



# Cochrane training: 3 Developing structured conceptual breakdowns

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**June 2016**

# Today's Agenda



- How do we typically identify the concepts we are going to use in our search?
  - What are the challenges of choosing a conceptual breakdown?
  - Discussion
- What other approaches have you tried out, other than PICO?
  - Discussion
- Presentation of selected non-PICO conceptual breakdowns
  - What are they? What are they for? How do they work?
- Questions and discussion
- Homework for today (to be discussed in July)
- Discussion of homework from the May session

# Identifying concepts



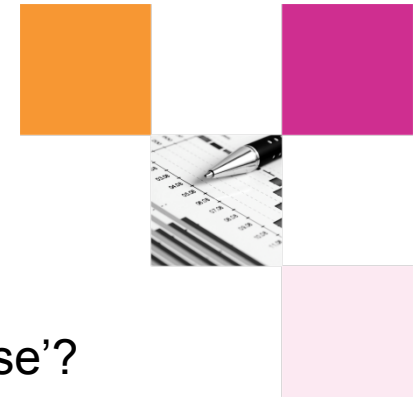
- How do we typically identify the concepts we are going to use in our search?
  - What are the challenges of choosing a conceptual breakdown?
  - How do we choose the concepts we are going to use in our search?
  - Group discussion

# Deciding which concepts to use in the search, 1



- The more concepts we use, the smaller the result set and the more stringent we make our requirements
  - We run the risk of missing relevant records
  - So the fewer the concepts involved, the better
- What can our reviewers cope with/what is the timeline?
- Choose most specific concept as ‘base’?
  - Might be the intervention?
  - Might be the population e.g. in an orphan disease?
  - Very often it might be the study design concept?

# Deciding which concepts to use in the search, 2



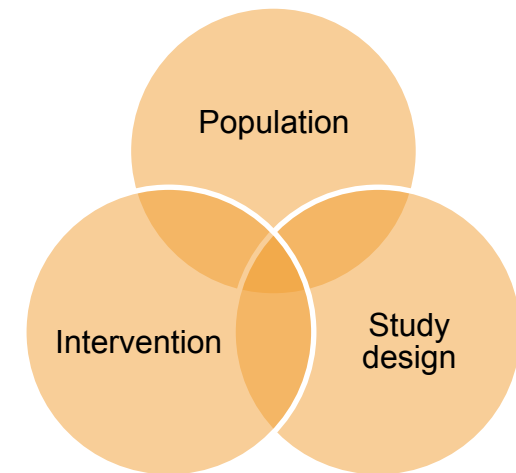
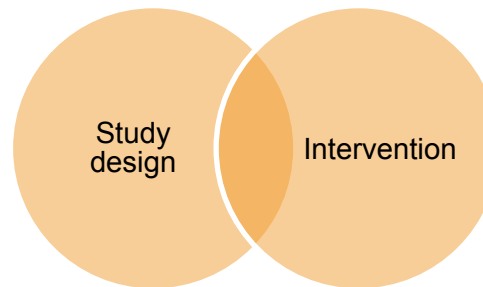
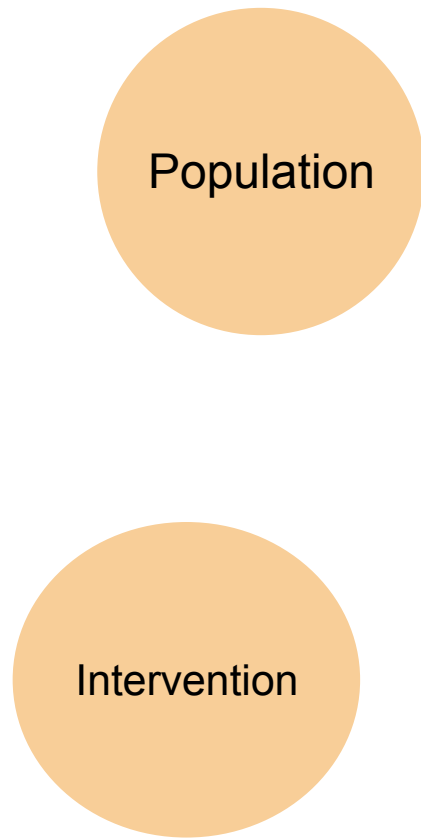
- Choose the concept with the lowest number of results as the 'base'?
  - Might be the intervention?
  - Might be the population e.g. in an orphan disease?
  - Very often it might be the study design concept?
- All judgements are likely to be made according to volume of studies returned.
- Then decide if second concept is needed, and which one it is might need to be explored
  - Next most specific?
  - Next smallest in terms of results?

# Combined concepts



- Population can often combine **two** concepts
  - Adults with diabetes
  - Children with urinary tract infections
- Or are these implicitly **P** AND **O**
  - **Adults** AND **diabetes**
  - **Children** AND **urinary tract infections**
  - Because **O** really represents reductions in the disease?

# PICO into search strategy?



# Rarely used concepts, 1



- Some of the PICO elements are rarely seen in search strategies
- Comparators
  - More sensitive to omit them
  - Might use if volume is too great
  - May not wish to specify individually
  - In the case of 'do nothing' comparators or 'best supportive care' the descriptions may be difficult to capture reliably
  - Comparators may sometimes be the same as or subset of interventions especially when looking at a drug class



# Rarely used concepts, 2



- Outcomes
  - May be unknown
  - Too various to capture economically in the strategy
  - May involve too many numbers and letters
    - e.g. blood pressure measures
  - May not be mentioned in all abstracts
    - e.g. specific adverse effects
  - Outcomes may be implicit in the population
    - e.g. less of the disease
    - Smoking cessation
    - Lowering high blood pressure

# NOT

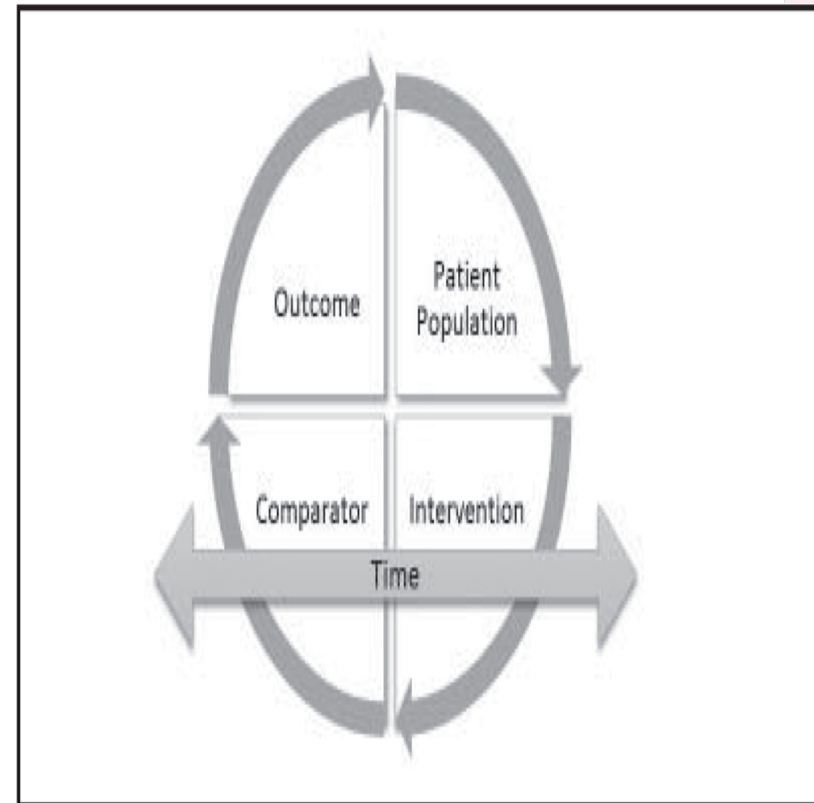


- In most PICO structured reviews there will be ineligibility criteria e.g.
  - No case reports
  - Date limits
  - Language limits
- We often apply specific limits but we rarely use NOT to exclude subject topics
  - NOT has to be used carefully
  - There are methods that can be used e.g.
    - (X NOT A).ti.
  - Where X is the topic to be excluded and A is a desirable concept
  - But this relies on A being consistently expressed

# PICO variants, 1



- **PICOS**
  - Adding study design to the conceptual breakdown and also maybe to the search?
- **PICOT**
  - Adding time to the conceptual breakdown: to capture longitudinal effects of an intervention
  - Is this really something we ever operationalise in the search?
  - Source: Elias Bl et al



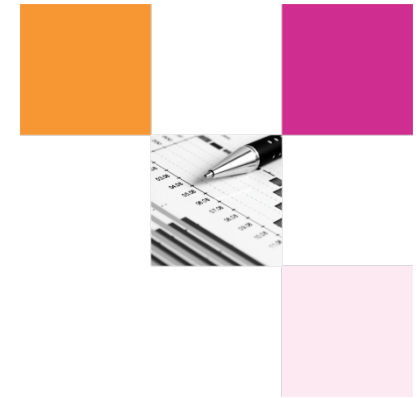
# PICO variants, 2



- **PICOT-D**

- PICO+ **Time+ data** measures of outcomes of interest e.g. blood glucose tests or Hba1C levels
- Valuable for study definition but how easy to operationalise in the search?
  - (see next slide)
- **Time** as well as **data** are difficult to search for and may not be reported at all
- Source: Elias BL et al

# PICO variants, 3



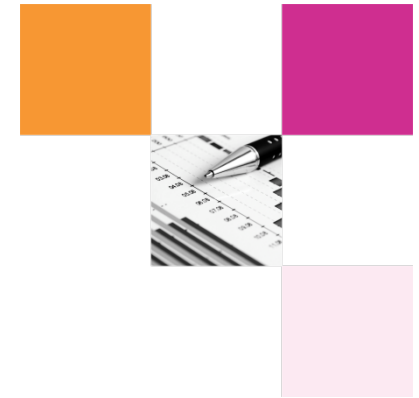
**TABLE 1**  
**PICOT-D Component Structure**

<b>PICOT-D Component</b>	<b>Component Wording</b>	<b>Evidence-Based Search Terms</b>
<u>P</u> opulation/patient problem	In adult patients newly diagnosed with type 2 diabetes	
<u>I</u> ntervention	How does transdermal monitoring of blood glucose	
<u>C</u> omparison intervention/current state	Compared with finger-stick blood glucose testing	
<u>O</u> utcome/desired state	Affect compliance with blood glucose testing frequency and lowering Hba1C levels	
<u>T</u> ime	Within a 6-month period	
<u>D</u> ata	When looking at home blood glucose test frequency and Hba1C levels	

*Note. PICOT-D = Population/patient problem, Intervention, Comparison intervention/current state, Outcome/desired state, Time, Data; Hba1C = glycated hemoglobin.*

The authors have left a space for the search terms but they don't offer a worked up strategy

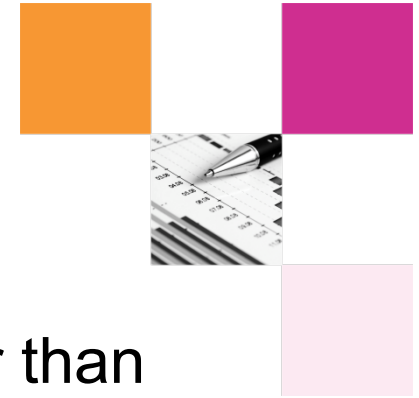
# PICO variants, 4



- PICO**Cs**

- PICO plus – Context – Study design
- Context: country, rural/urban, hospital/primary care, deprived area
- Study design: RCTs, uncontrolled studies, qualitative data
- Source: Petticrew, M and Roberts, H. Systematic reviews in the social sciences: a practical guide. Oxford; Blackwell; 2006
- See also:  
<http://lirneasia.net/wp-content/uploads/2013/10/Developing-question-for-SR.pdf>

# Structures other than PICO?



- What other approaches have you tried out, other than PICO?
  - Discussion

# Other non-PICO breakdowns



- PICO fits intervention questions, but may not be suitable for reviews of other types of questions e.g.
  - health policy and management
  - external factors
  - service evaluation
  - Social care issues
- Also other types of research may demand different question structures (or less structured approaches)
  - case control and cohort studies
  - qualitative research
  - diagnostic test accuracy studies



# ECLIPSE



- Source: Wildridge and Bell
- **Expectation**
  - what does the search requester want the information for?
- **Client Group**
- **Location**
- **Impact**
  - what is the change in the service, if any, which is being looked for? What would constitute success? How is this being measured?
- **Professionals**
- **Service**
  - for which service are you looking for information?
  - outpatient services, nurse-led clinics, intermediate care

# ECLIPSE example



Expectation	Client group	Location	Impact	Professionals	Service
<ul style="list-style-type: none"><li>• Looking to improve the discharge procedure from the hospital to the community where rehabilitation will continue.</li></ul>	<ul style="list-style-type: none"><li>• People with head injuries.</li></ul>	<ul style="list-style-type: none"><li>• Community.</li></ul>	<ul style="list-style-type: none"><li>• Improved continuity of care;</li><li>• patient satisfaction increased;</li><li>• greater sense of communication between professionals</li></ul>	<ul style="list-style-type: none"><li>• Hospital nurses</li><li>• community staff</li><li>• social services.</li></ul>	<ul style="list-style-type: none"><li>• Community rehabilitation service.</li></ul>

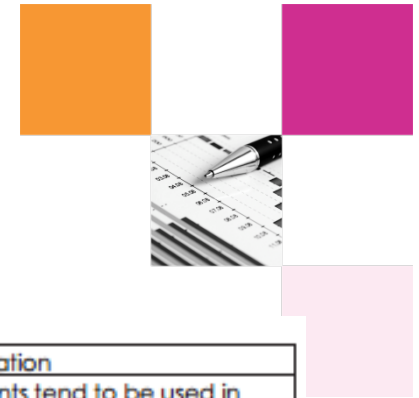
Source: Wildridge and Bell

# Searching issues



- Some redundancies across the concepts
- Many of the concepts are going to be difficult to capture efficiently

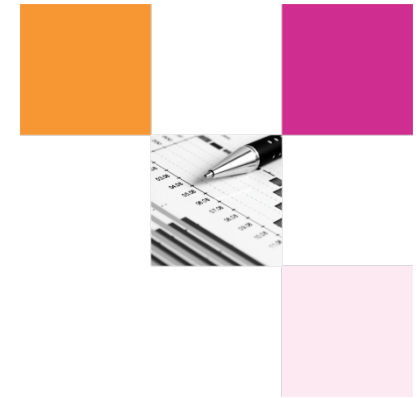
# SPIDER



- Source: Cooke et al
- Designed specifically to identify relevant qualitative and mixed-method studies

SPIDER	Justification
S – Sample	Smaller groups of participants tend to be used in qualitative research than quantitative research, so this term was deemed more appropriate.
PI – Phenomenon of Interest	Qualitative research aims to understand the how and why of certain behaviours, decisions, and individual experiences. Therefore, an intervention/ exposure per se is not always evident in qualitative research questions.
D – Design	The theoretical framework used in qualitative research will determine the research method that is used. As inferential statistics are not used in qualitative research, details of the study design will help to make decisions about the robustness of the study and analysis. In addition, this might increase the detection of qualitative studies in the databases in which titles and abstracts are unstructured.
E – Evaluation	Qualitative research has the same end result as quantitative research methods: outcome measures. These differ depending on the research question and might contain more unobservable and subjective constructs when compared to quantitative research (e.g., attitudes and views and so forth), so evaluation was deemed more suitable.
R – Research type	Three research types could be searched for: qualitative, quantitative, and mixed methods.

# SPIDER example



- Source: Cooke et al
- What are young parents' experiences of attending antenatal education

Sample	Phenomenon of Interest	Design	Evaluation	Research type
<ul style="list-style-type: none"><li>• Young parents</li></ul>	<ul style="list-style-type: none"><li>• Antenatal classes</li></ul>	<ul style="list-style-type: none"><li>• Questionnaires, surveys, observational research</li></ul>	<ul style="list-style-type: none"><li>• Views</li><li>• experiences</li><li>• Beliefs</li></ul>	<ul style="list-style-type: none"><li>• Qualitative</li><li>• Mixed method</li></ul>

# SPIDER search



**Table 2.** The Search Terms Used for the SPIDER Search

SPIDER Tool <sup>a</sup>	Search Terms
S	"young" OR "teen*" OR "parent*" OR "mother*" OR "father*"
P of I	"antenatal" OR "prenatal" OR "pregnancy" OR "birth" OR "class*" OR "education" OR "workshop*"
D	"questionnaire*" OR "survey*" OR "interview*" OR "focus group*" OR "case stud*" OR "observ*"
E	"view*" OR "experienc*" OR "opinion*" OR "attitude*" OR "perce*" OR "belie*" OR "feel*" OR "know*" OR "understand*"
R	"qualitative" OR "mixed method*"

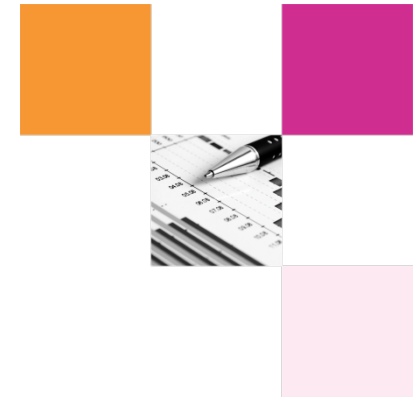
<sup>a</sup>[S AND P of I] AND [(D OR E) AND R].

# SPIDER example



- Using the full five concepts in strategy seems very stringent
- Combining D OR E makes sense
  - but then ANDing with R again seems quite stringent
  - given variation in methods descriptions in abstracts
- But perhaps we are encountering the paradigm for SRs of qualitative evidence
  - searches don't always need to be exhaustive?
- At least someone has been investigating these issues (next slide)

# SPIDER evaluation



- Source: Methley 2014
- Compared PICO vs PICOS vs SPIDER
- A systematic narrative review of qualitative literature investigating the health care experiences of people with multiple sclerosis
- Identical search terms were combined into the PICO or SPIDER search tool and also a modified version of PICO with added qualitative search terms (PICOS)
- Compared across Ovid MEDLINE, Ovid EMBASE and EBSCO CINAHL Plus databases
- They used 3 concepts in PICO and all 5 in SPIDER
- PICO had many more results (23758) than SPIDER (239)
- SPIDER found 13 relevant articles, PICOS found 13 relevant articles and PICO found 18 relevant articles.
- PICOS was much more precise than PICO but no more sensitive than SPIDER
- **Authors recommend using PICO for extensive search but PICOS when time and resources are limited**

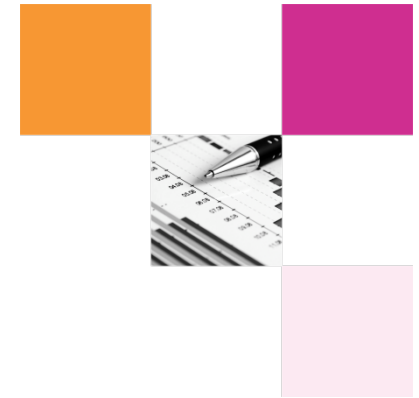


# SPICE



- Source: Booth 2006
- Splits **Population** into
  - Setting – where?
  - Perspective – for whom?
- **Intervention** – what?
- **Comparison** – compared with what?
- **Evaluation** (not Outcomes)– with what result? E.g. outputs and impact
  
- Capturing **Evaluation** in the search may not always be straightforward
- Dividing up the population could be helpful for precision

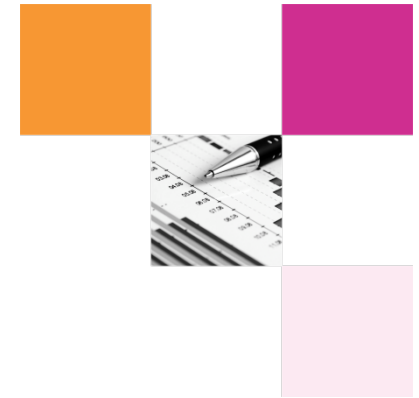
# SPICE example



SETTING	PERSPECTIVE	INTERVENTION	COMPARISON	EVALUATION
<ul style="list-style-type: none"><li>• University library</li></ul>	<ul style="list-style-type: none"><li>• Undergraduate student</li></ul>	<ul style="list-style-type: none"><li>• Provision of a short term loan collection</li></ul>	<ul style="list-style-type: none"><li>• General collection</li></ul>	<ul style="list-style-type: none"><li>• Percentage availability of recommended texts</li></ul>

Source: Booth 2006

# Another SPICE example



SETTING	PERSPECTIVE	INTERVENTION	COMPARISON	EVALUATION
<ul style="list-style-type: none"><li>• Awaiting Surgery</li></ul>	<ul style="list-style-type: none"><li>• Patients</li></ul>	<ul style="list-style-type: none"><li>• Coronary Artery Bypass Graft Surgery</li></ul>	<ul style="list-style-type: none"><li>• None</li></ul>	<ul style="list-style-type: none"><li>• Uncertainty and Anxiety</li></ul>

Source: Helen Buckley Woods' presentation <http://esquiresheffield.pbworks.com/f/TuSearching.pptx>

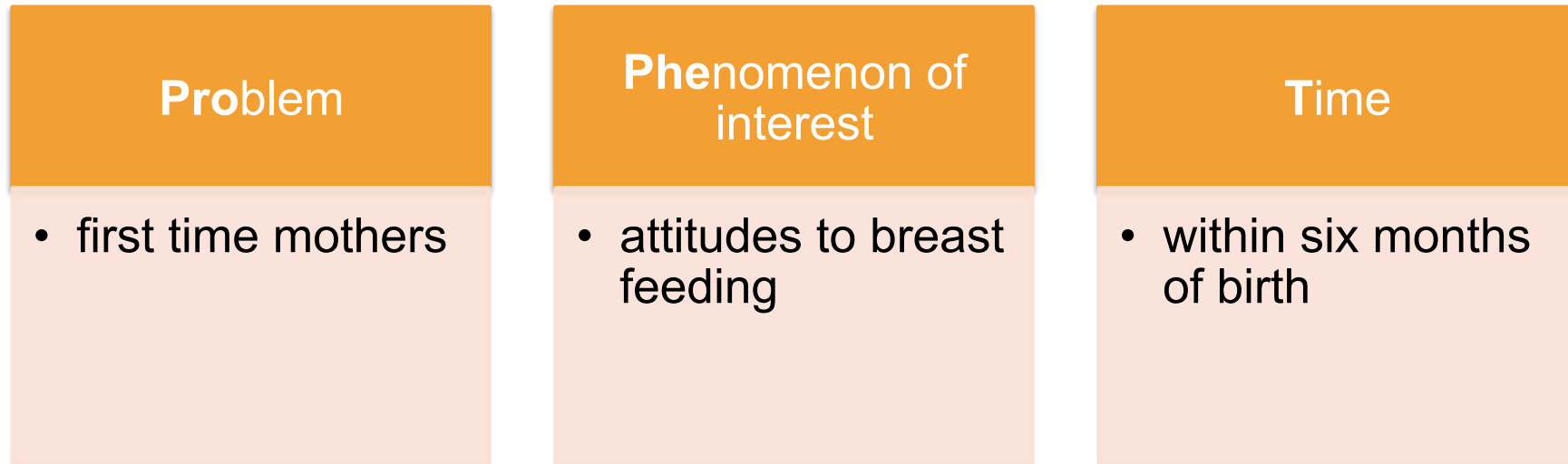
# ProPHET



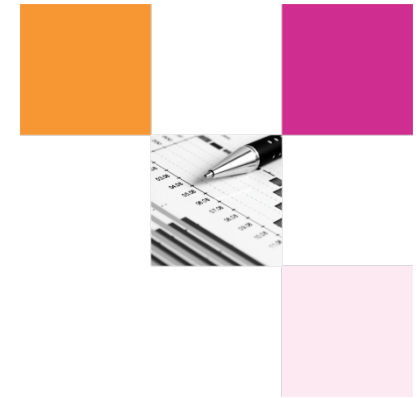
Source: Helen Buckley Woods' presentation

<http://esquiresheffield.pbworks.com/f/TuSearching.pptx>

From search perspective there are a lot of pre-coordinated concepts present in this approach



# PECODR

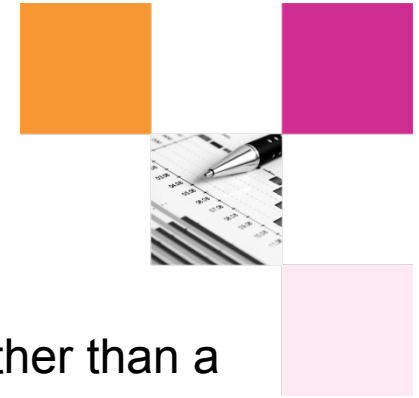


- Source: Dawes et al 2007

**Table 1** PECODR elements

PECODR elements	Example
P Patient–Population –Problem	56-year-old man with hypertension
E Exposure	Atenolol
C Comparison	Placebo
O Outcome	Cardiovascular event
D Duration of exposure/follow-up	4.5 years
R Results	Number needed to treat of 25

# PECODR, 2



- This seems to be more a way to code or interrogate abstracts rather than a question definition acronym
- The paper describes an analysis process that is more like text mining abstracts than searching.
  - They used Nvivo software
- It could be that you could carry out a sensitive search and then use text mining software to build rules to find these elements in abstracts.
- This was a pilot study to explore feasibility: only 20 abstracts and their synopses were analysed, by only three people.
- From 20 abstracts they retrieved 759 extracts relating to PECODR elements from the PubMed abstracts and 835 from the EBM synopses.
- Did not find text patterns associated with Patient–Problem, Duration or Outcome.

# Other Conceptual Breakdowns



- CIMO
  - Context, Intervention, Mechanism, Outcome (CIMO)
  - Developed for management questions
  - Source: Denyer, Tranfield, & Van Aken, 2008
- BeHEMoth
  - Behaviour, Health Context, exclusions, Models or Theories
  - Source: Booth A, Carroll C. Systematic searching for theory to inform systematic reviews: is it feasible? Is it desirable? Health Info Libr J. 2015;32(3):220–35.

# Diagnostic test accuracy reviews



- Source: <http://methods.cochrane.org/sdt/HANDBOOK-DTA-REVIEWS>
- the review title should provide these key concepts:
  - a defined study population (patient description)
  - the diagnostic test(s) of interest (index test)
  - the clinical condition of interest (target condition)
- PIT?



# DTA reviews, 2



- Currently, a search strategy to identify studies for a Cochrane review of diagnostic test accuracy will typically have two sets of terms:
  - (i) terms to identify the index test(s) under evaluation
  - (ii) terms to search for the target condition(s) to be detected
  - Biopsy AND liver cancer
- Using a study design concept is not recommended
  - See Cochrane Methods Review Beynon 2013

# DTA reviews: index tests



- May be specific in its name and use, e.g.
  - dipstick detecting nitrite and leucocytes in urine is uniquely aimed at diagnosing urinary tract infections
  - mammography is uniquely performed to detect breast cancer.
- In many cases there are multiple names for the test, e.g.
  - FDG PET (Mijnhout 2000; Mijnhout 2004)
- Or the review may cover a class of tests e.g.
  - laboratory tests to diagnose liver pathology

# DTA reviews: target condition



- Particular disease or disease stage that the index test is intended to detect e.g.
  - Breast cancer

# Other search approaches



- Specifically for SRs of qualitative data the structured conceptual breakdown may be required for the definition of the question or may not!
- In terms of the search, purposeful sampling might be used rather than structured conceptual breakdowns
  - “For a qualitative reviewer, time is best spent not “piling up examples of the same finding, but in identifying studies that contain new conceptualisations of the phenomena of interest””
  - “Innovative techniques might be “borrowed” from primary qualitative research such as deliberately seeking studies to act as negative cases, aiming for maximum variability and designing results set to be heterogeneous, as an alternative to “the homogeneity that is often the aim in statistical meta-analyses””
- Source: Booth 2016

# Summary



- The key conceptual breakdowns for intervention/exposure reviews are based on PICO
- BUT PICO clearly doesn't fit all questions
- Most conceptual breakdowns are focused on organising the question
- BUT they should not be taken as the pattern for the search
- Will need to explore and select the parts of the conceptual breakdown that work for the database and the question
- Some “so-called” PICO variants (e.g. EPICOT) are not about the question but about other issues such as framing recommendations
- Some SR topics may not require conceptual breakdowns but may use search approaches such as purposeful sampling

# Questions/Discussion



# June homework



- Question:
  - **What is the effectiveness and cost effectiveness of interventions, systems and processes that change health and social care practitioners' decision making to ensure appropriate antimicrobial stewardship**
- Explore which conceptual breakdowns in the presentation might help with this question
- Make a table of each breakdown and show whether the question fits

# May Homework



- Use your most current review question to test out exploratory searches in these resources
- Compare and contrast PubReminer and GoPubMed
- Compare and contrast Termine and TextAnalyser
- Compare and contrast MeSHOnDemand and GoPubMed for MeSH identification
- Prepare a table with key strengths and weaknesses of each resource
- Which do you prefer?
- Which might you use?



# References, 1



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# Thank You

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