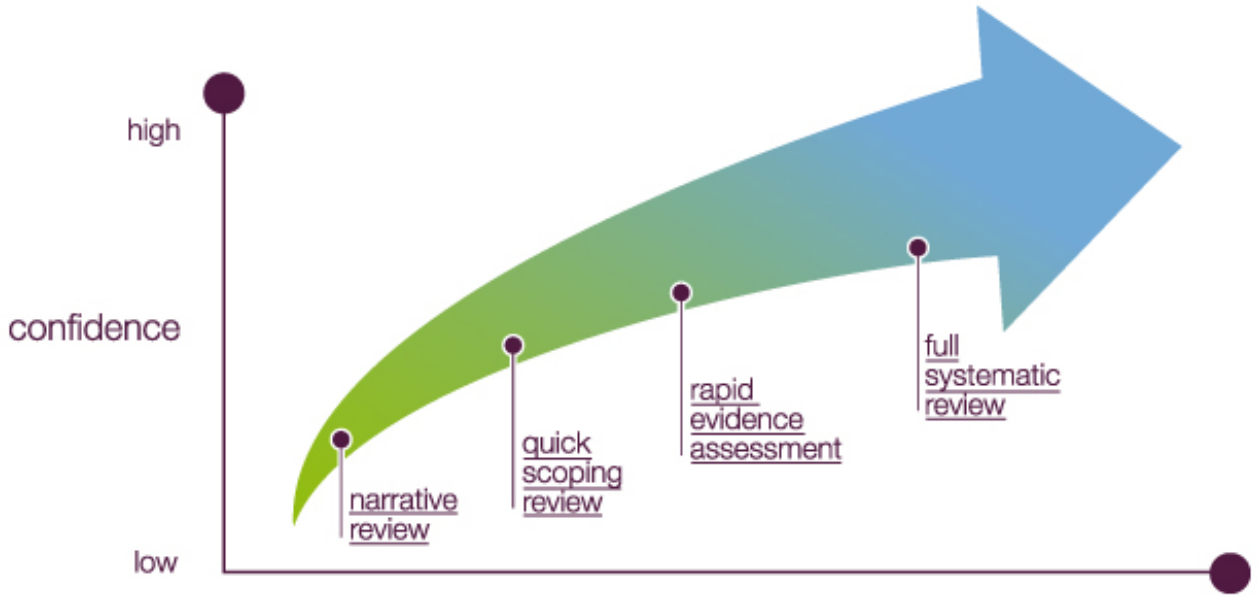
Systematic Reviews



Aims of this presentation

- What is a systematic review?
- How to formulate a review question and decide on scope
- What is the purpose of a review protocol?
- Describe systematic searching and screening studies
- How to extract data and appraise the quality of studies
- Introduce methods for synthesizing the evidence

What is a systematic review?

Systematic

- Done or acting according to a fixed plan or system; methodical. [1]

Review

- A formal assessment of something with the intention of instituting change if necessary.[1]

Oxford English Dictionary 2018

Clinical Question

- Mr. X is a 23 year old man recently diagnosed with schizophrenia. He has been experiencing delusions and hallucinations very frequently in the past few months. You wish to know what is the best treatment for him – what do you do?

Making a decision

- Use your intuition and experience
- Ask your peers
- Consider the patients treatment history, if there is one
- Use what is available/practical
- Consult the evidence/clinical guidelines

Consulting the evidence

- Over 20 million citations in PubMed
- Approx. 75 to 100 RCTs published daily
- Impossible for individual clinicians to consider all relevant individual primary research studies in their decisions

- INFORMATION OVERLOAD !!!

How do systematic reviews help?

- Facilitates decision-making by providing a comprehensive search and synthesis of relevant studies on a specific topic
- Minimises error and bias by using a systematic approach
- Helps end confusion about the best course of action
- Helps us understand what doesn’t work
- Might reduce the need for further unnecessary trials

Difference between *systematic* and *traditional* reviews

- Broadly defined *vs* clearly-defined topic
- Authors intuition *vs* pre-defined selection criteria
- Simple description *vs* systematic protocol for extracting data
- One or two search engines *vs* comprehensive search
- Overall description *vs* data synthesis using trusted guidelines
- Subjective inclusion of data *vs* selection on predefined criteria

Scope of the Review

Explore a variety of questions:

- What is the extent of a problem?
- Which risk and protective factors are associated with specific conditions?
- How acceptable are specific interventions in different populations?
- Which interventions have been rigorously evaluated with what results?
- What works best, for whom, under what conditions, and at what cost?

Deciding on a question

- Questions may be broad or narrow
- Formulating a question clearly guides the process of the review

ACTIVITY – IN YOUR GROUPS

- What is the rational for your question/why is it important?
- Discuss a very broad question and how you might narrow it down?
- Discuss the potential limitations of conducting a review using your question.

Do we need another review?

- Database of Abstracts of Reviews of Effects (DARE)
- Cochrane Database of Systematic Reviews (CDSR)
- International Prospective Register of Systematic Reviews (PROSPERO)

Other sites to consider:

- National Institute for Health and Clinical Excellence (NICE) and the NIHR Health Technology Assessment (NIHR HTA)
- Campbell Library of Systematic Reviews
- Evidence for Policy and Practice Information (EPPI) Centre

The Review Protocol

- Developing the protocol includes pre-specified definitions of the important processes for conducting the review
  - Inclusion criteria –what will be accepted, types of study, population, intervention of interest, outcomes the review is interested in
  - Exclusion- what will be left out
  - Methods- how many databases, how many search terms, who will do the searching and how, how will quality be assured, how will the data be synthesised and reported

Systematic Searching and Screening

- Population
- Intervention/Comparator
- Outcomes
- Study Design[2]

Approaches to Systematic Searching

Studies can be located using one or more of the following methods:

- Searching relevant electronic databases
- Visually scanning reference lists of relevant studies
- Handsearching key journals and conference proceedings
- Contacting study authors, experts, manufacturers, and other organisations
- Searching relevant Internet resources
- Using a project Internet site to canvas for studies

Searching Electronic Databases

- Depends on review question but can be determined by checking with specialist librarian/database provider
- Pilot, pilot pilot

Healthcare databases include:

- MEDLINE
- EMBASE
- Cinahl
- ASSIA
- PsychINFO
- JSTOR
- OVID

Searching Other Sources

- Grey literature
- Scanning reference lists of relevant studies
  - checking texts in reference lists from articles found following a database search/highly cited articles
- Handsearching key journals
  - Scanning relevant journals/special issues publishing conference proceedings
- Contacting experts and manufacturers
  - Contacting relevant research centres/specialist libraries
- Searching trials registers
  - UK Clinical Trials Gateway/US National Library of Medicine

Developing a Search Strategy

- PICOS is a good format but it is not essential that every element is used
- Using a specific question framework can result in more efficient searching that retrieves more

EXAMPLE: Review questions: 1. What civic engagement activity has currently been undertaken in mental health services in South East Asia? 2. What are the mechanisms through which civic engagement interventions are expected to affect individual, system and community level mental health outcomes in South East Asia? 3. What are the contextual conditions that affect the operation of these mechanisms?

#civic engagement OR “civic engagement” OR “user involvement” OR “co-design” OR “people focussed design” OR “participation” OR “engagement OR “volunteer OR “involvement” OR “#involvement” OR “#participation” OR “#engagement OR “#co-design” OR “Participatory” OR “co-production” OR “social accountability”

Group exercise

- In your groups: take your question and break down using the framework
- Design a brief plan for your review:
  - What will your search terms be
  - Inclusion/exclusion criteria
  - Where will you search
    - Databases
    - Grey literature
    - Other strategies

Study Selection: Two Stages

01

Stage 1: Decision based on titles and where available, abstracts

02

Stage 2: Uncertain studies decided based on the full paper should when decision cannot be made with the title/abstract

Just making sure……

- Piloting the study selection process
- The selection process can be piloted by applying the inclusion criteria to a sample of papers in order to check that they can be reliably interpreted and studies can be assessed appropriately

- If not, refine and clarify the inclusion criteria.

- Piloting also helps judge the amount of time needed for screening.

Extracting Data

- Used to obtain the necessary information about study characteristics and findings from the included studies
- Extraction forms should be tailored to the review question

What to include (some examples):

- Study Design
- Aim
- Population/Sample Size
- Data analysis
- Findings

Quality Appraisal

Why?

- Research can vary considerably in methodological rigour and flaws in design or conduct can result in bias which can influence the observed effects. This can inflate or decrease the effects observed for an intervention making it difficult to understand whether a true effect has occurred.

Quality Criteria Examples

Quality assessment usually considers the following:

- Appropriateness of study design to the research objective
- Risk of bias
- Choice of outcome measure
- Statistical test appropriateness/are conclusions valid?
- Quality of reporting
- Quality of the intervention/standardisation and fidelity
- Generalisability – can we apply this outside the study itself?

Synthesising the Evidence

- Many systematic reviews evaluating the effects of health interventions focus on evidence from randomised controlled trials (RCTs), the results of which, generally, can be combined quantitatively.
- Not all questions answered by RCTs

Some types:

- Initial Descriptive Synthesis
- Narrative Synthesis
- Developing theory
- Exploring relationships within and between studies


TIME
FOR A
BREAK

Critical Appraisal

Critical Appraisal

What is Critical Appraisal

- Large group exercise
- Discuss the advert in terms of its validity

‘9 out of 10 cats prefer Catomeat’

What is critical appraisal

- “Critical appraisal is the process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision” (Hill and Spittlehouse, 2001)

Critical appraisal

Critical Appraisal aims to help people develop the necessary skills to make sense of scientific evidence based on **validity, results and relevance.**

Why are we interested in critical appraisal

- To find out the validity of the study

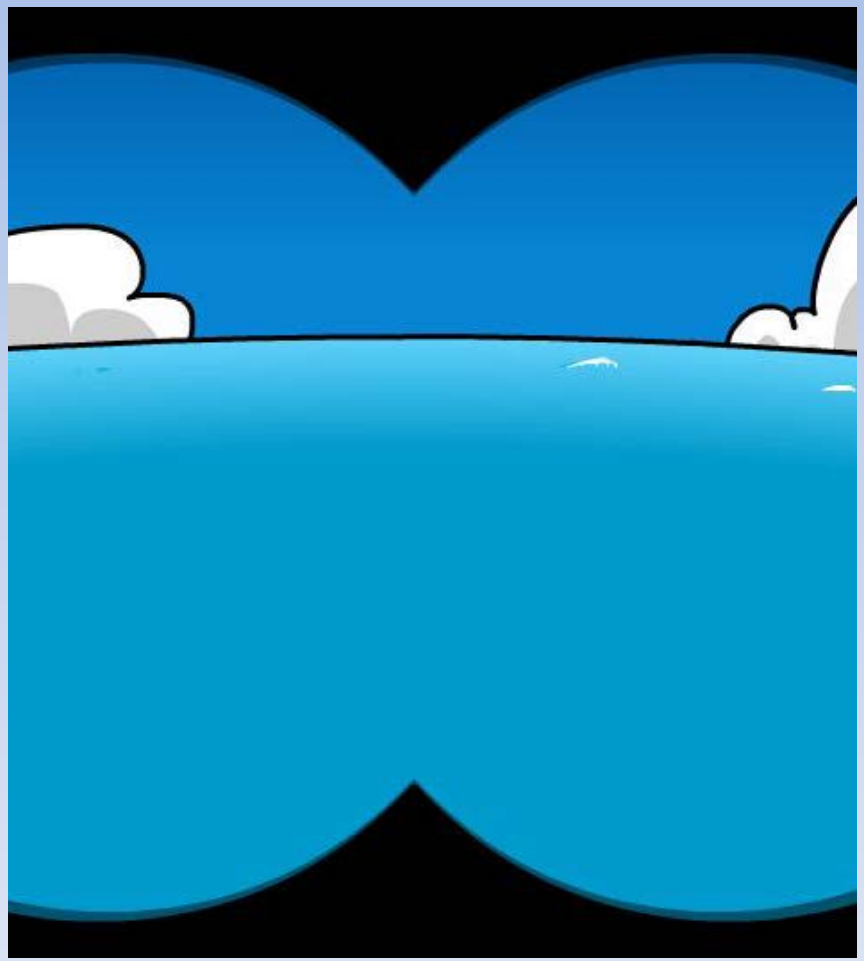
  are the methods robust?

- To find out the reliability of the study

  what are the results and are they credible?

- To find out the applicability of the study

  is it important enough to change my practice?



- Watch the video
- https://www.youtube.com/watch?v=iZg_3AjFJH0

Assessing bias

- Objectivity is key to good science
- To be objective, research studies need to be designed and conducted in a way that does not introduce bias into the study.

BIAS

- Bias is described as a systematic error or deviation from ‘true’ results.
- It occurs when there is an underlying factor that consistently distorts the results.
- Bias is important in research because it can affect the findings of the study and how they are reported.
- If bias exists health decisions may be made on incorrect information.
- Researchers and clinicians try to identify possible sources of bias, or systematic error so they can eliminate or compensate for possible bias.

Types of bias

- Selection bias – who is included in the study
- Attrition (drop out) bias
- Researcher bias
- Measurement bias

Critical appraisal

- **Randomised controlled trial of animal facilitated therapy with dolphins in the treatment of depression**

- Christian Antonioli, Michael A Reveley

Small group exercise

- In small groups discuss the Dino paper:
- What was the research question
- Is this paper important (if so why)
- What do you think the key strengths and weaknesses of the paper are?

- **Objective** To evaluate the effectiveness of animal facilitated therapy with dolphins, controlling for the influence of the natural setting, in the treatment of mild to moderate depression and in the context of the biophilia hypothesis.
- **Setting** The study was carried out in Honduras, and recruitment took place in the United States and Honduras.
- **Design** Single blind, randomised, controlled trial.
- **Participants** Outpatients, recruited through announcements on the internet, radio, newspapers, and hospitals.
- **Results** Of the 30 patients randomly assigned to the two groups of treatment, two dropped out of the treatment group after the first week and three withdrew their consent in the control group after they had been randomly allocated. For the participants who completed the study, the mean severity of the depressive symptoms was more reduced in the treatment group than in the control group (Hamilton rating scale for depression, $P = 0.002$; Beck depression inventory, $P = 0.006$). For the sample analysed by modified intention to treat and last observation carried forward, the mean differences for the Hamilton and Beck scores between the two groups was highly significant ($P = 0.007$ and $P = 0.012$, respectively).
- **Conclusions** The therapy was effective in alleviating symptoms of depression after two weeks of treatment. Animal facilitated therapy with dolphins is an effective treatment for mild to moderate depression, which is based on a holistic approach, through interaction with animals in nature.

Systematic review software – COVIDENCE

- Streamlines reviews
- Improves efficiency and experience of undertaking systematic reviews
- Each reviewer will receive an invite to join via email

My reviews

Current reviews | Archived reviews

Create new review

Sort by Newest

My reviews

19/03/2015 COLLABORATIVE PRESCRIBING Archive

22/04/2016 Prescribing update

02/03/2017 Role of pets for the management of mental health

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Current reviews | Archived reviews

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TITLE AND ABSTRACT SCREENING

Import references

view all duplicates

Import

Title and abstract screening

7193 irrelevant

1 studies to screen

TEAM PROGRESS

7618	0	0	1
DONE	ONE VOTE	CONFLICTS	NO VOTES

Team settings

HELEN, YOU CAN STILL

SCREEN

1

Continue

You've screened **3716** studies so far

Full text screening

413 excluded

0 studies to select

Extraction

0 extracted

10 studies to extract

Import references

view all duplicates

Import

Title and abstract screening

7193 irrelevant

1 studies to screen

TEAM PROGRESS

7618	0	0	1
DONE	ONE VOTE	CONFLICTS	NO VOTES

Team settings

HELEN, YOU CAN STILL

SCREEN

1

Continue

You've screened **3716** studies so far

Full text screening

413 excluded

0 studies to select

Extraction

0 extracted

12 studies to extract

Settings

Review settings | Add/remove reviewers | Team settings | Criteria & exclusion reasons | Study tags

Title and abstract screening

Team Progress

7619 DONE | 0 ONE VOTE | 0 CONFLICTS | 0 NO VOTES

REVIEWER	CONTRIBUTION
Helen Brooks	3717
Suzy Eu	2003
Karina Lovell	1030
Laura Grant	688
Katie Robinson	152
Lauren Walker	41
Kelly Rushton	0
Penny Bee	0

Rules

(•) Everyone can do anything ( ) Manage rules

Full text screening

Extraction

Import references

view all duplicates

Import

Title and abstract screening

7193 irrelevant

1 studies to screen

TEAM PROGRESS

7618	0	0	1
DONE	ONE VOTE	CONFLICTS	NO VOTES

Team settings

HELEN, YOU CAN STILL

SCREEN

1

Continue

You've screened **3716** studies so far

Full text screening

413 excluded

0 studies to select

Extraction

0 extracted

12 studies to extract

Title and abstract screening

Screen references 1 | Resolve conflicts 0 | Awaiting other reviewer 0 | Irrelevant references 7193

All | Filter | Tags | Add criteria | Add highlights | Hide abstracts | Display: 10 | Author

#6504 - Stern 2013

Stern, Stephen L.; Donahue, D. Allen; Allison, Sybil; Hatch, John P.; Lancaster, Cynthia L.; Benson, Trisha A.; Johnson, Allegro L.; Jeffreys, Matthew D.; Pride, Denise; Moreno, Carlos; Peterson, Alan L.

Potential benefits of canine companionship for military veterans with posttraumatic stress disorder (PTSD)

Society and animals 2013 2013;21(6):568-581
2013 2013

No

Maybe

Yes

Hide Abstract & IDs

DOI: http://dx.doi.org/10.1163/15685306-12341286

Investigators surveyed 30 U.S. military veterans with PTSD who reported having benefited from living with a dog. The subject population included men and women aged 34 to 67, with a mean of 56.9 years (SD - 8.1), who were being treated at two Department of Veterans Affairs (VA) outpatient clinics. Participants received a questionnaire packet designed to assess aspects of their mental and physical health and relationship with a canine companion, which they completed at home and returned either in person or by mail. The packet consisted of the PTSD Checklist-Military Version (PCL-M); Beck Depression Inventory, Second Edition (BDI-II); Veterans Short Form Health Survey and Health Behaviors Questionnaire (SF-36); Dog Information Sheet; Dog Relationship Questionnaire; and Lexington Attachment to Pets Scale. Respondents indicated that since adopting their dog they had experienced improvement in several areas, including feeling calmer, less lonely, less depressed, and less worried about their and their family's safety. These results suggest that living with a companion dog may help relieve some of the psychological distress associated with PTSD in some veterans. Reprinted by permission of Brill Academic Publishers

View history | Add a note

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View history | Add a note

FULL TEXT SCREENING

Review Summary

Settings | PRISMA | Export

Import references

view all duplicates | Import

Title and abstract screening

7193 irrelevant | 0 studies to screen

Full text screening

413 excluded | 1 studies to select

TEAM PROGRESS

425	0	0	1
DONE	ONE VOTE	CONFLICTS	NO VOTES

Team settings

HELEN, YOU CAN STILL

SCREEN

1

Continue

You've screened **3** studies so far

Extraction

0 extracted | 12 studies to extract

Full text review

Screen references 1 | Resolve conflicts 0 | Awaiting other reviewer 0 | Excluded references 413

Bulk upload PDFs

All | Filter | Tags | Add criteria | Add highlights | Display: 10 | Author

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Include

Exclude

View Abstract & IDs | View full text

View history | Add a note | Move study to Screen

Full text review

Screen references 1 | Resolve conflicts 0 | Awaiting other reviewer 0 | Excluded references 413

Bulk upload PDFs

All | Filter | Tags | Add criteria | Add highlights | Display: 10 | Author

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View Abstract & IDs | View full text

View history | Add a note | Move study to Screen

What is the reason for excluding this study?

Select a reason

Confirm | Cancel

INCLUSION/EXCLUSION CRITERIA

INCLUSION CRITERIA

- ✔ Undertaken in South East Asia (Brunei, Burma, Cambodia, Timor-Leste, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, Vietnam)
- ✔ Related to the use of civic engagement approaches in mental health services

EXCLUSION CRITERIA

- ✘ Not accessible online or via inter-library loan
- ✘ Published in abstract only form
- ✘ Study not undertaken in South East Asia
- ✘ Not related to mental health services
- ✘ Studies not related to the use of civic engagement approaches in South East Asia

Full text review

Screen references 1 | Resolve conflicts 0 | Awaiting other reviewer 0 | Excluded references 413

Bulk upload PDFs

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View Abstract & IDs | View full text

View history | Add a note | Move study to Screen

What is the reason for excluding this study?

- ✓ Select a reason
- 5. Not related to the impact of pet...
- 6. Not available through interlibra...
- 3. Not a peer reviewed journal arti...
- Duplicate
- 4. Not related to pet ownership and...
- 2. Not primary data
- 1. Not an English Language paper
- Edit this list

Live demo!

www.covidence.org

Data Extraction in Systematic Reviews

Data Extraction

- Data extraction is the process by which researchers obtain the necessary information about study characteristics and findings from the included studies.[1]
- Data extraction varies from study to study/extraction forms are tailored for each study
- Limited familiarity with the study topic can lead to inefficient use of extraction time – pilot extraction forms is beneficial to see if any important information is missed/can studies be classified in advance?

General information

- Researcher performing data extraction
- Date of data extraction
- Identification features of the study:
  - Record number (to uniquely identify study)
  - Author
  - Article title
  - Citation
  - Type of publication (e.g. journal article, conference abstract)
  - Country of origin
  - Source of funding

Study characteristics

- Aim/objectives of the study
- Study design
- Study inclusion and exclusion criteria
- Recruitment procedures used (e.g. details of randomisation, blinding)
- Unit of allocation (e.g. participant, GP practice, etc.)

Reference (Author, date)	Country	Service Setting	Participant Recruitment method	Inclusion criteria	Exclusion criteria	Method of data collection	Analysis type
Besenius 2012	UK	Phase 2 and 3: mixed	NS	NS	NS	Phase 2 and 3: interview	Thematic analysis
Carrick 2004	UK	Community	Phase 1: volunteers from invite letter. Phase 2: Convenience	Phase 1: Aged 18-65; taking antipsychotic meds; diagnosis of schizophrenia, schizoaffective disorder, psychotic illness or borderline personality disorder; not taking other psychoactive meds (except anti-muscarinic drugs); able to speak English fluently; not considered 'a threat' to interviewer by psychiatrist. Phase 2: Anyone reporting taking antipsychotic medication at the day centres approached.	Phase 1 and 2: NS.	Phase 1: interview. Phase 2: focus groups and interviews	Grounded theory

Participant characteristics

- Characteristics of participants at the beginning of the study e.g.
  - Age
  - Gender
  - Ethnicity
  - Socio-economic status
  - Disease characteristics
  - Co-morbidities
  - Number of participants in each arm

Reference (Author, date)	Number service users	Number SU approached	SU Number females	SU diagnosis make-up (if applicable) - **SMI** : Sample people with SMI - **Mixed:** SMI + some pts with other diagnoses (e.g. anxiety - SMI should constitute 75%+ of sample to meet inclusion). - **Rule:** Not specified (but meets inclusion based on rule of antipsychotics + secondary care)	SMI Diagnosis type (if applicable)	SU mean age	SU age range	SU ethnicity
Besenius 2012	18	NS	4 (22%)	Rule	NS	44	NS	NS
Carrick 2004	Total: 25 **Phase 1**: 9, **Phase 2**: 16	**Phase 1**: 25 (36% response rate), **Phase 2**: NS	**Phase 1**: 5 (56%), **Phase 2**: 7 (44%)	**Phase 1**: SMI **Phase 2**: Rule	NS	**Phase 1**: 37.2, **Phase 2**: 46.8	**Phase 1**: 24-47, **Phase** 2: 24-70	NS

Intervention and setting

- Setting in which the intervention is delivered
- Description of the intervention(s) and control(s) (e.g. dose, route of administration, number of cycles, duration of cycle, care provider, how the intervention was developed, theoretical basis (where relevant))
- Description of co-interventions

Outcome data/results

- Unit of assessment/analysis
- Statistical techniques used
- For each pre-specifi ed outcome:
  - Whether reported
  - Definition used in study
  - Measurement tool or method used
  - Unit of measurement (if appropriate)
  - Length of follow-up, number and/or times of follow-up measurements
- For all intervention group(s) and control group(s):
  - Number of participants enrolled
  - Number of participants included in analysis
  - Number of withdrawals, exclusions, lost to follow-up
  - Summary outcome data e.g.
  - Dichotomous: number of events, number of participants
  - Continuous: mean and standard deviation

Outcome data/results continued….

- Type of analysis used in study (e.g. intention to treat, per protocol)
- Results of study analysis e.g.
  - Dichotomous: odds ratio, risk ratio and confidence intervals, p-value
  - Continuous: mean difference, confidence intervals
- If subgroup analysis is planned the above information on outcome data or results
- will need to be extracted for each patient subgroup
- Additional outcomes
- Record details of any additional relevant outcomes reported
- Costs
- Resource use
- Adverse events

Covidence number	Reference (Author, date)	Included or excluded	Single extracted by:	Impact of pet ownership on MH (positive)?	Impact of pet ownership on MH (negative)	Impact of pets on MH (neutral)
	#812 - Bradley 2015 Bradley, Lahna; Bennett, Pauleen C. Companion-animals' effectiveness in managing chronic pain in adult community members	I	HB		A statistically significant difference between owners and non-owners on the com-bination of depression, anxiety, and stress variables resulted ($F(3,141) = 2.97$, $p = 0.034$, Pillai's Trace = 0.01, $\eta 2 = 0.06$). No statis-tically significant differences between owners' and non-owners' anxiety and stress scores resulted..	

Summary

- Data extraction forms must be tailored and piloted

- Should be unbiased and reliable so clear decision points should be explained in the protocol

Group exercise

- Decide how you will extract data for your study
  - Who will do this?
  - How will you ensure thoroughness?
  - Will you use any tools to support systematic review
  - How will you synthesis your data?

Prepare a 60 second pitch to sell your proposed review and present to the group!


Evaluation