SPHERE
School for Public Health Environments Research at Exeter

System Mapping for Public Health Research

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Intended Learning Outcomes

By the end of this session, you will be able to:

- Identify ways to apply systems thinking in public health research
- Recognise when to use system mapping
- Understand the steps to build, analyse, and refine a system map

What is systems thinking?

"At its core, systems thinking is an enterprise aimed at seeing how things are connected to each other within some notion of a whole entity…"

(Peters, 2014)

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Complex interventions

- **A simple intervention** is like a recipe: follow the book exactly and you get the same results repeatedly.

- **A complicated intervention** is something far more difficult and technical – but once the technical difficulties are mastered it can be replicated exactly. Like mass-producing an iPhone.

- **A complex intervention** is less predictable and unreplicable: technical expertise might help, but so might experience, personality, favourable environment and luck. Like raising a child.

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Activity 1 (5 mins) identifying complexity

- A city council introduces a programme to reduce childhood obesity. The programme includes a campaign to support parents to buy alternatives to ultra-processed food, to provide healthier school meals, and supply new funding for community sports activities.

- In groups of 2-3, discuss in what ways this intervention can be framed as simple, complicated or complex.

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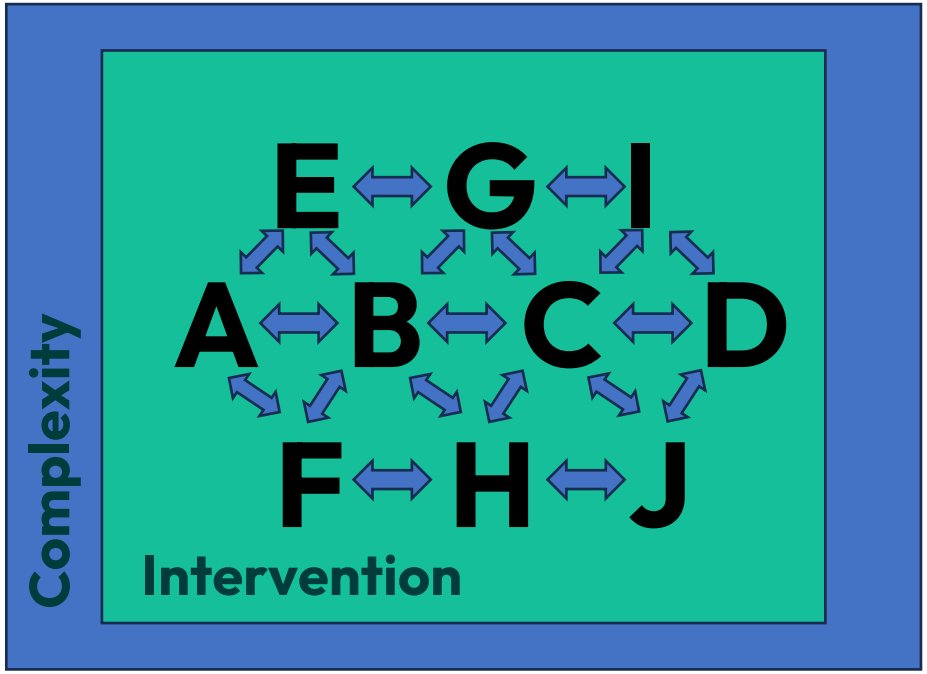
Complex interventions vs Complex Systems



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At which stage of evaluation is system mapping usually used?

Theorising Stage

Identify and compare stakeholder understandings of a system.	Identify and compare stakeholder understandings of how a planned intervention might interact within a system.

Process evaluation Stage

Understand how an intervention has impacts within the system in the real world, including impacts of variation in local context

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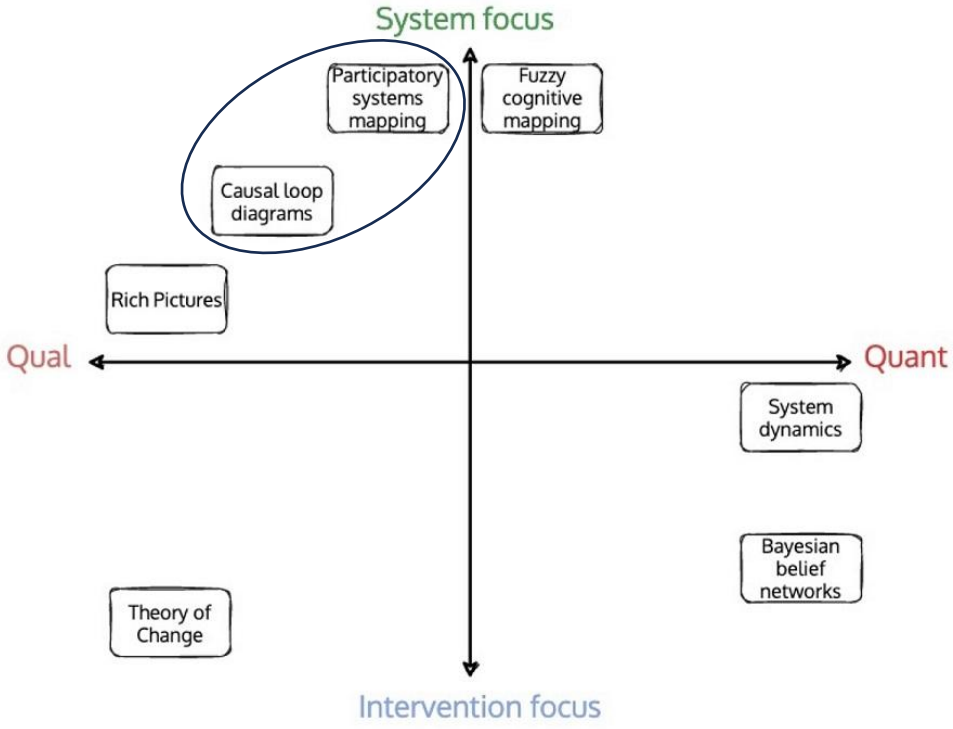
Evaluation of public health interventions from a complex systems perspective: A research methods review

Elizabeth McGill [a 1], Vanessa Er [a 2], Tarra Penney [b 1 2], Matt Egan [c 1], Martin White [b 1], Petra Meier [d 3], Margaret Whitehead [e], Karen Lock [f], Rachel Anderson de Cuevas [e], Richard Smith [f], Natalie Savona [a], Harry Rutter [g], Dalya Marks [c], Frank de Vocht [h], Steven Cummins [c], Jennie Popay [i], Mark Petticrew [c]

https://doi.org/10.1016/j.socscimed.2021.113697

Types of systems mapping



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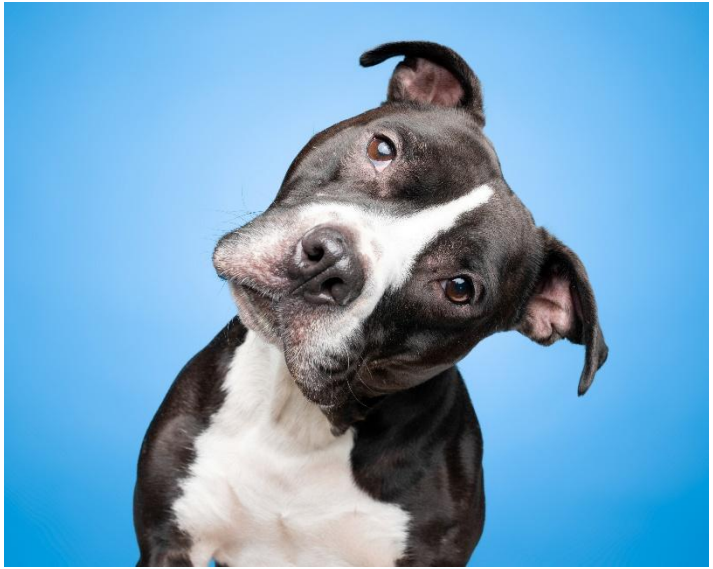
Source: Barbrook-Johnson and Penn (2022) 'How to build and use causal models of systems'

Questions?



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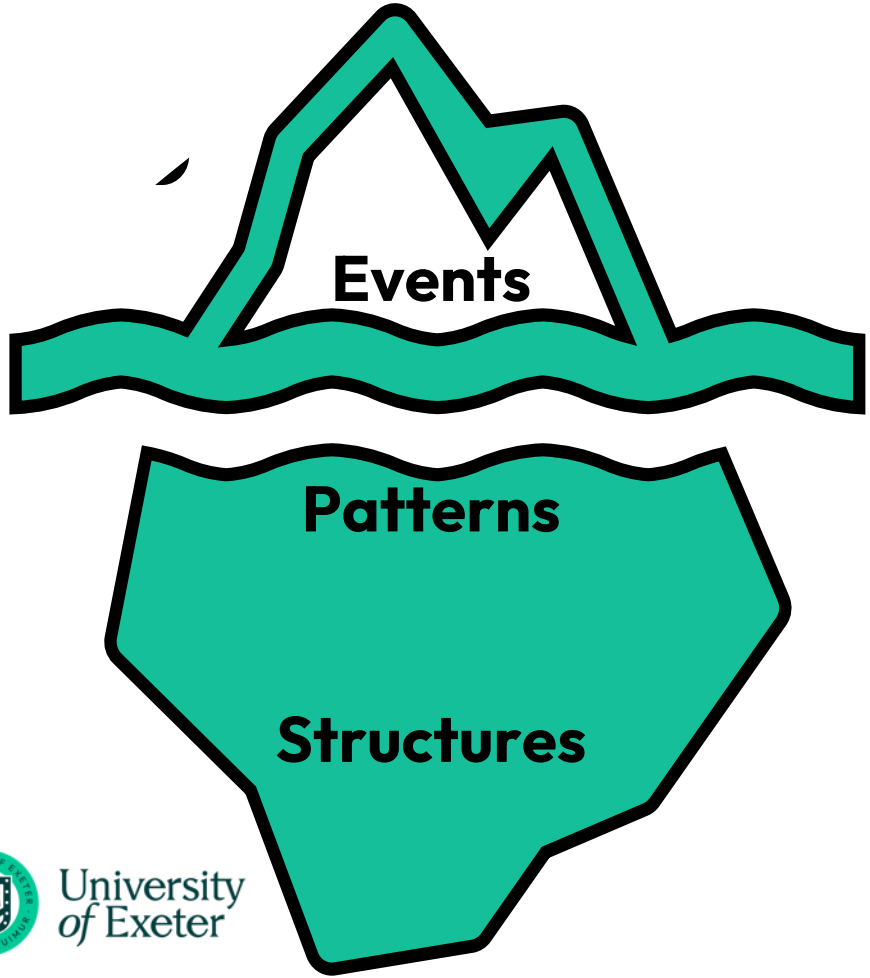

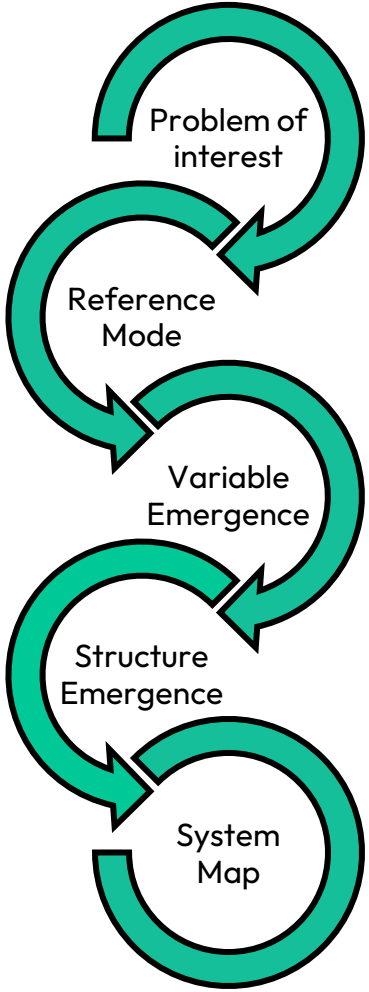

Navigating system mapping

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Defining a **problem of interest**

Build an initial understanding of a situation and its history

- Use methods such as system interviews or document analysis
- Draw from a diversity of stakeholders who can offer key insights about the issue

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Define a **problem of interest**

Design a question that seeks to understand the underlying processes that cause an issue.

- Why are ex-offenders reoffending despite the efforts of support services?
- (rather than) Does support service X decrease recidivism in young men?

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Organise information with a **reference mode**

Steps:

1. Look out for standout information and recognisable narratives/storylines in your data
2. Identify key indicators that represent your problem of interest
3. Determine a time range long enough to see the dynamics play out
4. Vision the observed behaviour of the indicator until present
5. Vision the expected, hoped and feared behaviour of the indicator into the future

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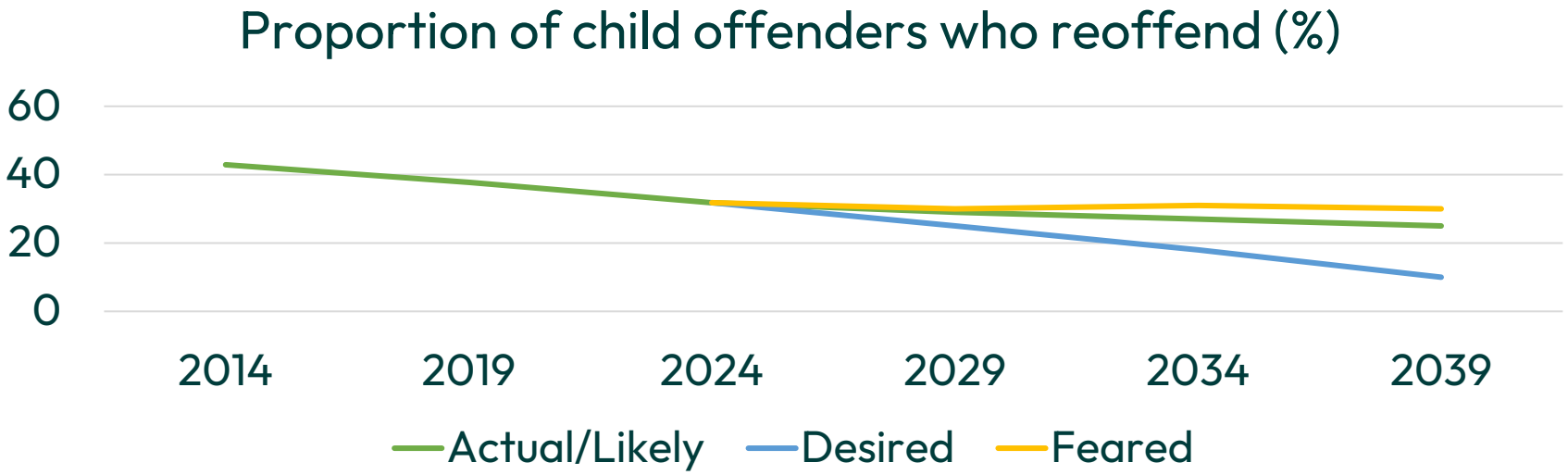
Vision a **reference mode**



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List factor/**variable emergence**

Use the reference mode – what contributes to the time trends observed? What are the consequences of these time trends?

Drivers	Consequences
Caseloads	Resettlement
Siloed commissioning	Homelessness
Service's community knowledge	Mental wellness

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Map **structure emergence**

Using the drivers and consequences identified, map the connections within the system that determine the observed/expected patterns

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Questions?

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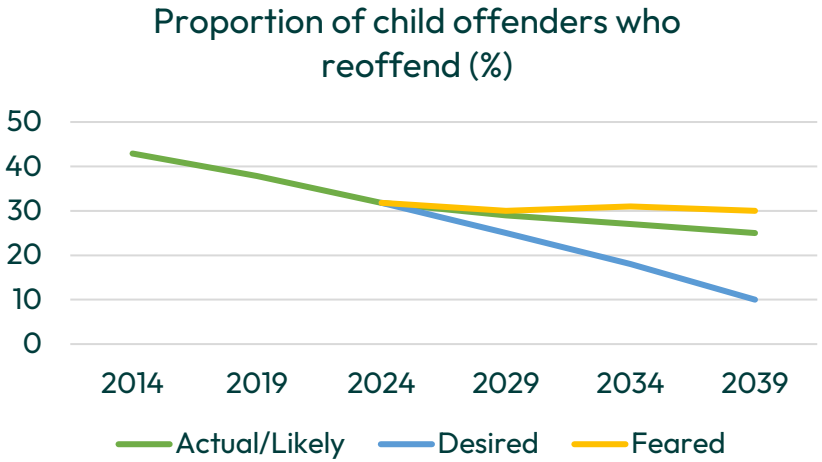
Activity (5 mins) before you map

Why are child ex-offenders reoffending despite the efforts of support services?



Drivers	Consequences
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Siloed commissioning	Homelessness
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…	…
…	…
…	…

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How to map

- **Causal** and **critical** connections (you are not trying to draw out the whole system)
- Assign polarity to each connection
- Consider how the consequences also contribute to shaping the problem (in a cyclical nature)
- You do not need to use all factors that emerge
- You can add new factors as the structure evolves

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Analyse **structure emergence**

Using narratives/storylines or more formal ‘systems archetypes’ can support a more comprehensive analysis.

Common archetypes:

- **Fixes that fail**
- **Shifting the burden**

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System Archetypes: fixes that fail

- Identify unintended consequences
- These are often “quick fixes”
- They have delayed negative effects

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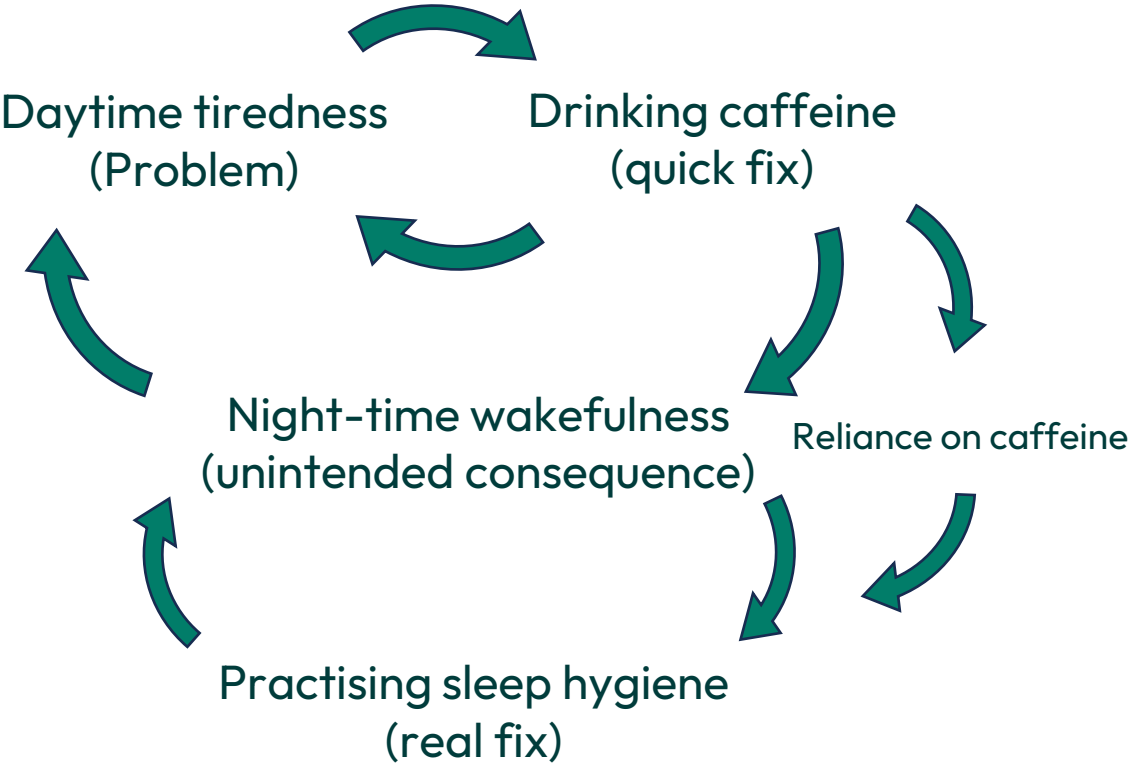
System Archetypes: shifting the burden

- Identify unintended dependences
- These are also often “quick fixes”
- Requires a deeper understanding of the systems
- Highlights the challenges in implementing a “real fix”



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Taking a systems approach forward

A systems approach can enable stakeholders to:

- Come together and share an understanding of the reality of the challenge.
- Consider how the system is operating.
- Identify where it might be feasible to intervene.
- Collectively agree actions and accountability.
- Decide as a network how they will move forward.

Whole systems approach to obesity: A guide to support local approaches (publishing.service.gov.uk)

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Map refining

- Are there factors in excess or missing to explain the key system dynamics?
- Are there connections in excess or missing to explain the key system dynamics?
- Are the variable names correct and clear?
- Are the connections' polarity correct?
- Do the causal pathways make sense?

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Questions?

ILOs

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