Developing a question for a systematic review

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Outline

- Developing questions which are feasible and useful
- Use of PICOCS
- PICOCS for complex interventions
- Refining review questions
- Use of logic models: workshop

Developing questions for systematic reviews

- Many reviews have been abandoned because the review question has not been well thought out

- Valuable to invest time to ensure question is:
  - Useful
  - Makes sense
  - Focussed- like research question
  - Feasible to complete in timescale
  - Answerable

Developing questions for systematic reviews

- Establish:
  - What has already been done- avoid duplication: no existing systematic reviews on the topic- completed or ongoing.
  - Useful: what is the priority for knowledge on this topic?
    - Nature of research- outcome evaluation, epidemiological studies
    - Will there be data available which can answer the question?
    - Is it conceptually useful to include studies from different contexts, populations, time points etc?
  - Manageable: what is nature & volume of existing research evidence is likely to be available

Developing questions for systematic reviews

- Development of question is iterative
- Requires scoping searches and consulting with topic experts
- Needs to respond to:
  - Needs of evidence users and priority for knowledge
  - Conceptually appropriate
  - Be answerable- reflect a body of existing evidence (avoid empty reviews)
  - Manageable in the timescale

Developing a systematic review question for a “what works” review: PICO(CS)

- **P**opulation
- **I**ntervention
- **C**omparison
- **O**utcome

- **C**ontext
- **S**tudy design

- All need to be pre-specified in the review protocol
- Be clear and replicable to reader- explore your assumptions

Developing a systematic review question (PICOCS)

- **P**opulation: age, socio-economic status, ethnicity, disease group
- **I**ntervention
- **C**omparison group: placebo, normal care…
- **O**utcome: broad health, or specific respiratory function
- **C**ontext- country, rural/urban, hospital/primary care, deprived area
- **S**tudy design: RCTs, uncontrolled studies, qualitative data

- Identify the PICOCS in this review

- PICOCS in reviews of complex interventions

Complex interventions & PICOCS

Population:

- Are you only interested in certain groups?
  - Alcoholic dependant, young offenders

- Are there likely to be variations across populations
  - which might have important influence on outcomes & potential effectiveness? Inequalities?
    - Older people vulnerable to cold, young people & STDs
  - which make some populations irrelevant?

    - Consider ethnicity, age, gender, socio-economic status, education, occupation, religion

Complex interventions & PICOCS

Intervention:

- Are there different terms to describe the intervention?
- What is the potential scope of the intervention?
  - e.g. housing improvements
- What are the key components of interest?
- What is the potential for variation?
  - Intended variation & unintended
    - Tailored to context/individual or implementation failure
  - In what way & why?
  - How much variation is manageable in your review?

Complex interventions & PICOCS

Comparison:

- What is the likely comparison?
  - Usual service provision- how much do you know about that?
  - No service provision
  - Is this a programme/policy that has been around for years, for example a welfare policy or emergency feeding clinics
    - Is it likely that there will be studies with comparisons?
      - What sort of comparisons?

Complex interventions & PICOCS

- Outcomes

Outcomes, impacts & effects

- Outcome: the measure used to assess
  - Income, HIV prevalence, hygiene practices

- Impact/effect: change in outcome
  - Change in: income, HIV prevalence, hygiene practices

Complex interventions & PICOCS

Outcome:

- **What is the primary intended outcome of this intervention?**
- **What range of outcomes are of interest to review?**
  - What is feasible to include? One domain e.g. respiratory outcomes?
  - Are there other likely outcomes?
- **Are there other determinants of, or influences on these outcomes which should be considered?**
  - What is known about these- what influences & how much?
- **What is the timescale of outcomes of interest to the review and other outcomes?**
  - If timescale long- how likely is it that studies will have assessed this?
    - Should you consider looking at more immediate outcomes or proxy outcomes for main outcome?

Review outcomes: Primary & secondary

- **Primary/Secondary outcome for intervention**
  - Primary outcome: Key aim of intervention
  - Secondary outcome: Not key aim of intervention
- Health impacts of social interventions
  - Secondary: may be beneficial & desirable

- **Primary/Secondary outcome for review question**
  - Primary outcome: Key aim of review
  - Secondary outcome: Not key aim of review-
    - but may be important additional impacts, e.g. which may explain variation in primary outcome or act as intermediate outcome
    - may be proximal impacts which act as determinant of primary review outcome, e.g. socio-economic determinants of health

Define primary review outcome(s)

- Limit number of primary review outcomes- to one?!
  - Maybe different measures of same broad outcome domain
    - Health
      - Self-reported health?
      - Validated measure e.g. SF-36?
      - Long term limiting illness?
      - How is your health compared to a year ago?
      - Parent reported for child?

      - Health service use
  - May need to define time point at which outcome is assessed?
    - 1 month, 6 months, 1 year, 2 years…
  - What is useful, manageable and synthesisable?

Define key outcome(s) for the review

- Limit number of key outcomes- to one
  - Maybe different measures of same broad outcome
    - Respiratory health
      - Asthma
      - Wheeze at night
      - Wheeze when talking
      - Wheeze when doing exercise
      - Wheeze in the morning
      - Cough in the morning
      - Phlegm in the morning
      - Peak flow measures…

Define key outcome(s) for the review

- Sets clear inclusion criteria for review
  - Study which does not assess change in primary outcome is not included- *even if very interesting and has many other outcomes reported in the review*
  - Useful to keep a list of studies identified which have potentially useful evidence- *mark in your database while screening*

- Developing a review question is similar to developing a research question in primary research- ***needs to be well defined***
  - **But may not be possible to pre-empt all potential variants of PICOCS**
    - **Some changes to protocol may be required but need clear recording and discussion with review team**

Selecting secondary review outcomes

- Prioritise secondary outcomes of most relevance to review purpose
  - Impacts associated with the intervention which may influence primary review outcome
  - Implementation

  - Selecting too many can result in very time consuming data extraction and overwhelming amounts of complex data
  - Tailor this to time allocated to review- easy to become overloaded with good intentions!

Complex interventions & PICOCS

Context:

- Are there particular contexts of interest/relevance to users of review?
  - Country/region/physical location (prison/schools), time period,
- Need to know if effectiveness varies by context, implementation etc.
  - Decide how much variation is essential, useful, & manageable

Complex interventions & PICOCS

- Study design
  - What type of research evidence or study design is:
    - Best to answer question of interest
    - Likely to be available
  - Systematic reviews can include any type of data or even theoretical literature
    - Not just randomised controlled trials
    - Can include qualitative & quantitative

What kind of questions can systematic reviews of interventions address?

- **What works?** Effectiveness reviews
  - Is it effective for achieving a specific outcome?
  - What is the size of effect?
  - Is it effective for achieving a specific outcome compared to existing an service?
  - What type/range of effects does it have? Benefits & harms
  - Do the effects vary by population, context, details of the intervention? Impact on inequalities?
  - How does it work?
  - Is it worth the money?
  - Acceptability and appropriateness to certain groups

Refining a review question

- Keeping it manageable

- Apparently simple questions can be very broad
  - What is the effect of the recession on health?

  - Interventions to promote social cohesion in sub-saharan Africa

Review questions: broad or narrow?

- Depend on evidence users needs
- What is available
- What makes sense
- Resources

- Broad reviews can become overwhelming
  - Volume of evidence to review
  - Complexity of the data- diversity of the PICO
  - Only for experienced reviewers

Focussing a review question

- Restrict aspects of the PICOCS
  - Population
  - Intervention
  - Comparison
  - Context/Timescale
  - Outcome
  - Study design

Focussing a review question

- Keep scope of question tight
  - For example, restrict:
    - Dates of searches e.g. 2005-2010
    - Country or language of publication
    - Population of interest
    - Range of sources searched e.g. Medline only
    - Randomised controlled trials

    - Justification on grounds of time should be balanced by what is useful and conceptually appropriate

Development of review questions

- **Health impacts of employment interventions**
  - Spent over 6 months trying to organise and becoming familiar with huge volume of literature
  - Original question too big
  - Question narrowed and refined to reflect feasible and conceptually appropriate question
    - What are the health impacts of work based interventions that impact on psycho-social work environment (ie demand, control and support outcomes)?

Use of logic models in systematic reviews

What is a logic model?

Different jargon used to describe the same thing

- Logic model
- Analytic framework
- Theory of change diagram
- Conceptual framework
- Concept map
- Map of pathways
- Mechanisms
- Influence diagram…etc etc etc

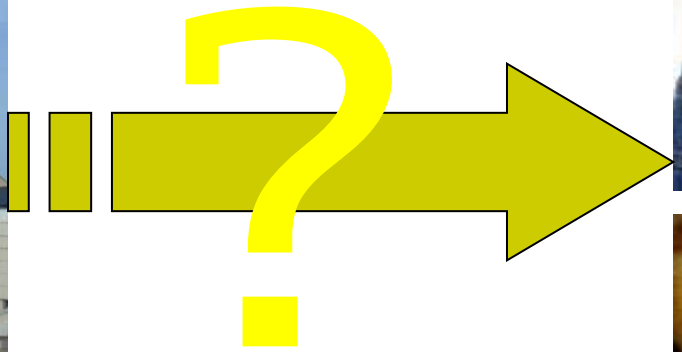
- Broadly- a diagram to visually represent key steps to an expected impact which incorporates key influences which need consideration
- Developed within the evaluation field but of use in systematic reviews of complex interventions

Why logic models?

Input →  → **Output**

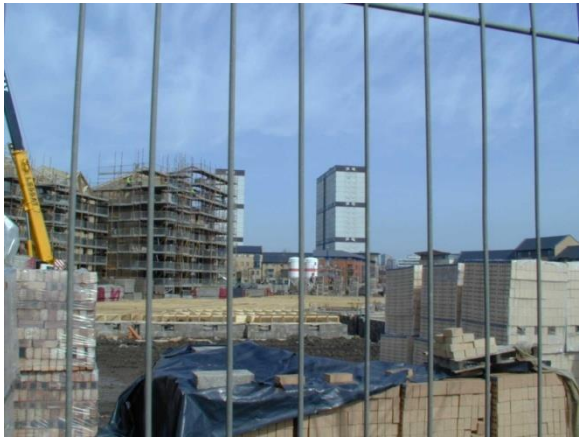
- **Interventions can be like black boxes**
  - Often assumed that the intervention will lead to the intended outcome
  - But when evaluated this is not always the case- WHY?

How might neighbourhood regeneration impact on health?



What is it about this intervention that might improve health?

How might neighbourhood regeneration impact on health?

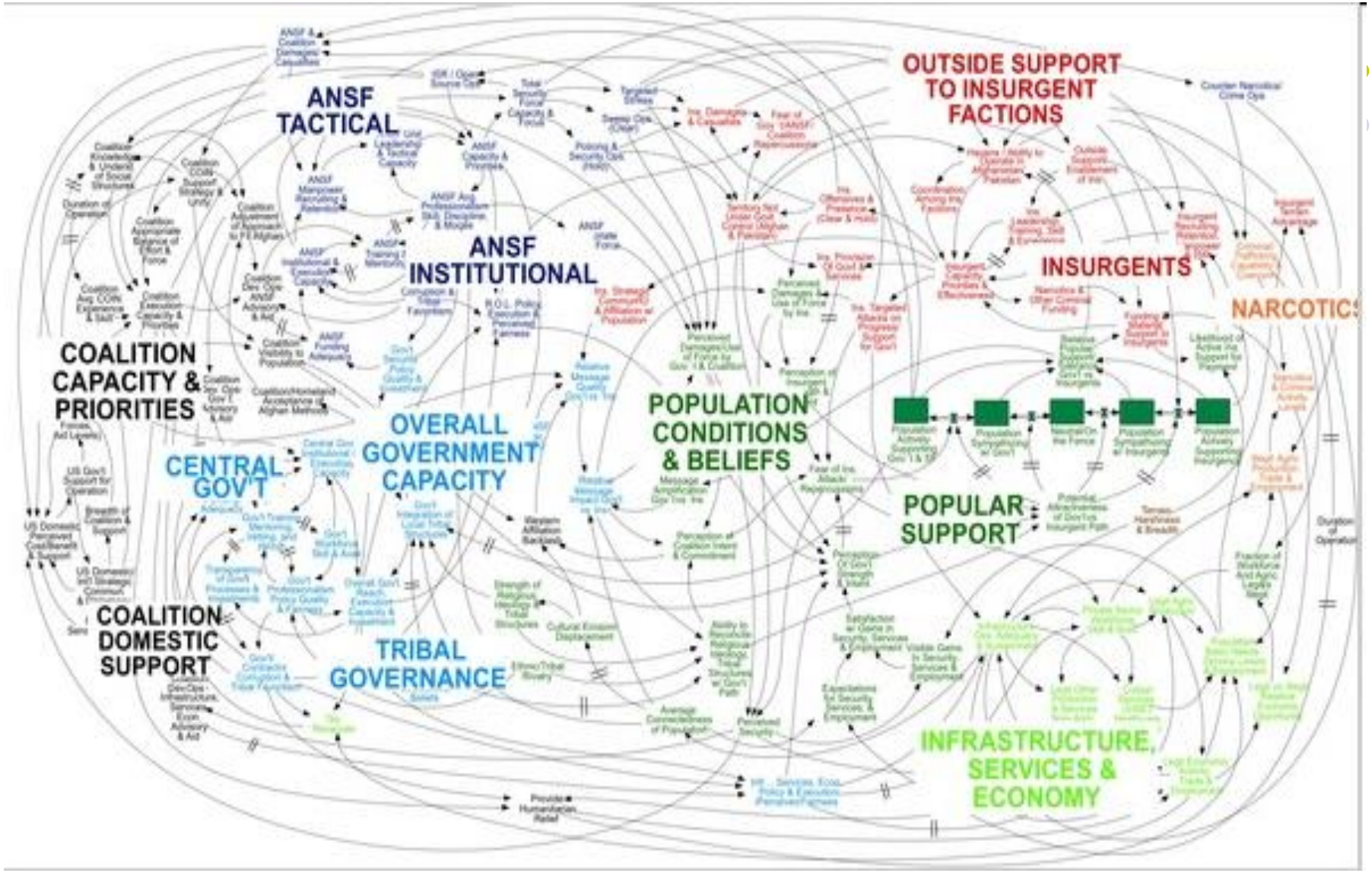


Also influence of contextual factors: economic, Political, social, etc

Use of logic models to refine questions

- Help to map out hypothesis(es)/review question
  - Highlight assumptions in hypothesis
- Highlight complexity and potential for multiple questions
  - Range of potential PICOCS
  - Intermediate variables & confounders
- Identify priorities for review- set limits to PICOCS
  - Illustrate to review commissioners that review is unmanageable
  - Develop in discussion with stakeholders to promote useful reviews

Beware of spaghetti!



"When we understand the diagram we will have won the war"

- Spaghetti good way to highlight need to limit the review

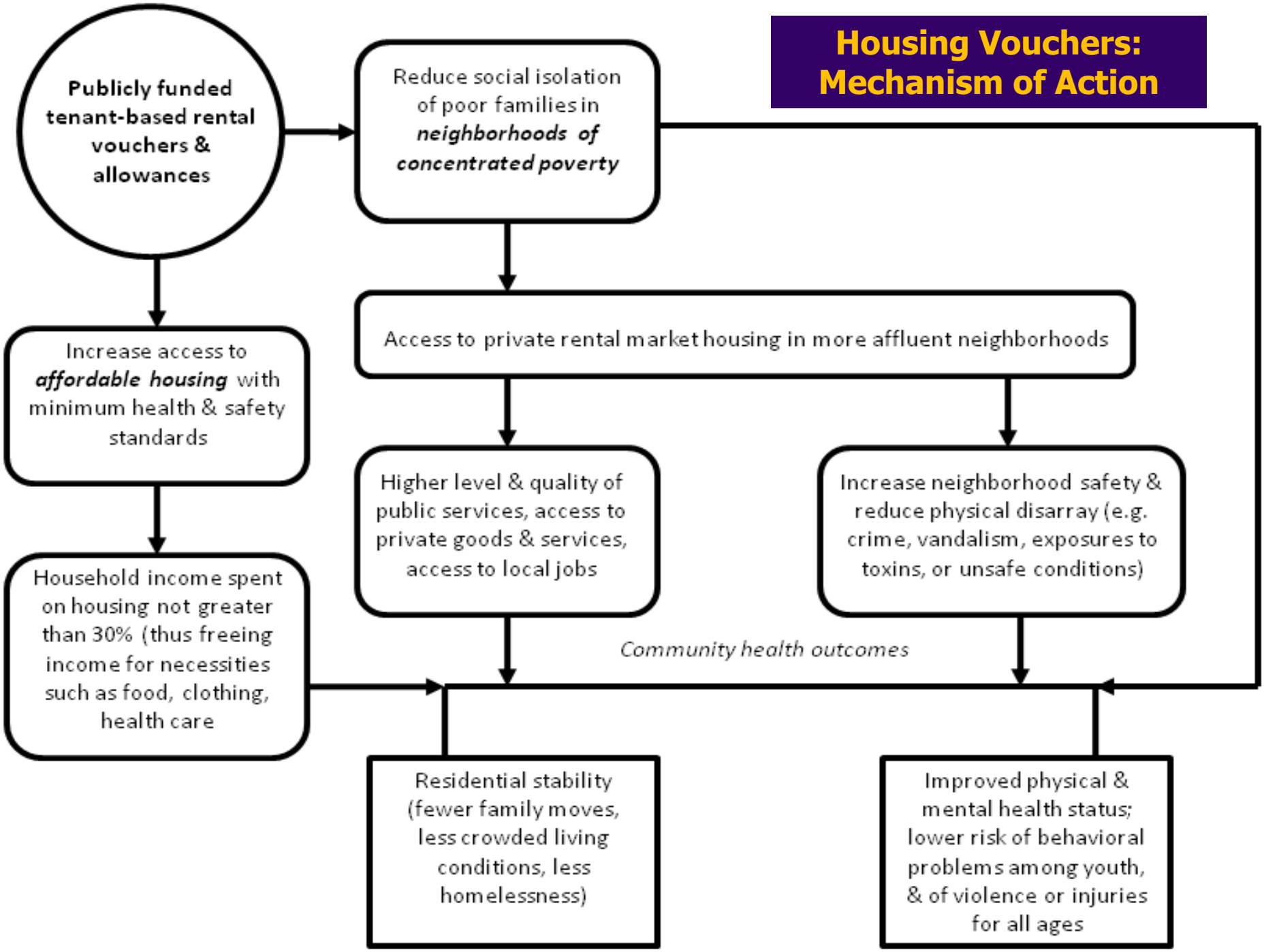
Developing a theory: logic models useful to develop a theory or hypotheses

Housing improvement → **Health outcomes**

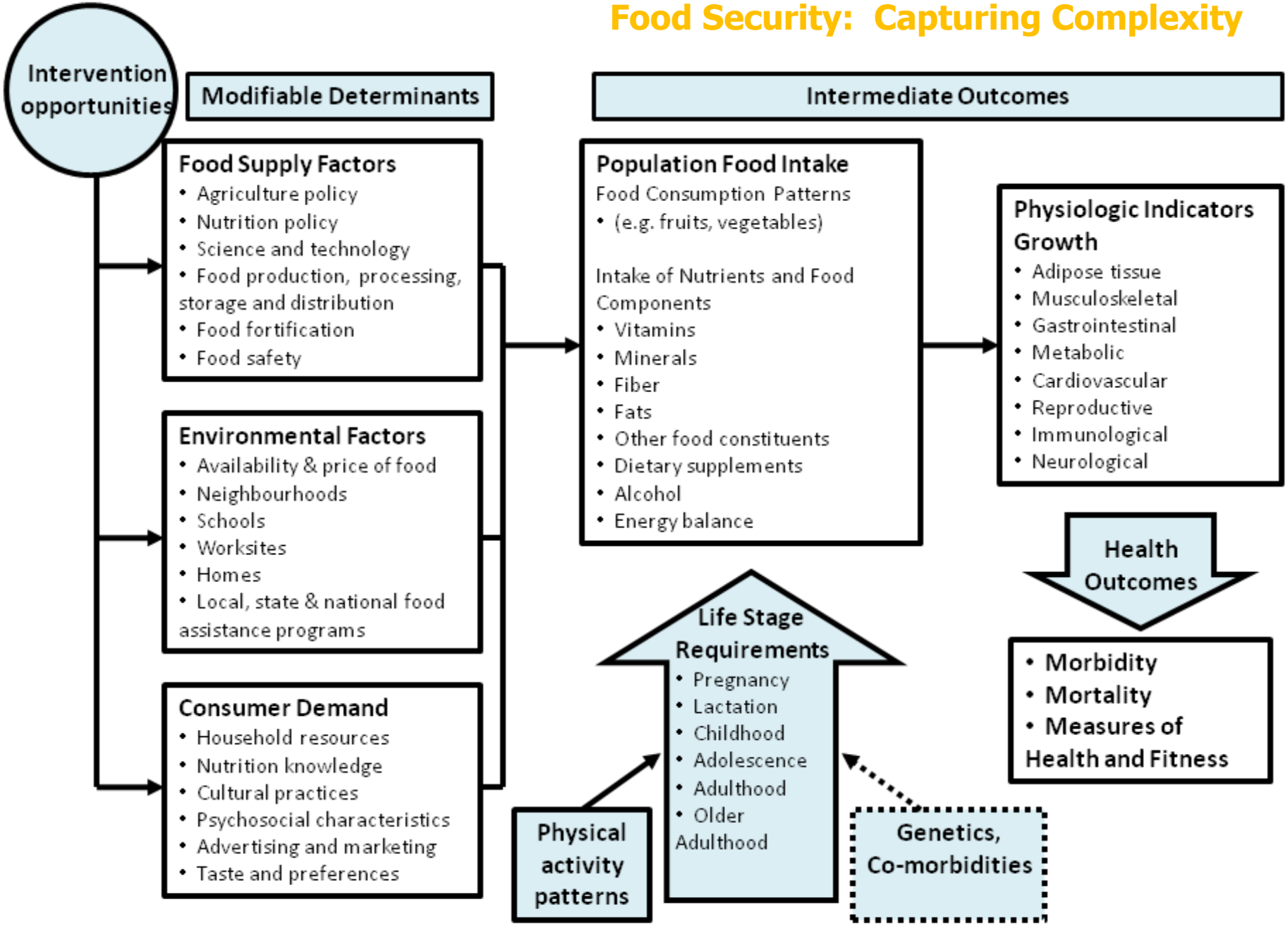
Key questions to shape theory of impacts of an intervention

- What sort of health outcomes are most likely?
  - For Who? When?
- Implementation of intervention: Did housing actually improve?
- Participation in intervention: Did people use warmth measures?
- What are potential unintended impacts of intervention?
  - Were there other changes to peoples lives and living conditions as a result of the housing improvement?
  - Might these additional changes impact on health or your key outcome?

Housing Vouchers: Mechanism of Action



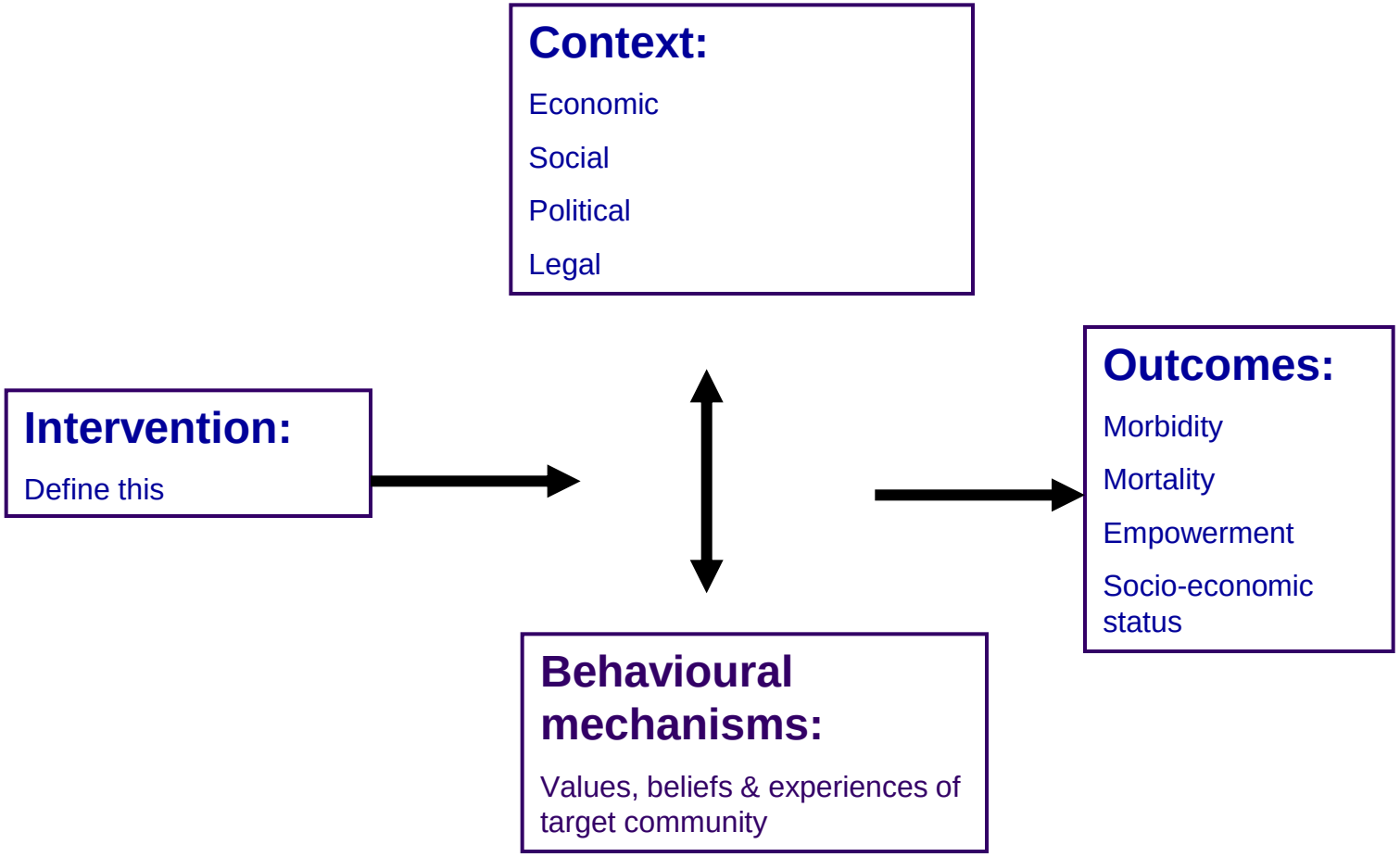
Food Security: Capturing Complexity



Logic model workshop: your turn!

- Groups of 4-5
- Choose a review question
- Draw out a preliminary logic model
  - In your logic model consider and map the following:
    - potential elements of the intervention
    - key outcomes of interest- may be one or more
    - important contextual influences on the intervention AND the outcome of interest
    - list other outcomes which might be of interest
    - the potential for differential effects across different population groups
- No holds barred! (don’t worry about spaghetti)
- Use yellow stickies to help?
- Write down questions that arise
- Feedback

Impact of social interventions likely to be mediated by, implementation, context & behavioural mechanisms



From Water & Sanitation review (3ie)

Key questions to shape theory of impacts of an intervention

- **What is the intervention- and what are the potential different components?**

- **What sort of health outcomes (or key outcome of interest) are most likely?**
  - For Who? When? What is the likely timescale of your key outcome?
  - Are there proxy outcomes which are highly linked to subsequent impact on key outcome? E.g. reduced smoking before seeing respiratory improvement or reduced lung cancer
  - What are other important and likely influences on key outcome of interest- context, influences on health behaviour etc?

- **Implementation of intervention:** Was the intervention implemented as intended?

- **Participation in intervention:** Did people use the intervention as intended?

- **What are potential unintended impacts of intervention?**
  - Are there additional possible/likely changes to peoples lives and living conditions as a result of the intervention?
  - Might these additional changes impact on health or your key outcome?