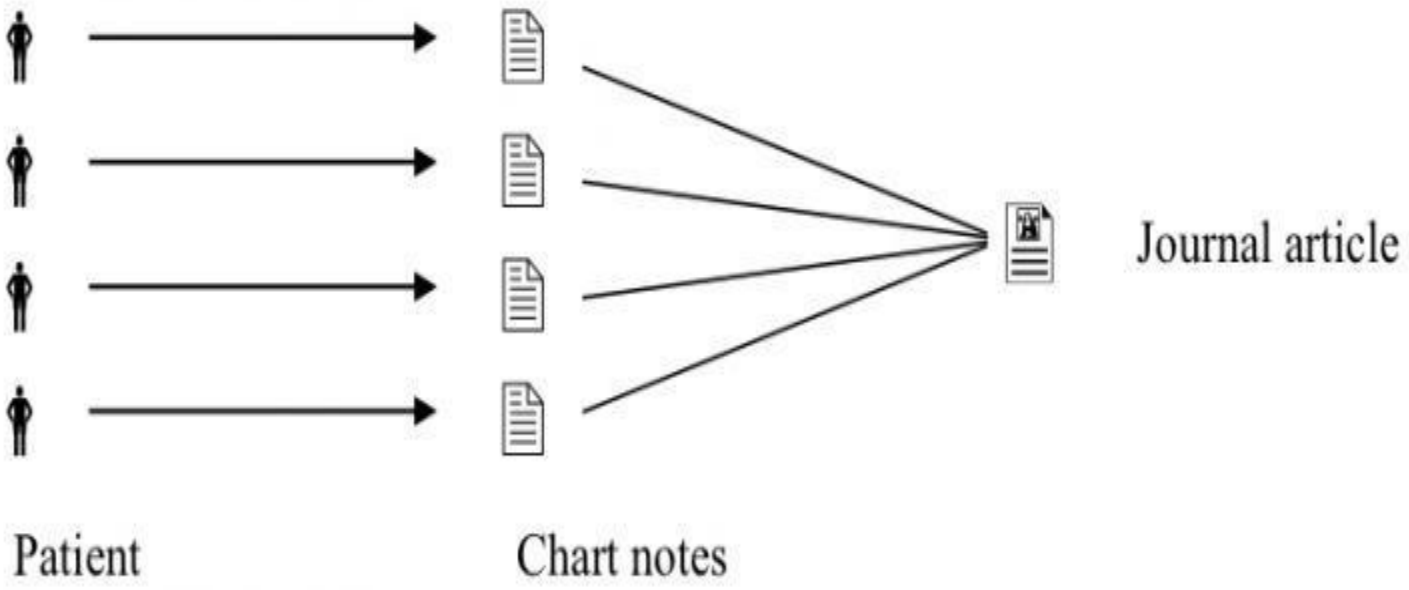


http://www.nature.com/ebd/journal/v7/n1/full/6400375a.html

Case Series and Case Reports

- A group or series of case reports involving patients who were given similar treatment. Reports of case series usually contain detailed information about the individual patients. This includes demographic information (for example, age, gender, ethnic origin) and information on diagnosis, treatment, response to treatment, and follow-up after treatment.
- Case series/reports have no control group (one to compare outcomes), so they have no statistical validity.
- The benefits of case series/reports are that they are easy to understand and can be written up in a very short period of time.

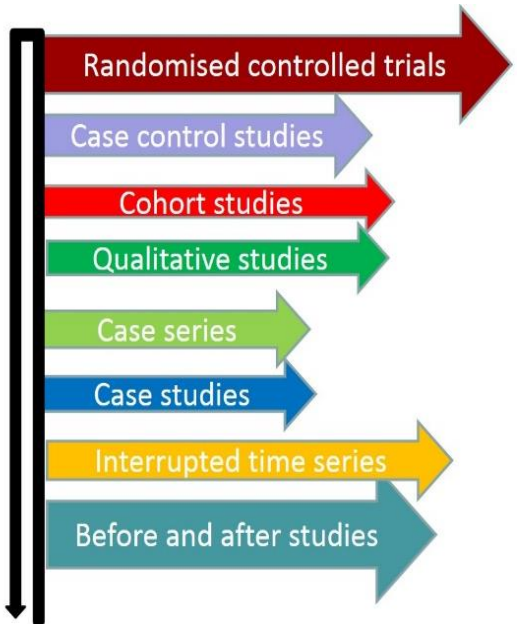
Case series study



https://hsl.lib.umn.edu/biomed/help/understanding-research-study-designs

Exercise

What Type of study is this?



What Type of study is this?

1

2

3

4

5

Initial Screening

- Is this the right study type?
  - An intervention looking at treatment outcomes
- Can you identify a PICO?
  - Population/problem
  - Intervention
  - Control group
  - Outcomes
    - Objective?
    - Primary , secondary or surrogate?

Research Question

- Is there a focused question?
- PICO/PECO
  - Population or problem
  - Intervention/Exposure
  - Control/comparator
  - Outcomes
    - What measures?

Randomisation/Allocation Concealment

- Avoids selection bias
- Randomisation process appropriate?
  - Method clearly described
  - Groups similar at the start of the trial?
    - Check baseline characteristics
- Allocation of patients hidden?

Study blinding

- Used to avoid observer bias
  - Knowledge can influence researcher observations
- Blinding not always possible/effective
  - Surgical treatments
  - Ethical considerations
  - Patient may be aware
- Blinded outcome assessment
  - Most important to avoid bias

Intervention

- Clear detail on intervention/control
  - What was being done by whom?
- Similar treatment
  - Were all groups treated equally apart from the intervention?
- Any between-group ‘contamination’?

Are the results due to chance?

Results can simply occur due to chance

The role of chance can be dealt with statistically:

- Calculating p value of a result
  - p values less than 0.05 are judged to be statistically significant ($p<0.05$)
- Sample size (power) calculations
  - Calculation of the sample size needed to ha enough power to detect a statistically signi result.

Follow-up

- How many patients completed study?
  - Full follow-up for at least 80%?
  - Any loss to follow up discussed?
  - Intention to treat analysis?

Approval/Protocol

- Was ethical approval obtained?
  - Reported?
- Is there a protocol
- Registered with clinical trial registry?
  - EU Clinical Trials Register https://www.clinicaltrialsregister.eu/
  - Clinical Trials.gov http://clinicaltrials.gov/
  - Current Controlled Trials http://www.controlled-trials.com/

And finally…

- Is the trial sponsored or are there competing interests?
- Were the important outcomes measured?
- Any side effects mentioned?
- Study limitations identified?
- Accurate abstract?

Probability (p values)

- P-value results range from 0 to 1
- The closer the p-value is to zero, the less chance there is that the effects of two interventions are the same

A p-value is a measure of statistical significance which tells us the probability of an event occurring due to chance alone

Confidence Intervals

- Shows whether the strength of the evidence is strong or weak.

- The general confidence level is 95%. Therefore, the 95% CI is the range within which we are 95% certain that the true population value lies

Tells us whether the result is significant or not

Power

- The ability of a study to demonstrate an association or causal relationship between two variables, given that an association exists.
- 80% power in a clinical trial = 80% chance of ending up with a p value of less than 5% (ie a statistically significant treatment effect)
- Low powered studies may be too small to detect any difference.

Risk

- Odds ratio
  - The ratio of the odds of an event occurring in one group to the odds of it occurring in another group
- Relative risk/risk ratio
  - The risk of an event (or of developing a disease) relative to exposure.

Number needed to treat (NNT)

- Number of patients needing to be treated for one person to benefit
- NNTs for **treatment** should be small (range: 2 – 4)
- NNTs for **prophylaxis** will be larger

http://www.medicine.ox.ac.uk/bandolier/Extraforbando/NNTextra.pdf

Bias

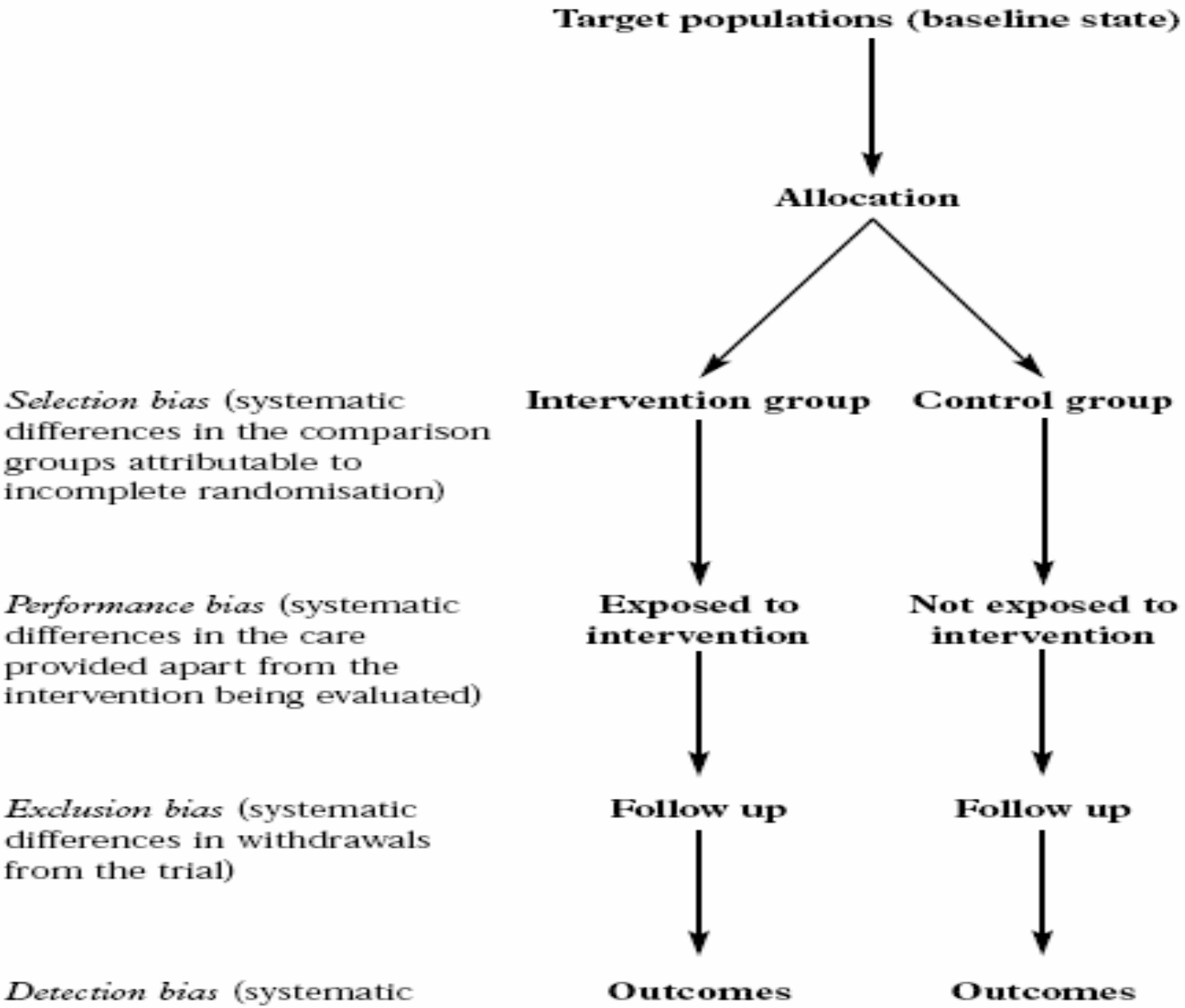
- Distorts results from the truth
- Numerous types of bias e.g. sampling, volunteer, observer…
- Need to understand where bias may be present and its effect

Image: archive.student.bmj.com/.../05/education/143.php

Bias

- Numerous types of bias, including:
  - Sampling/Selection (not representative)
  - Volunteer (healthier people)
  - Observer (avoided by study blinding)

http://www.medicine.ox.ac.uk/bandolier/Extraforbando/Bias.pdf



(Greenhalgh 2001)

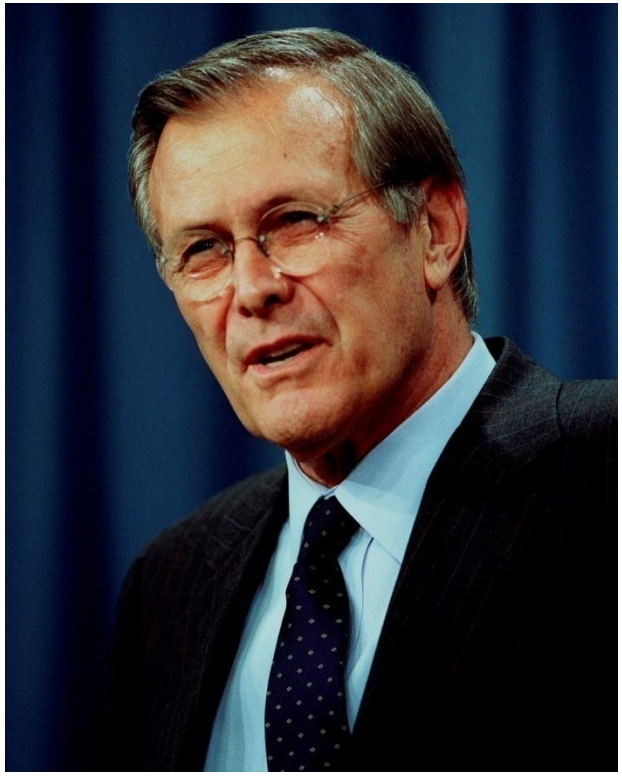
Odds ratio (OR)

- Expresses the odds of having an event compared with not having an event in two different groups

$$\text{OR} = \frac{\text{odds in the treated group}}{\text{odds in the control group}}$$

Confounders

"…there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns -- the ones we don't know we don't know."



Donald Rumsfeld

http://en.wikiquote.org/wiki/Donald_Rumsfeld

Confounding

- Is there another explanation?
- An error in the way results are interpreted
- Common confounders include:
  - Age
  - Gender
  - Smoking
- Results can be adjusted known confounders

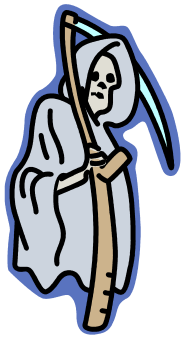
Example 1

Confounding factor

Age

Grey hair

Risk of death



Variable of interest

Outcome

Example 2

Smoking

Coffee

Myocardial infarction

http://www.medi-mouse.com/ebm/

Be aware of:

- Insufficient sample size
- Blinding
  - Participants and researchers should be blinded from the intervention received
- Selection bias
  - Sample isn't representative of the target population
- Information bias
  - reporting or observer bias
- Confounders

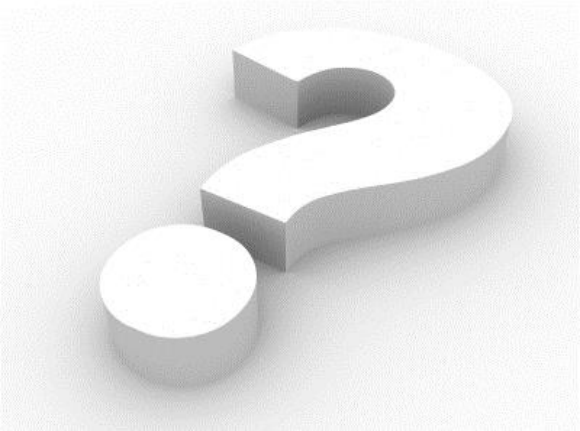
If it doesn't look right…it probably isn't!

CONSORT 2010 checklist of information to include when reporting a randomised trial*

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a randomised trial in the title	
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale	
	2b	Specific objectives or hypotheses	
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	
Participants	4a	Eligibility criteria for participants	
	4b	Settings and locations where the data were collected	
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	
	6b	Any changes to trial outcomes after the trial commenced, with reasons	
Sample size	7a	How sample size was determined	
	7b	When applicable, explanation of any interim analyses and stopping guidelines	
Randomisation:			
Sequence generation	8a	Method used to generate the random allocation sequence	
	8b	Type of randomisation; details of any restriction (such as blocking and block size)	
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those	

Key questions

1. Is there a focused research question?
2. Did the authors look for appropriate studies?
3. Will the search strategy find all the evidence?
4. Are all relevant studies and data included?
5. Was study quality considered?
6. Is key information available on included studies?



Group exercise
Systematic Review

Group Exercise

Hanson S, Jones A. Is there evidence that walking groups have health benefits? A systematic review and meta-analysis. *Br J Sports Med* *doi:10.1136/bjsports-2014-094157*

PICO/PECO

Did the authors have a clearly focused question?

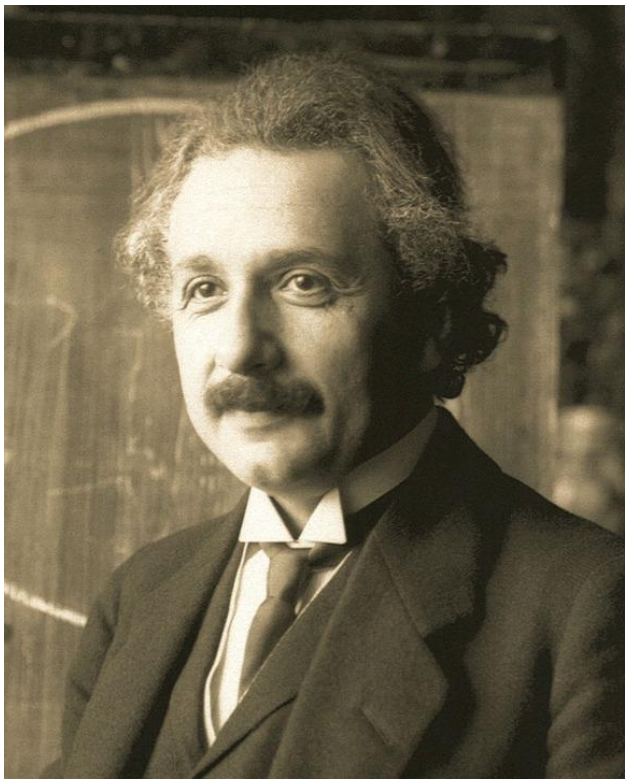
Population or problem	
Intervention/Exposure	
Control/comparator	
Outcomes	

Introduction to qualitative research


DKL EH11

Qualitative research uses individual in-depth interviews, focus groups or questionnaires to collect, analyse and interpret data on what people do and say. It reports on the meanings, concepts, definitions, characteristics, metaphors, symbols and descriptions of things.

“Not everything that can be counted counts and not everything that counts can be counted”



Albert Einstein
1879-1955

Qualitative research methods:

- are concerned with opinions, feelings and experiences
- describes social phenomena as they occur naturally - no attempt is made to manipulate the situation - just understand and describe
- understanding is sought by taking a holistic perspective / approach, rather than looking at a set of variables
- qualitative research data is used to help us to develop concepts and theories that help us to understand the social world
- qualitative data is collected through direct encounters i.e. through interview or observation and is rather time consuming

http://libweb.surrey.ac.uk/library/skills/Introduction%20to%20Research%20and%20Managing%20Information%20Leicester/page_52.htm

What is qualitative research?

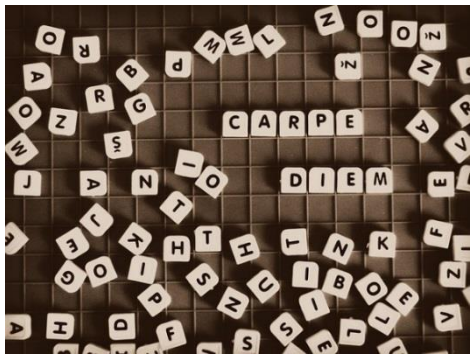
- **Experiences**
- **Meaning**
- **Feelings**

Overview of qualitative methods

Research methods

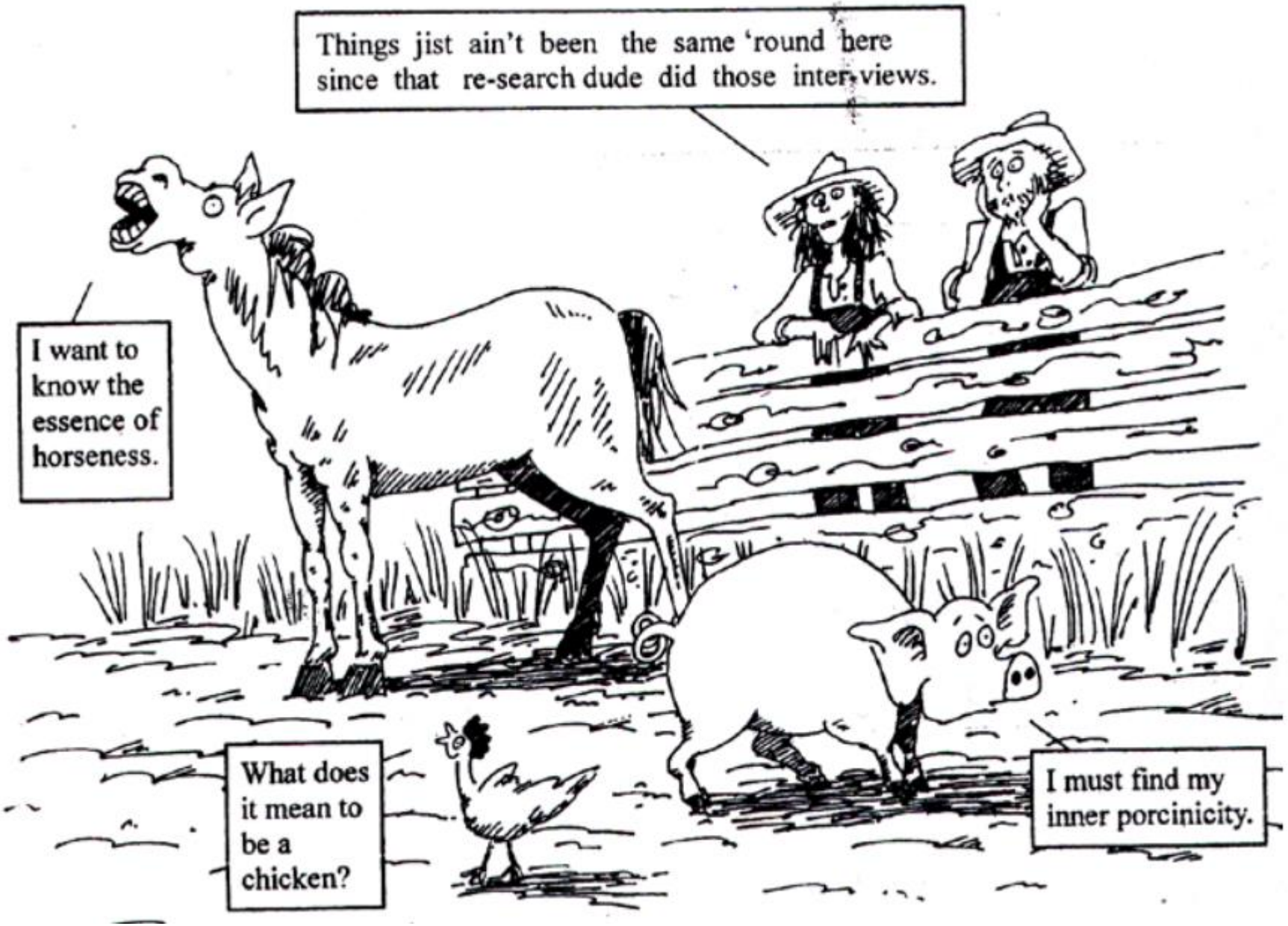
Quantitative

- Uses numbers to describe and analyse
- Useful for finding precise answers to defined questions



Qualitative

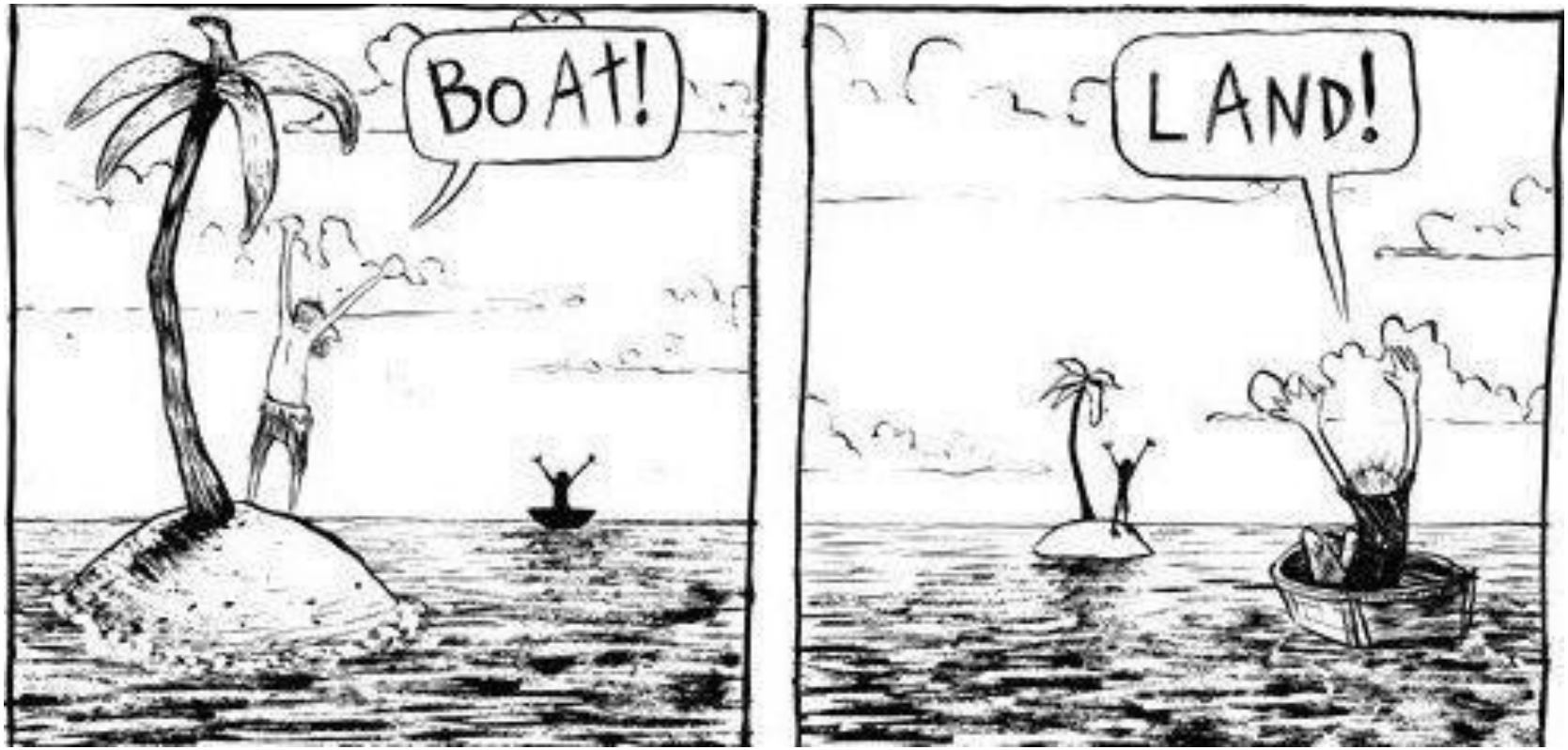
- Uses words to describe and analyse
- Useful for finding detailed information about people's perceptions and attitudes



http://fieldresearch.msf.org/msf/bitstream/10144/84230/1/Qualitative%20research%20methodology.pdf

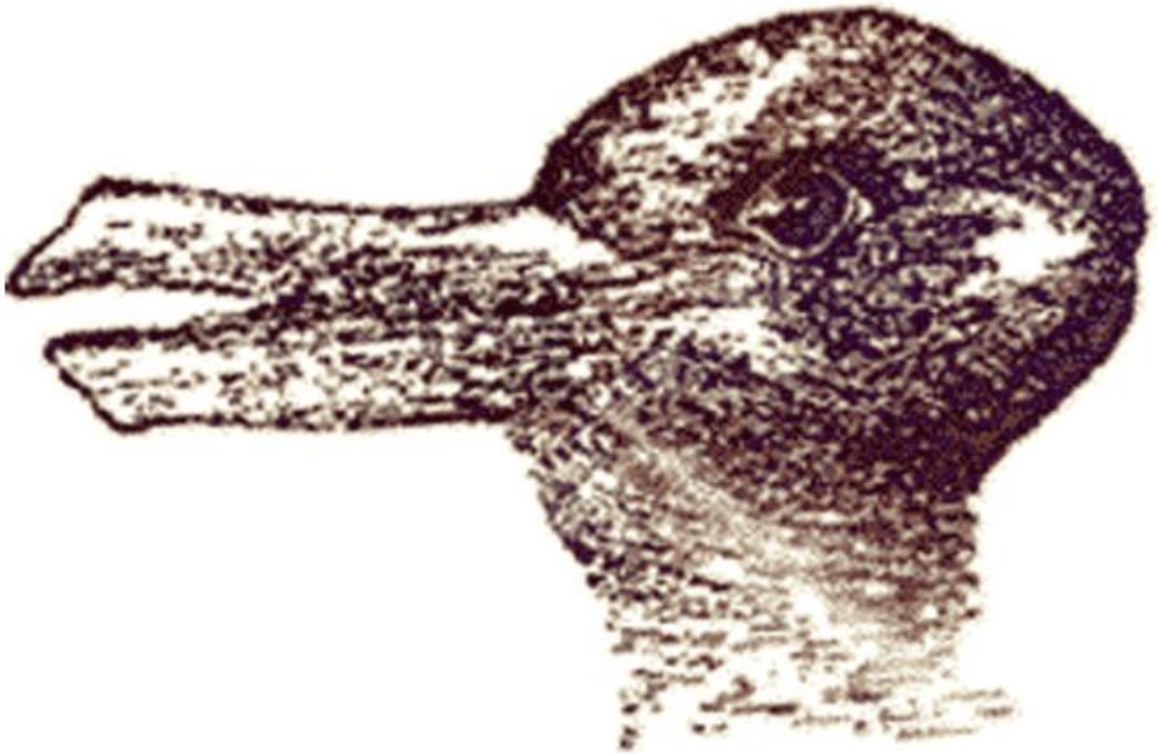
Qualitative research

Allows us to understand different perspectives



http://rolobotrambles.com/category/general/

What can you see?



https://www.brainbashers.com/showillusion.asp?72

Qualitative research

- Provides the individual perspective
- Highlights meaning – the ‘why?’
- Enhances understanding of behaviour
- Barriers to/facilitators of change
- Improves quantitative research
  - Identifying neglected outcomes
  - Making an intervention more effective

Qualitative Research

- Interviews
- Focus groups
- Observation
- Analysis of written, printed or recorded data

Qualitative research

- Narrative
  - Descriptions of an individual's events or happenings
- Phenomenological
  - Describes a common experience
- Grounded theory
  - Thematic – collect data then develop theories
- Ethnographic
  - [Participant] observation of a group's lived experience
- Case study
  - Evaluates potential policy changes/ initiatives

Qualitative research

- Credible
  - do we have confidence in the results?
- Transferable
  - Can they be applied in similar settings?
- Dependable
  - appropriate design, methodology and process?

Qualitative Research Questions ?

To explore…

To understand…

Attitudes and beliefs

Perceptions

Role relationships

Why do…?

Barriers and facilitators

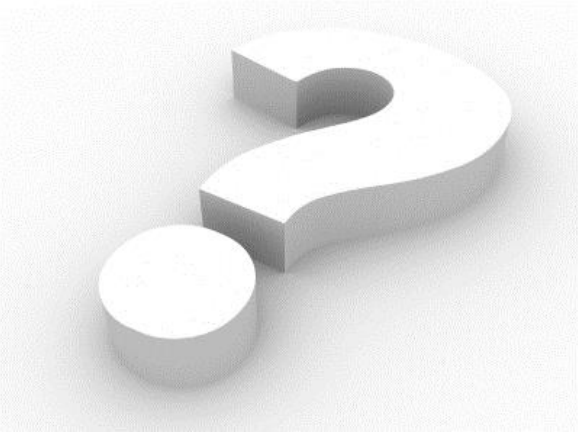
Coping strategies

How do…?

http://www.kcl.ac.uk/sspp/policy-institute/scwru/pubs/2012/conf/samsi26jul12.pdf

Clear Statement of Research Aims? SPICE identifiable?

- Setting
- Perspective
- Intervention/Phenomen
- Comparison
- Evaluation/Exploration



SPICE

What to consider in the SPICE framework

Setting	Where? In what context?
Perspective	For who?
Intervention / Interest	What?
Comparison	What else?
Evaluation	How well?

http://esquiresheffield.pbworks.com/f/Focusing.pdf

Ask yourself, which of these topics and issues can be researched qualitatively?

1 The link between playing violent computer games and violent behaviour in children aged 10–15.

2 Exploring the barriers and facilitators to retaining nursing staff in critical care units.

3 The link between living near to someone and being friends with them.

4 The experience of living with an autistic child.

Qualitative Research Questions

- To understand the attitudes, the social pressures (subjective norms) and the enabling factors (environment: services access and quality, time, money etc.,) that influenced the decisions and ability of pregnant women and their families to utilize available safe birthing. (Khan et al., 2012)

- To explore barriers and facilitators to cancer education. (Louis-Nance et al., 2012) How do mentor mothers living with HIV in South Africa cope with potential impact on their role? (Dhlamini et al., 2012)

- What is the lived experience of mothers and families aiming for the clinical ideal of breastfeeding their new born for 6 months? (Hoddinott et al., 2012)

http://www.kcl.ac.uk/sspp/policy-institute/scwru/pubs/2012/conf/samsi26jul12.pdf

Is the study design appropriate?

- Why did authors choose this design?
- Would a quantitative method be better?

Is the sampling strategy clearly described and justified?

- From where?
- Who did it and how?
- Why?
- Why people did/did not take part

Qualitative sampling

- Size of the sample not an issue
- Small compared to quantitative
- Inclusion criteria
  - knowledge of the topic to be examined
- Saturation
  - Point where new themes or information stop emerging

Were the data collected in a way that considered the research issue?

- Methods clear?
- Appropriate setting?
- How were data recorded?
- Methods modified?
- Multiple methods used?
  - Triangulation
- Data saturation achieved?

Relationship between researcher and participants adequately considered?

- Reflexivity (researcher bias)
  - Is the researcher role examined
    - Developing research questions?
    - Proposed data collection?
  - How did researcher(s)deal with bias?

Have ethical issues been taken into consideration?

- Ethics committee approval sought and obtained?
- How was the research explained to participants?
  - Expectations
  - Timescale
  - Informed consent obtained?
- Any confidentiality issues?

Data analysis/interpretation sufficiently rigorous?

- Methods explicit?
- How were themes and concepts identified?
- Enough data to support findings?
- More than one researcher?
- Opposing viewpoints considered?
- Impact of researcher on analysis and data selection?

Are the findings credible?

- Clearly states results?
- Sufficient data?
- Use of original data?
- Selected how?
  - Rich – participant vs researcher voice?
  - Explanations plausible?
- Addresses research aim?
- Related to other studies?

How valuable is it?

- Any conflict of interest?
- Does it add anything new?
- Are study strengths and weaknesses described?
- Suggestions for further research?
- Conclusions accurately reflected in abstract?

Group exercise
Qualitative study

Group Exercise

Kristiansen, E, Roberts G.C. Young elite athletes and social support: coping with competitive andorganizational stress in ‘‘Olympic’’ competition. Scand J Med Sci Sports 2010: 20: 686–695
doi: 10.1111/j.1600-0838.2009.00950.x

Checklists and guides

How to do critical appraisal?

- Common sense
- Simple checklists
  - range available
  - focus on the important elements

CASP CHECKLISTS

This set of eight critical appraisal tools are designed to be used when reading research, these include tools for Systematic Reviews, Randomised Controlled Trials, Cohort Studies, Case Control Studies, Economic Evaluations, Diagnostic Studies, Qualitative studies and Clinical Prediction Rule.

CASP Checklists (click to download)

CASP Systematic Review Checklist	CASP Qualitative Checklist
CASP Randomised Controlled Trial Checklist	CASP Case Control Checklist
CASP Diagnostic Checklist	CASP Cohort Study Checklist
CASP Economic Evaluation Checklist	CASP Clinical Prediction Rule Checklist

CEBM

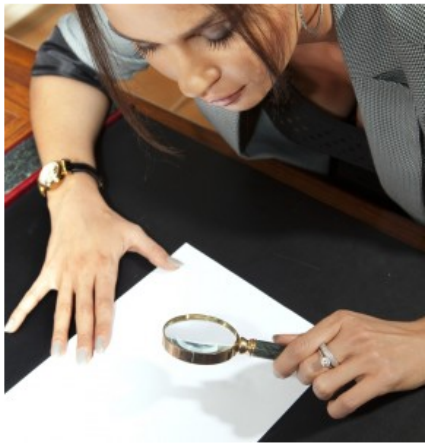
Critical Appraisal tools

Critical appraisal is the systematic evaluation of clinical research papers in order to establish:

1. Does this study address a clearly focused question?
2. Did the study use valid methods to address this question?
3. Are the valid results of this study important?
4. Are these valid, important results applicable to my patient or population?

If the answer to any of these questions is “no”, you can save yourself the trouble of reading the rest of it.

This section contains useful tools and downloads for the critical appraisal of different types of medical evidence. Example appraisal sheets are provided together with several helpful examples.



Critical Appraisal Worksheets

English

- Systematic Review Critical Appraisal Sheet
- Diagnosis Critical Appraisal Sheet
- Prognosis Critical Appraisal Sheet
- Therapy / RCT Critical Appraisal Sheet

German – Translated by Johannes Pohl and Martin Sadilek

- Systematic Review German Translation (PDF)
- Diagnosis German Translation (PDF)
- Prognosis German Translation (PDF)
- Therapy / RCT German Translation (PDF)

Spanish – Translated by Ana Cristina Castro

- Systematic Review (PDF)
- Diagnosis (PDF)

Health Evidence™

Helping public health use best evidence in practice

Quality Assessment Tool – Review Articles

Instructions for completion:

Please refer to the attached dictionary for definition of terms and instructions for completing each section. For each criteria, score by placing a check mark in the appropriate box.

First Author: _____

Year: _____

Journal: _____

Reviewer: _____

CRITERION	YES	NO
Q1. Did the authors have a clearly focused question [population, intervention (strategy), and outcome(s)]?		
Q2. Were appropriate inclusion criteria used to select primary studies?		
Q3. Did the authors describe a search strategy that was comprehensive? *Circle all strategies used*: ▪ health databases ▪ psychological databases ▪ social science databases ▪ educational databases ▪ other ▪ handsearching ▪ key informants ▪ reference lists ▪ unpublished		
Q4. Did search strategy cover an adequate number of years?		

For questions **5, 6**, and **8**, please choose the column relating to the appropriate methodology. Strike a line through the column that does not apply.

Q5. Quantitative reviews: Did the authors describe the level of evidence in the primary studies included in the review? ▪ Level I → RCTs only ▪ Level II → non-randomized, cohort, case-control ▪ Level III → uncontrolled studies	**Q5.** Qualitative reviews: Do the authors provide a clear description of the range of methods in each of the primary studies included in the review?		
Q6. Quantitative reviews:	**Q6.** Qualitative reviews:		

http://www.healthevidence.org/our-appraisal-tools.aspx

Support Unit for Research Evidence (SURE)

Questions to assist with the critical appraisal of qualitative studies[1]

Citation:

1. Does the study address a clearly focused question/hypothesis	Yes	Can't tell	No
Setting?			
Perspective?			
Intervention or Phenomena			
Comparator/control (if any)?			
Evaluation/Exploration?			
2. Is the choice of qualitative method appropriate? Is it an exploration of eg behaviour/reasoning/ beliefs)?			

http://www.cardiff.ac.uk/insrv/libraries/sure/checklists.html

Published Critical Appraisal Checklists

1. Systematic (literature) reviews of primary research studies

- SURE checklist: Systematic Review
- Critical Appraisal Skills Programme (CASP) Systematic Review
- AMSTAR: a measurement tool to assess the methodological quality of systematic reviews [SCORE]

2. Intervention (experimental) studies

- SURE checklist: RCT and other experimental studies
- Critical Appraisal Skills Programme (CASP) Randomised Controlled Trials (RCTs)
- The Cochrane Collaboration's tool for assessing risk of bias [SCORE]

3. Observational studies

- Critical Appraisal Skills Programme (CASP) Cohort Studies
- Critical Appraisal Skills Programme (CASP) Case Control Studies
- Newcastle Ottawa Scale for non-randomised studies [SCORE]

4. Qualitative (views and opinions) studies

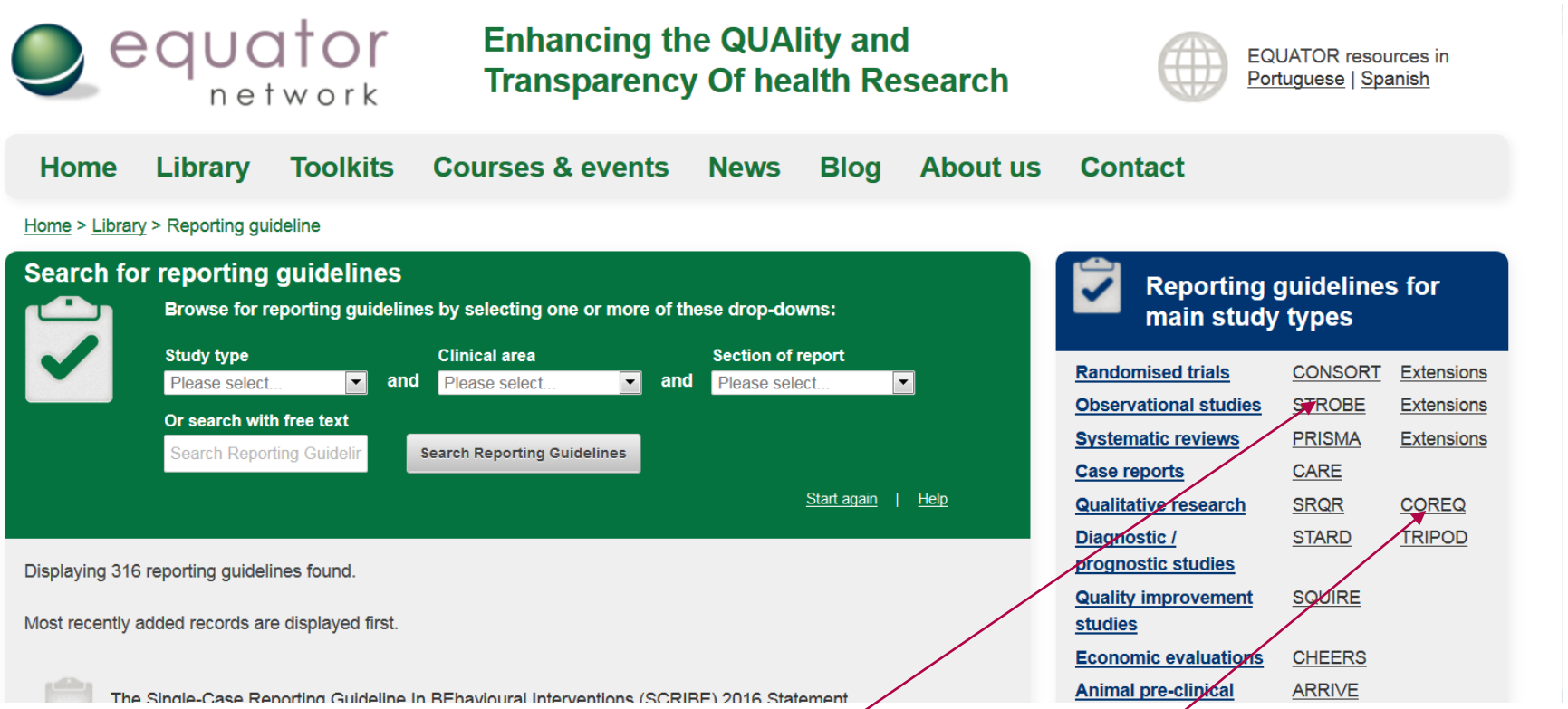
- SURE checklist: Qualitative studies
- Critical Appraisal Skills Programme (CASP) Qualitative Research

5. Diagnostic accuracy studies

- Critical Appraisal Skills Programme (CASP) Diagnostic Test Studies
  QUADAS-2 [SCORE]

SURE

Reporting guidelines for main study types



http://www.equator-network.org/reporting-guidelines/

Critical analysis sources

NHS choices Behind the Headlines

DC's Improbable Science

CANCER RESEARCH UK Science Update Blog

Bad Science

More or Less: Behind the Stats (BBC Radio 4 podcast)

Critical Appriasal Checklists

- CASP UK Website

http://www.casp-uk.net/

- Centre for Evidence-based Medicine

http://www.cebm.net/critical-appraisal/

- Health Evidence

http://www.healthevidence.org/our-appraisal-tools.aspx

- SIGN - Critical appraisal: Notes and checklists

http://www.sign.ac.uk/methodology/checklists.html

- SURE Critical Appraisal Checklists

http://www.cardiff.ac.uk/insrv/libraries/sure/checklists.html

Critical Appraisal Resources (1)

- What is Critical appraisal?

http://www.medicine.ox.ac.uk/bandolier/painres/download/whatis/what_is_critical_appraisal.pdf

- Critical appraisal of a journal article

https://www.ucl.ac.uk/ich/services/library/training_material/critical-appraisal

- CONSORT Guidelines for reporting RCTs

http://www.consort-statement.org/consort-statement/

- Glossary of terms used in Randomised Controlled Trials (RCTs)

http://www.nice.org.uk/website/glossary/glossary.jsp?alpha=A

- KT Clearinghouse - Tips on Critical Appraisal of Evidence

http://ktclearinghouse.ca/cebm/practise/ca

- Mann, CJ. Observational research methods. Research design II: cohort, cross sectional, and case-control studies. Emerg Med J 2003;20:54-60 doi:10.1136/emj.20.1.54

http://emj.bmj.com/content/20/1/54.short

Critical Appraisal Resources (2)

- What are confidence intervals and p-values?

http://www.medicine.ox.ac.uk/bandolier/painres/download/whatis/what_are_conf_inter.pdf

- Students 4 Best Evidence

http://www.students4bestevidence.net/

- Qualitative Research

http://www.edu.plymouth.ac.uk/resined/qualitative%20methods%202/qualrshm.htm#A%20focus%20on%20natural%20settings

- A Guide to Using Qualitative Research Methodology

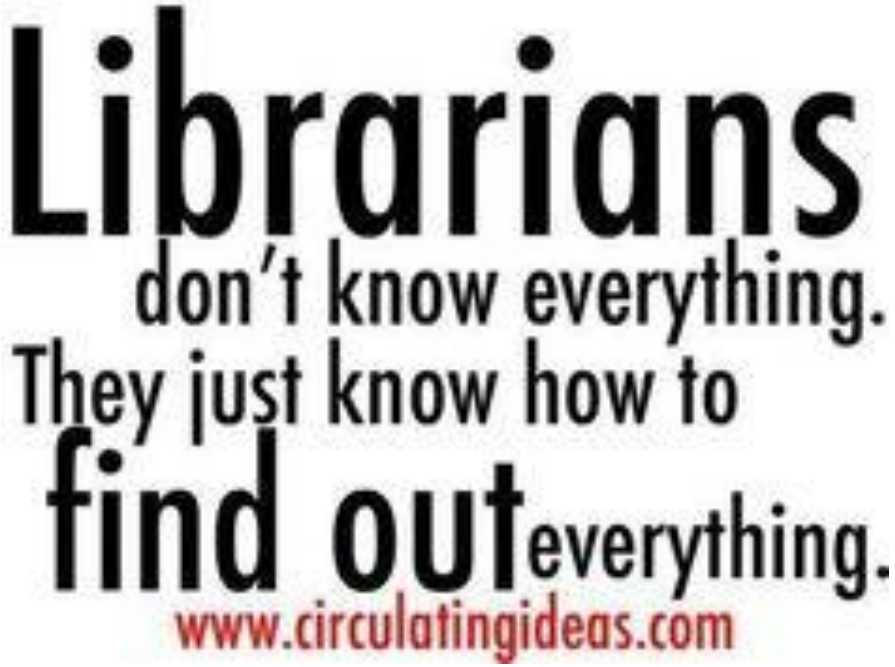
http://fieldresearch.msf.org/msf/bitstream/10144/84230/1/Qualitative%20research%20methodology.pdf

- Consolidated criteria for reporting qualitative research (COREQ)

http://intqhc.oxfordjournals.org/content/19/6/349

Three R's

- **Rigour** - how good is the study
- **Results** - what is it actually telling us
- **Relevance** – is it relevant to our patient



Uned Arbenigol ar Dystiolaeth Adolygu
SURE
Specialist Unit for Review Evidence

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