Understanding how things could change

Systems approaches in public health

Presented by
Bill Bellew | Adjunct Professor |
Prevention Research Collaboration |
Charles Perkins Centre

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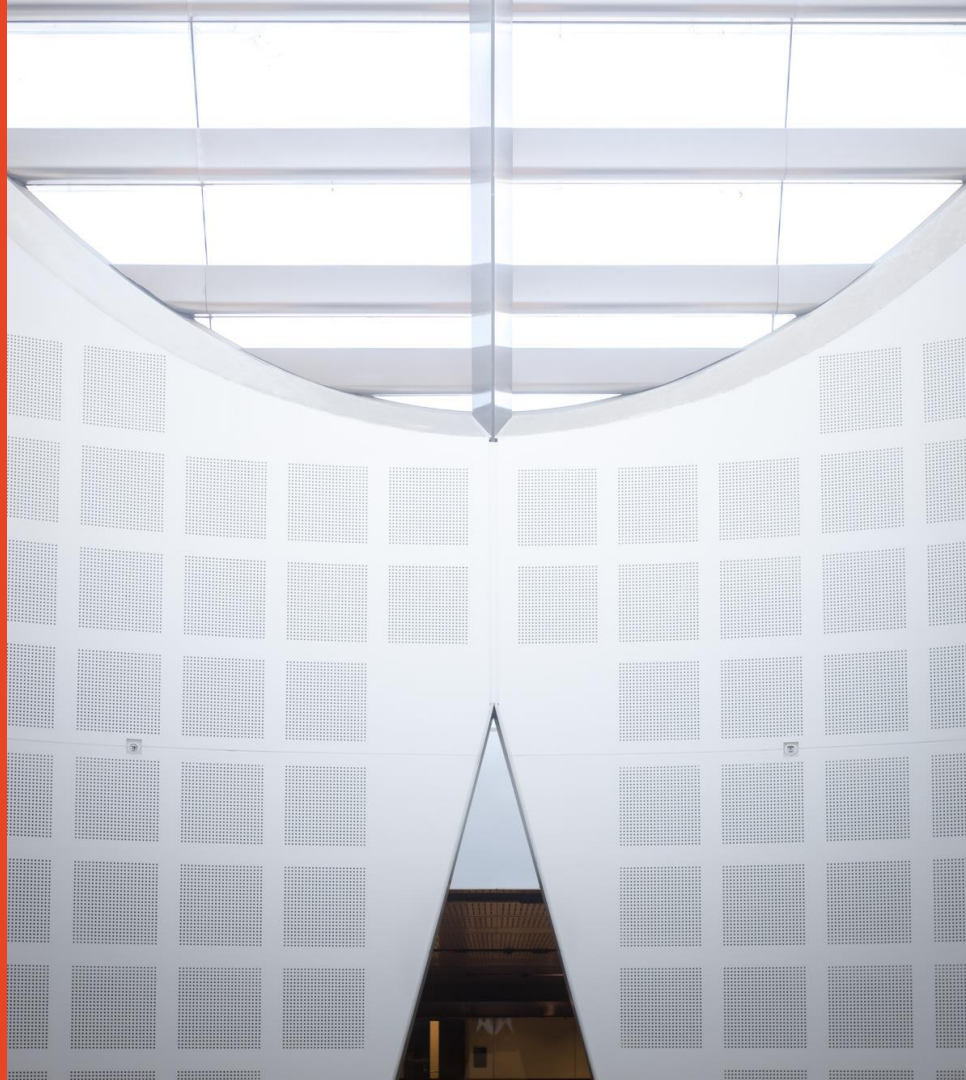

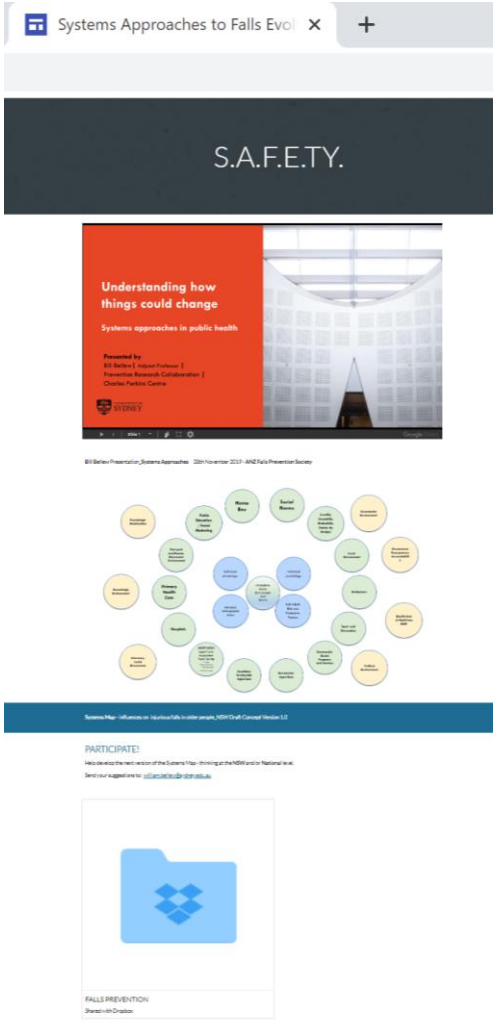

WEBSITE FOR PRESENTATION

https://sites.google.com/view/falls-safety

Please **engage** – questions, comments, contributions

www.slido.com

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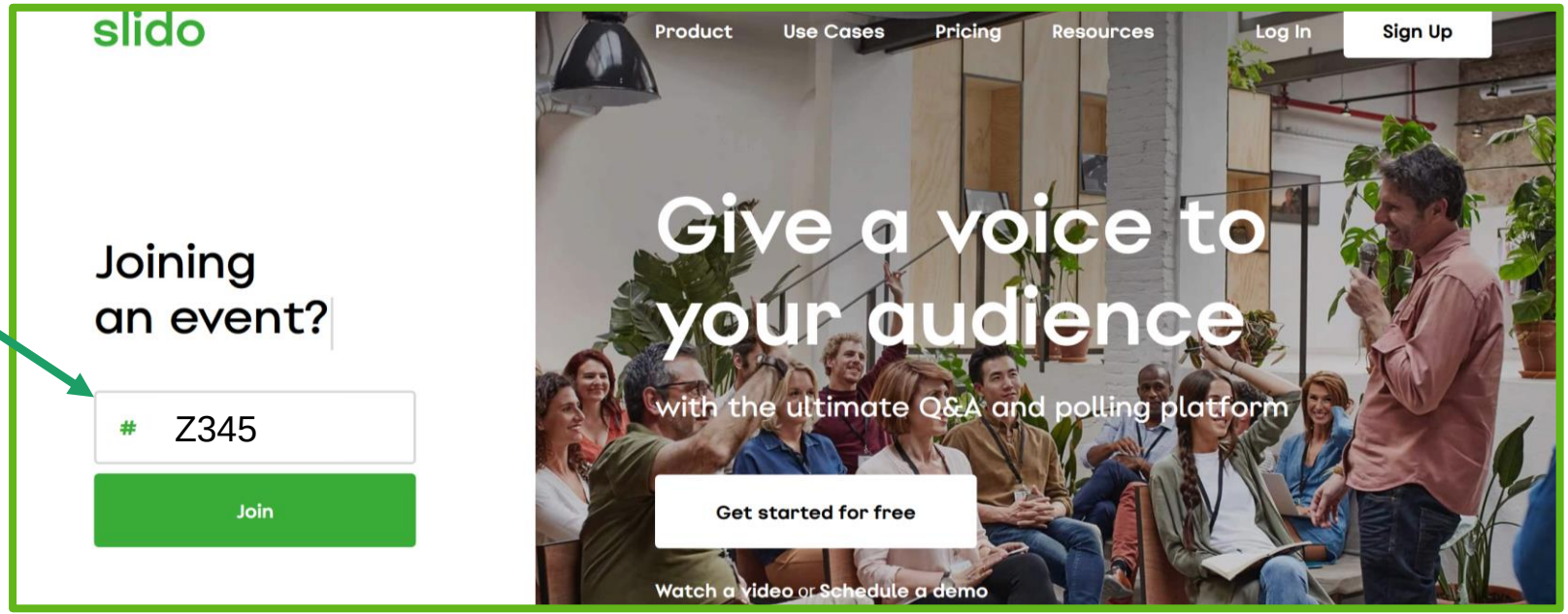
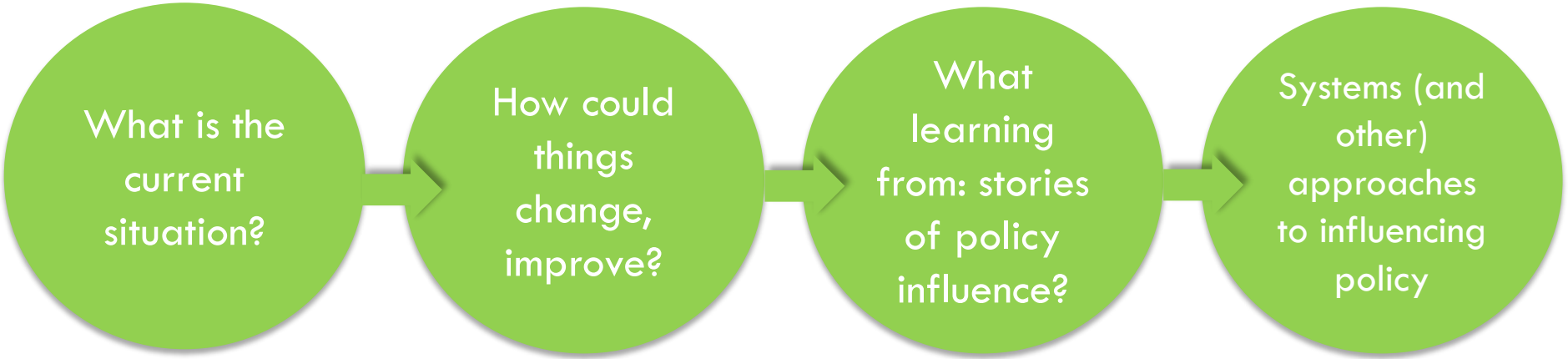


Australian & New Zealand Falls Prevention Society



OVERVIEW

- ❑ Why a *Systems* approach?
- ❑ **M**apping>**U**nderstanding>**A**ction (ASAPa example)
- ❑ What would/could a systems approach to Falls Prevention look like?
- ❑ Discussion

ASAP
Australian Systems Approaches to Physical Activity

The Australian Prevention Partnership Centre
Systems and solutions for better health

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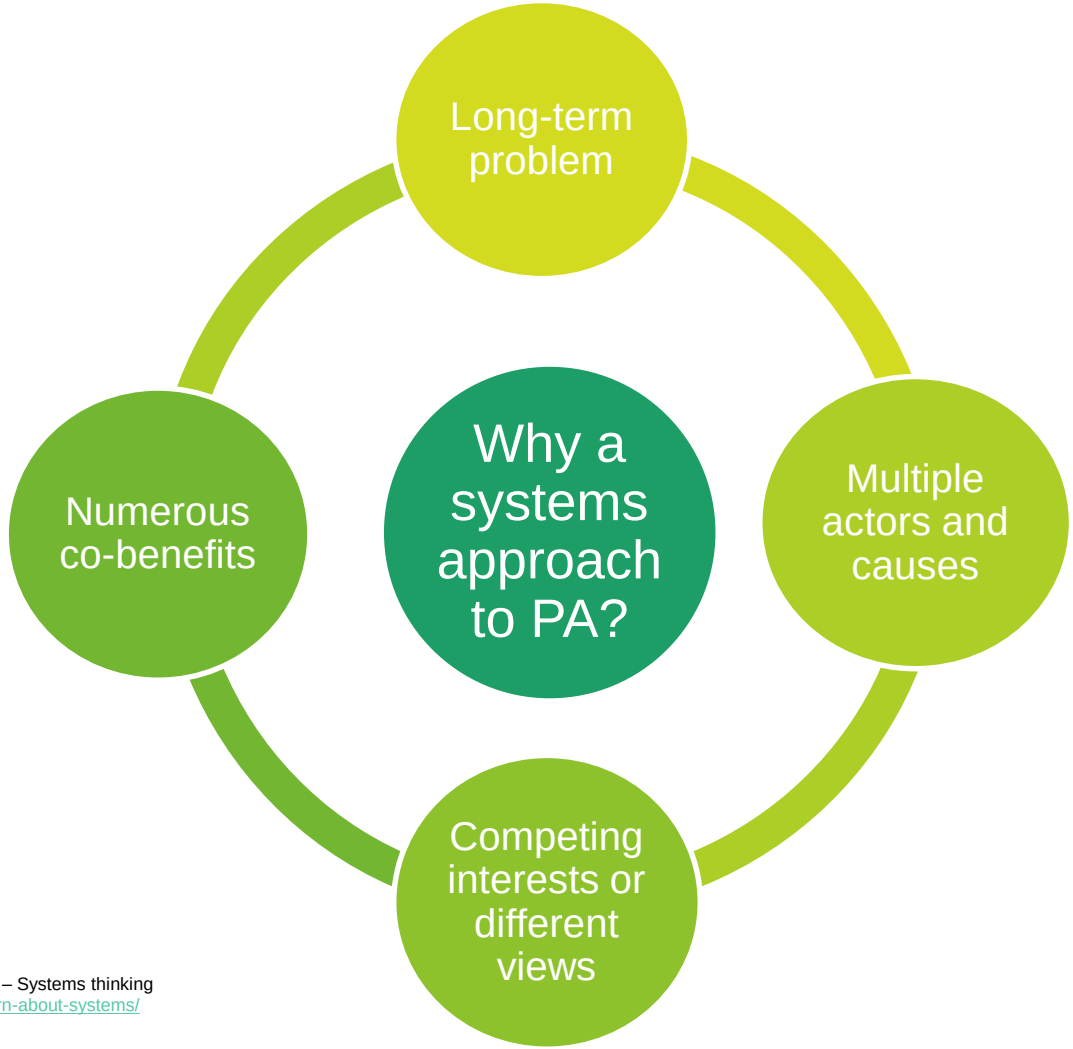


The Australian Prevention Partnership Centre – Systems thinking
https://preventioncentre.org.au/resources/learn-about-systems/

A bicycle is a system made up of many separate parts

A bicycle is a system made up of many separate parts

No single part operates the system alone

A bicycle is a system made up of many separate parts

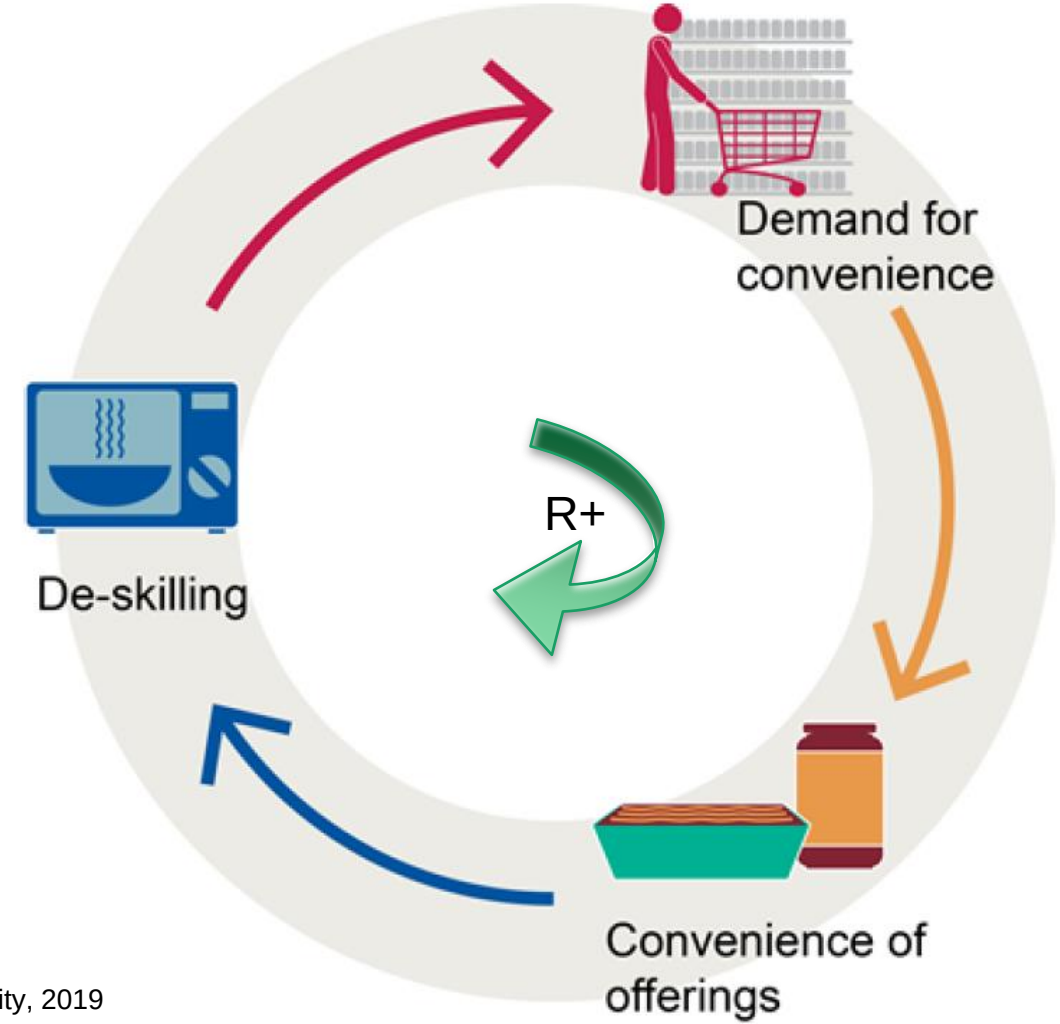
No single part operates the system alone

The bicycle can only be ridden when all parts work together

The function of the system is different from the sum of the parts

Example of a ***Feedback Loop***

A feedback loop occurs when a change in something ultimately comes back to cause a further change in the same thing. If the further change is in the same direction it's a [positive] reinforcing loop [R], if in the opposite direction it's a [negative] balancing loop [B]



Source: PHE, Whole systems approach to obesity, 2019

Causal Loop Diagrams
(bicycle commuting, Auckland)

In ST, Causal Loop Diagrams (CLD) can be thought of as building sentences within a story.

We identify the *key variables* in a system (the "nouns") and indicate the *causal relationships between them via links* (the "verbs").

By linking together several loops, we can create a concise story about a particular problem or issue.

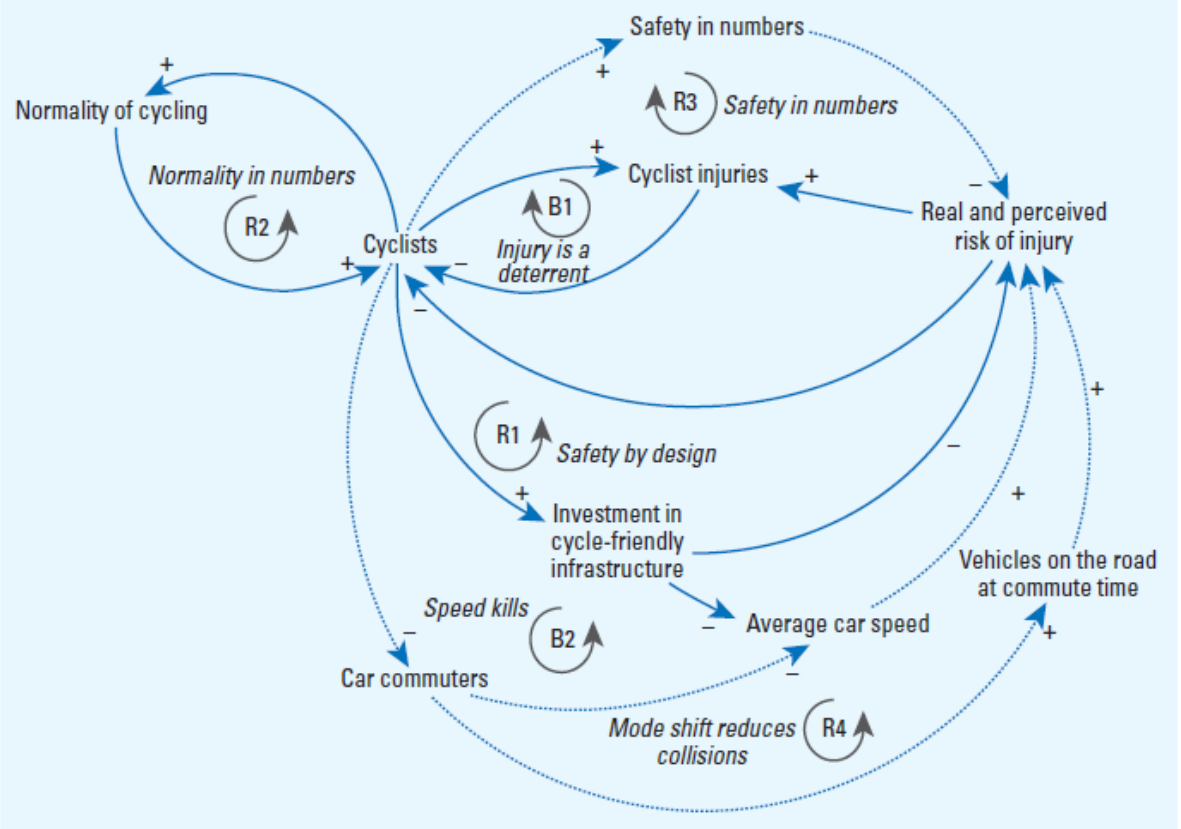
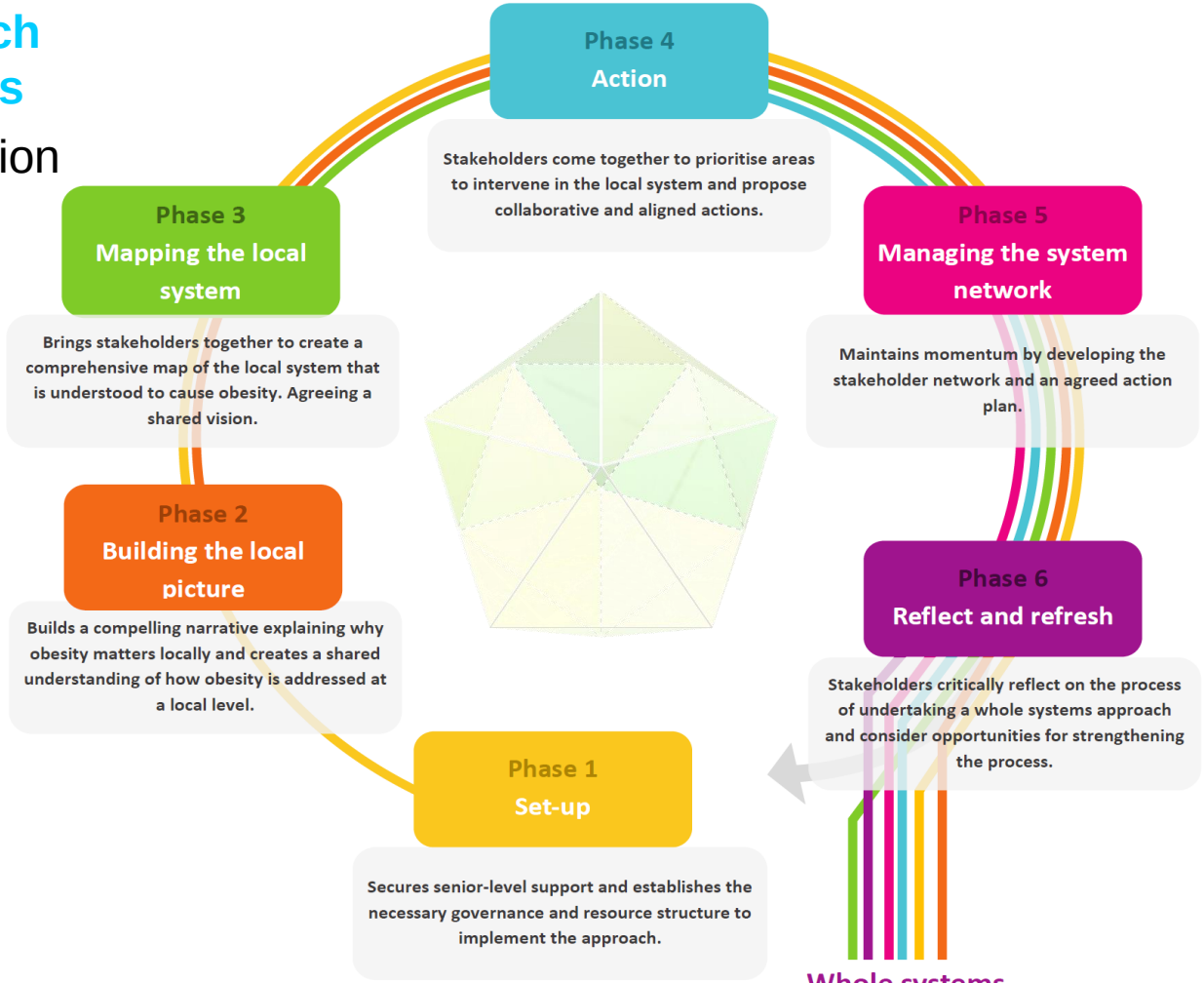


Figure 1. Causal loop diagram for bicycle commuting developed from stakeholder interviews and workshops, literature review, and data incorporation. Dotted lines denote loops identified by stakeholders and the literature, but where local data suggests they are currently inactive. Arrows with a positive sign (+) indicate that a change in the originating variable leads to a corresponding change in the variable at the arrowhead. Arrows with negative signs (–) indicate that a change in the originating variable leads to a change in the opposite direction for the arrowhead variable (R, reinforcing or positive feedback loop; B, balancing or negative feedback loop).

Whole Systems Approach Implementation Process

Example: Obesity Prevention

Main Focus is
IMPLEMENTATION
['Action']



Source: PHE, Whole systems approach to obesity, 2019

Purposes of systems mapping/modeling defined

- Prediction
- Forecasting
- Social learning
- Decision making under uncertainty
- Developing system understanding and experimentation

Continuum of systems mapping/modeling approaches

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Continuum of systems mapping/modeling approaches

Preparation phase	*Conceptualization (qualitative)*
Short term	Short to medium term
Interviews/data gathering	Cognitive mapping

Performance evaluation criteria for mapping/modeling

• Data acquisition • Expert knowledge • Completed functional model (validated) • Further use of the products (legacy) • Validation of the methods/findings	• Application of the model for intended purpose • Improved understanding of the system • Improved decision making • Understanding of others' perspectives • Capacity building, skills

[a] Unified Modelling Language

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Continuum of systems mapping/modeling approaches

Preparation phase	*Conceptualization (qualitative)*	*Conceptual modeling (semiquantitative)*	*Dynamic modeling (quantitative)*
Short term	Short to medium term	Medium term	Medium to long term
Interviews/data gathering	Cognitive mapping	Collective cognitive mapping (fuzzy cognitive mapping) All-encompassing framework Time-sequenced UML[a]	Agent-based model ABM Numeric ABM/ dynamic simulation

Main Focus varies across the Continuum

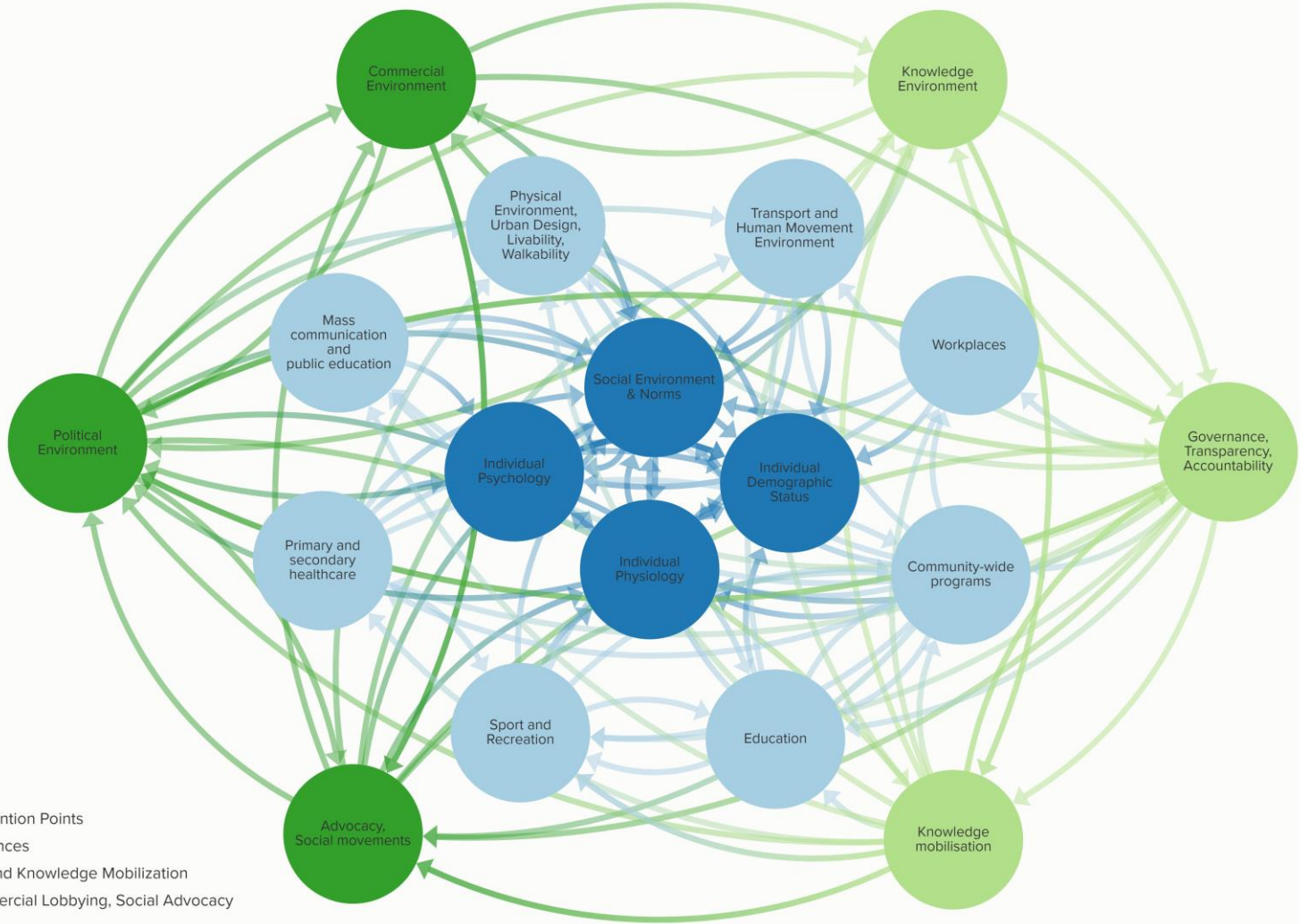
'Mapping' **'Understanding'** **'Action'** **'Deeper understanding'** **'Refined Action'**

[a] Unified Modelling Language

PA Systems Map

Australia – National Level

ASAP
Australian Systems Approaches to Physical Activity


Commercial Environment
Knowledge Environment
Physical Environment, Urban Design, Livability, Walkability
Transport and Human Movement Environment
Mass communication and public education
Workplaces
Social Environment & Norms
Political Environment
Individual Psychology
Individual Demographic Status
Governance, Transparency, Accountability
Primary and secondary healthcare
Individual Physiology
Community-wide programs
Sport and Recreation
Education
Advocacy, Social movements
Knowledge mobilisation
Legend
System Intervention Points
PA Core Influences
Governance and Knowledge Mobilization
Politics, Commercial Lobbying, Social Advocacy

From mapping to evidence-based guidance

Australian Systems Approaches to Physical Activity

Potential opportunities identified from mapping

Healthcare, workplaces

Priority groups

Implementation, Evaluation, Governance

Getting Australia Active 3

- Whole-of-systems approaches
- Policy domains for action
- Inactive groups and addressing inequity
- Surveillance and monitoring

What would a *systems approach* to *Falls Prevention* look like?

Australian and New Zealand Falls Prevention Society

Home

Welcome to the website of the Australian and New Zealand Falls Prevention Society (ANZFPS). The ANZFPS was formed in 2006 to promote the multidisciplinary study and implementation of falls prevention in older people. The society achieves this purpose by:

- holding regular meetings to present and discuss the latest research and clinical findings relating to the falls risk factors and falls prevention strategies;

RECENT POSTS

Statistics webinar now online!
ANZFPS Seminar
ANZ Society for Sarcopenia and Frailty Research Conference – Sydney – 22 – 23 November 2019
Call for bids to host ANZFPS 2022 confer-

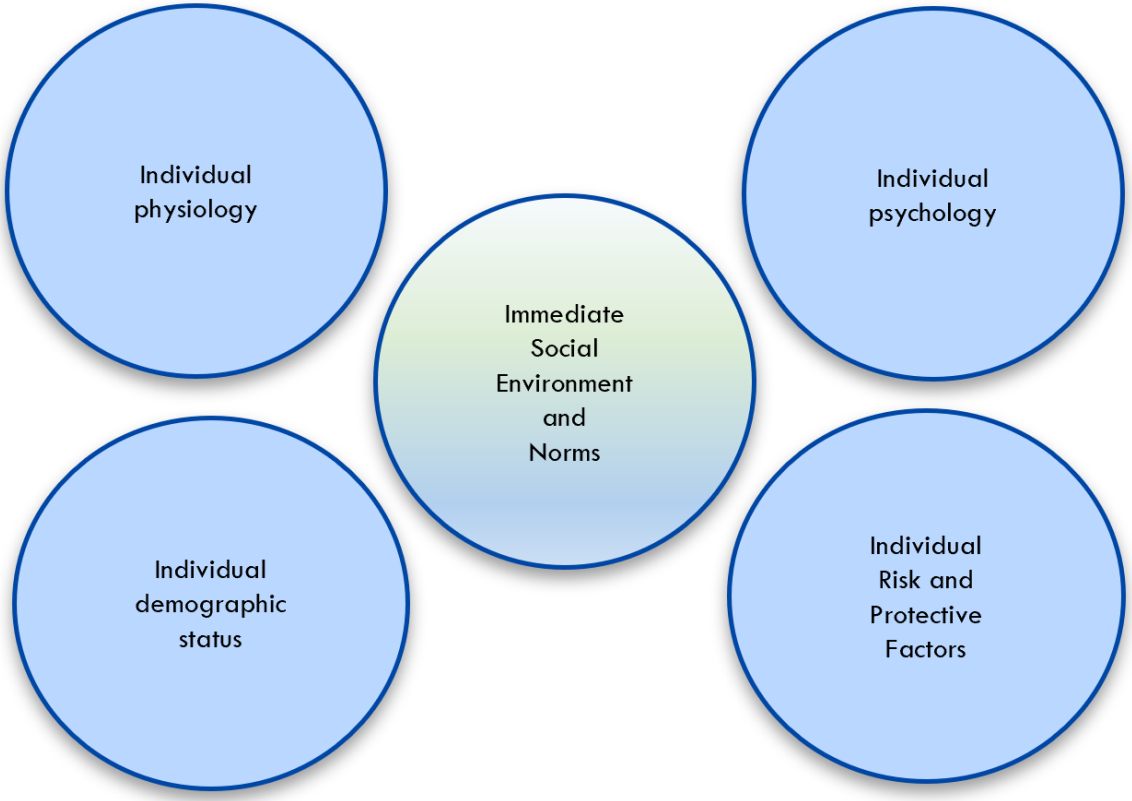
What would/could a *systems approach* to *Falls Prevention* look like?

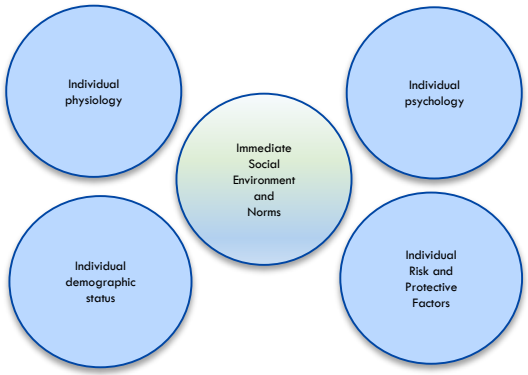
What would/could a *systems approach* to *Falls Prevention* look like?

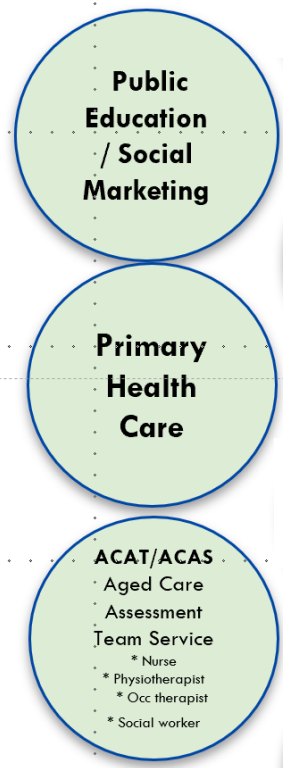
"Mapping the influences on injurious falls in older people"

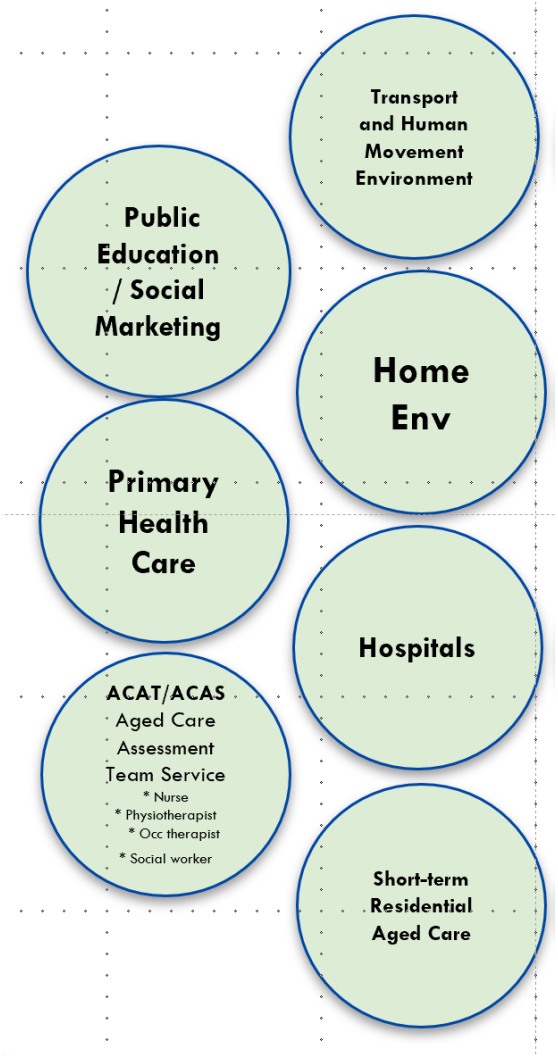
(*preliminary, draft, illustrative*)

“Core influences”




Individual physiology
Individual psychology
Immediate Social Environment and Norms
Individual demographic status
Individual Risk and Protective Factors


Public Education / Social Marketing
Primary Health Care
ACAT/ACAS
Aged Care Assessment Team Service
* Nurse
* Physiotherapist
* Occ therapist
* Social worker


Transport and Human Movement Environment
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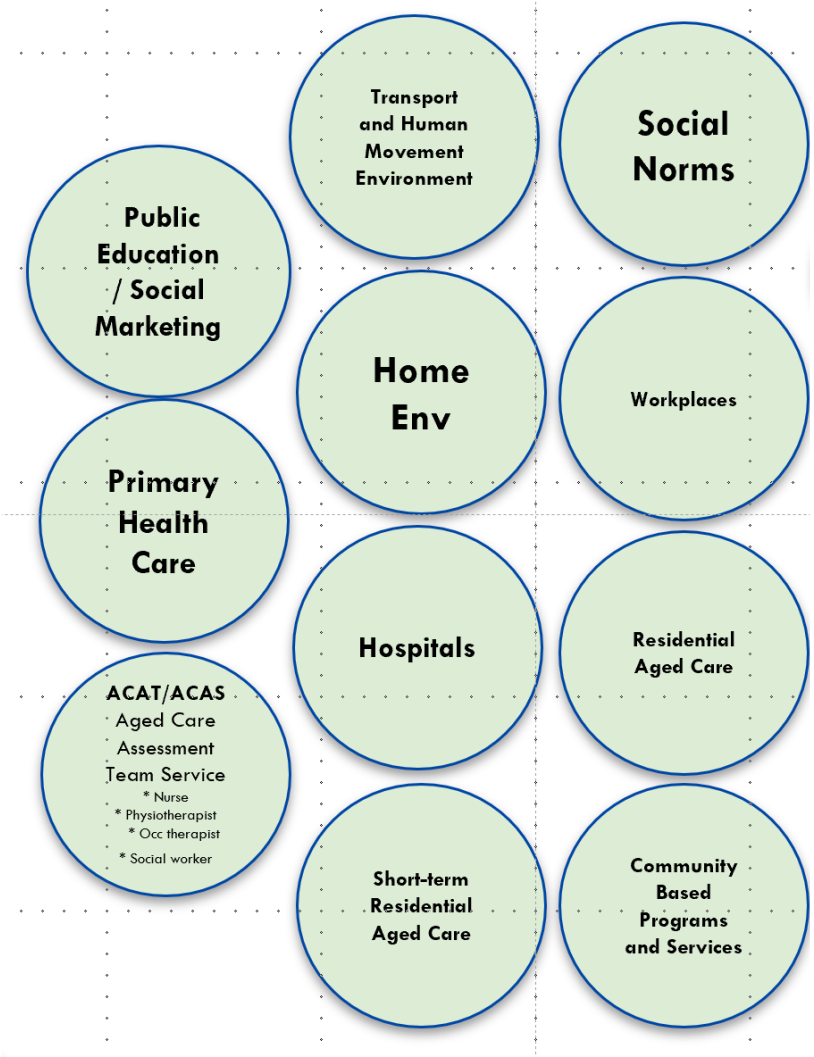
Short-term Residential Aged Care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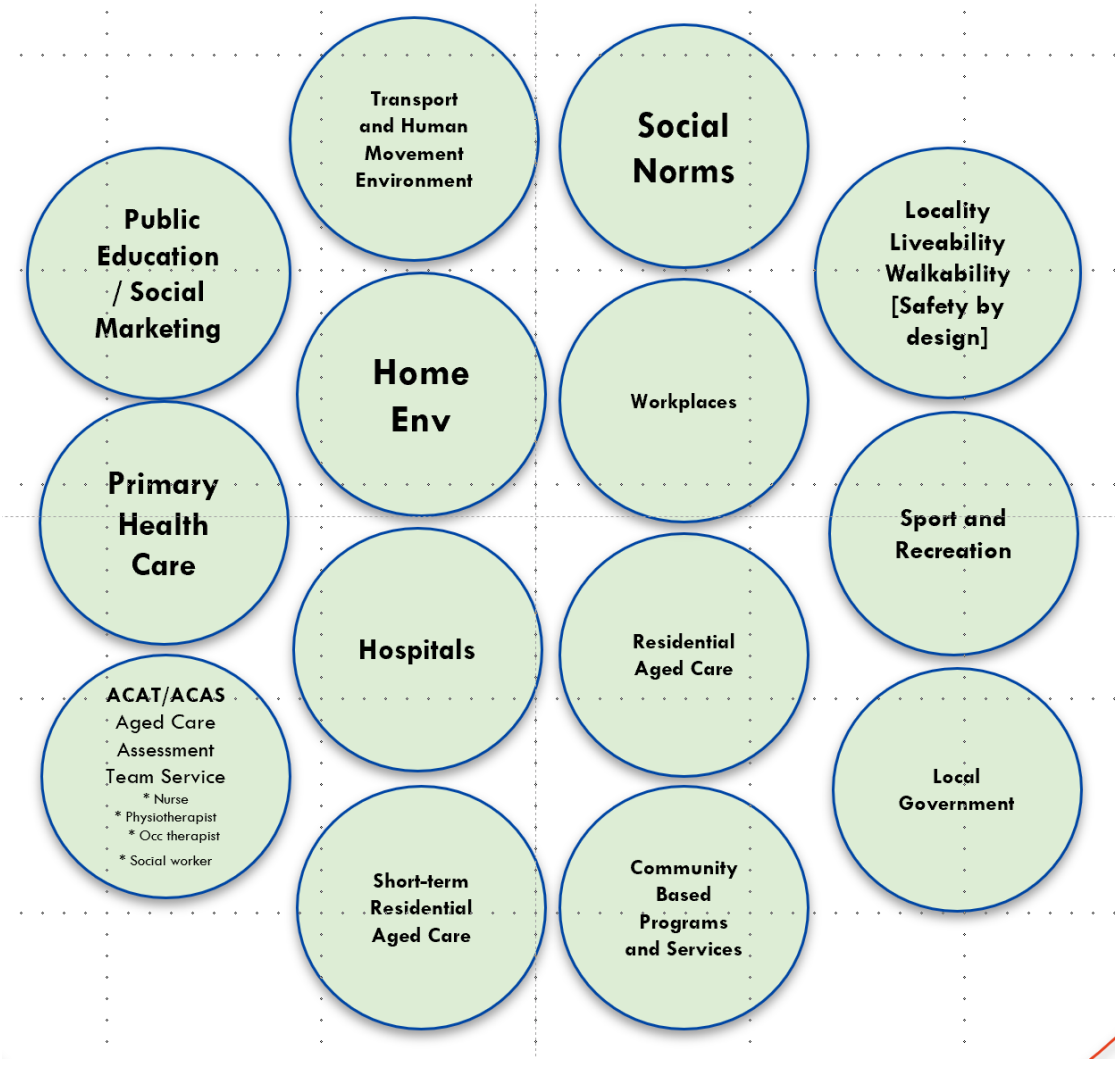
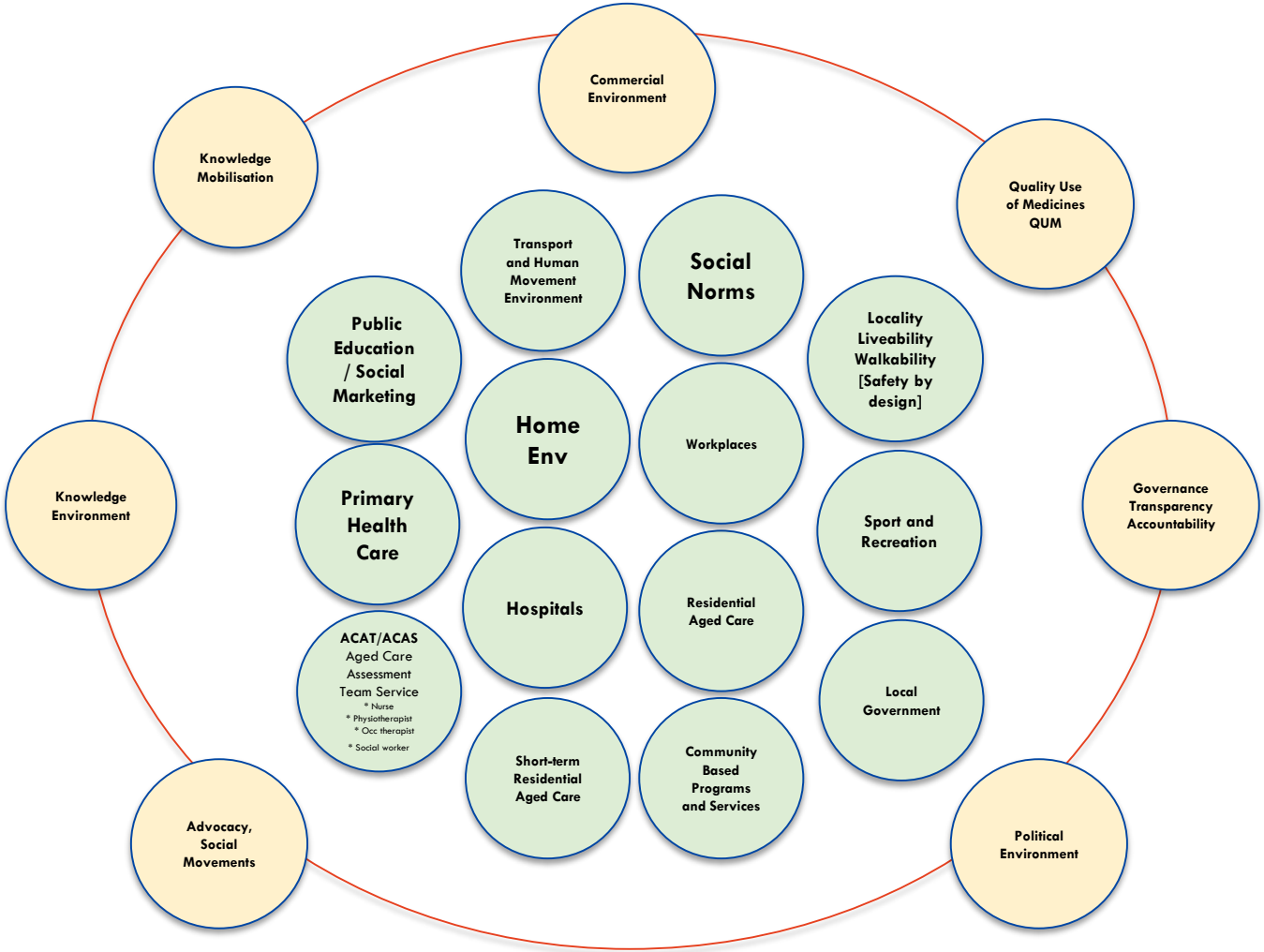
Community Based Programs and Services

“Influences in…
Settings
Strategies
Services…”



“Governance influences”

“Knowledge, Advocacy influences”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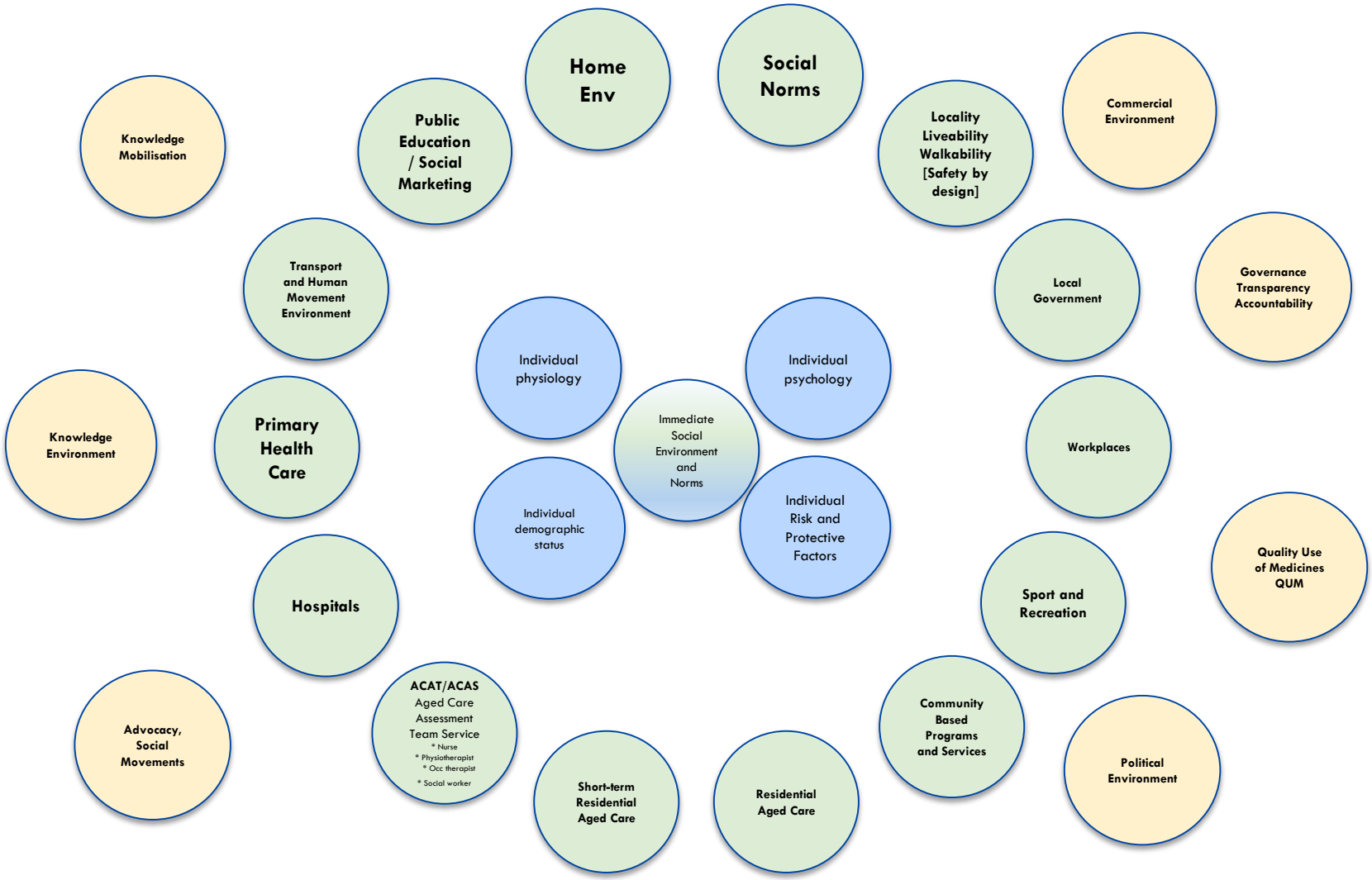
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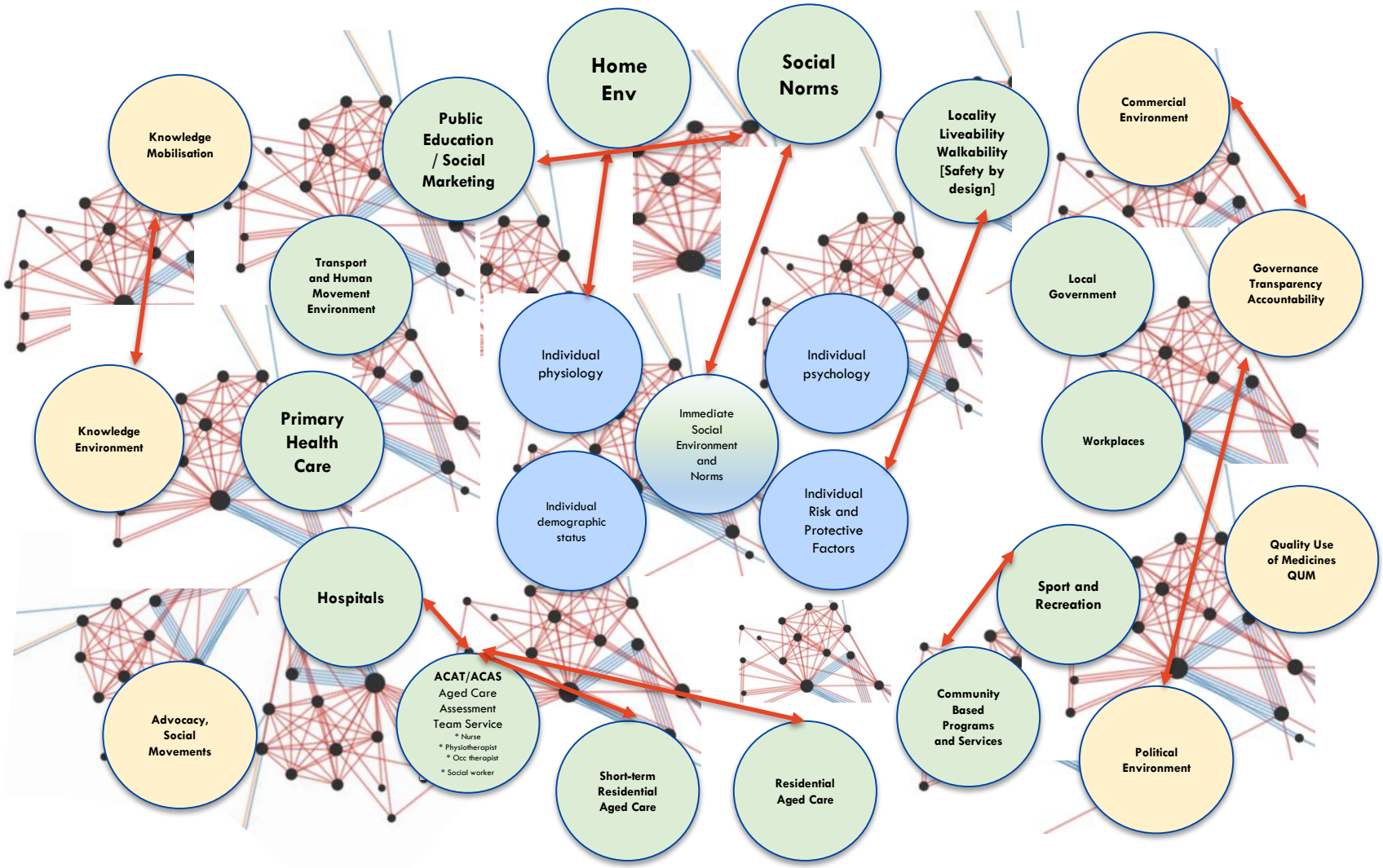
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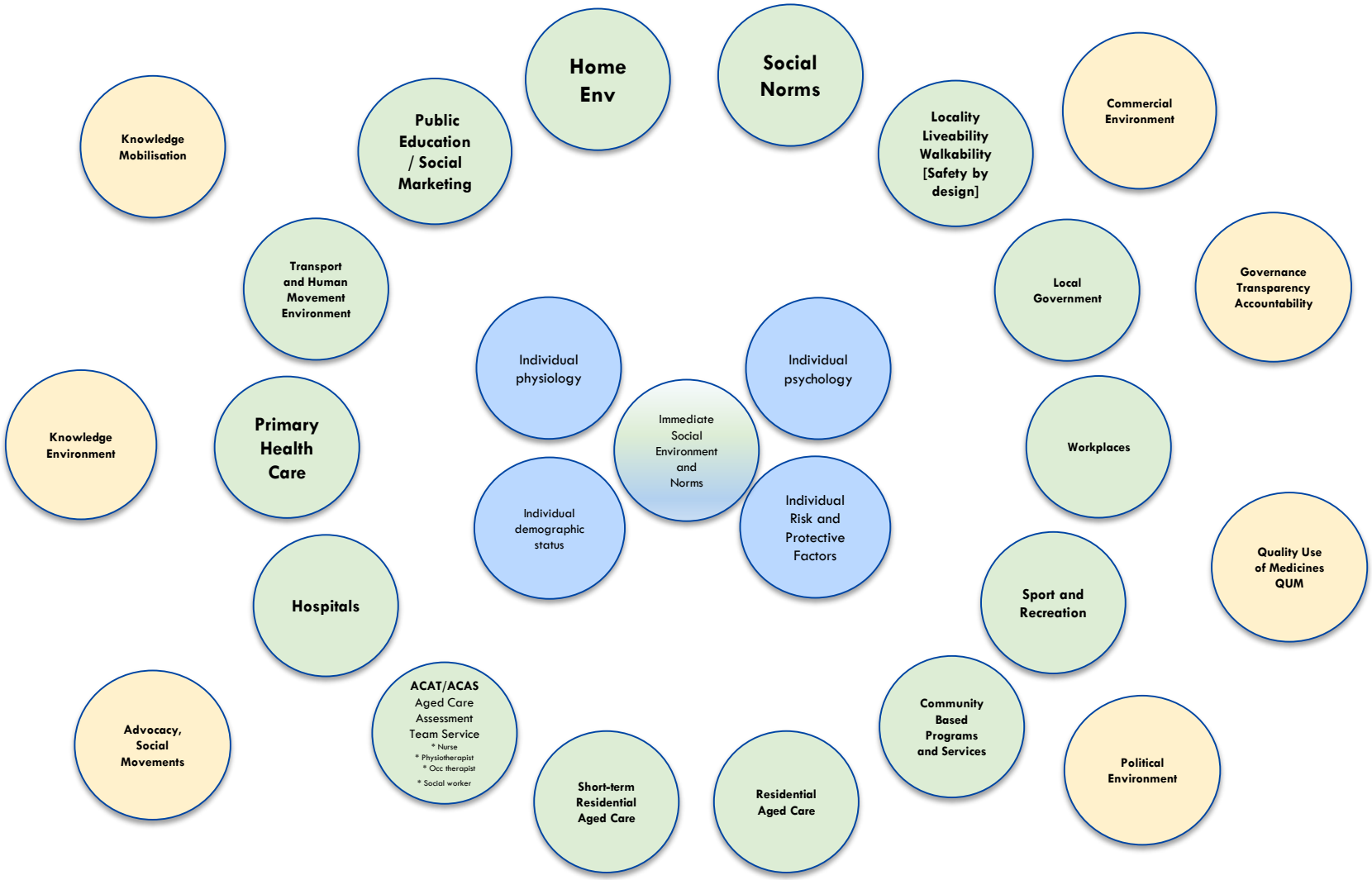
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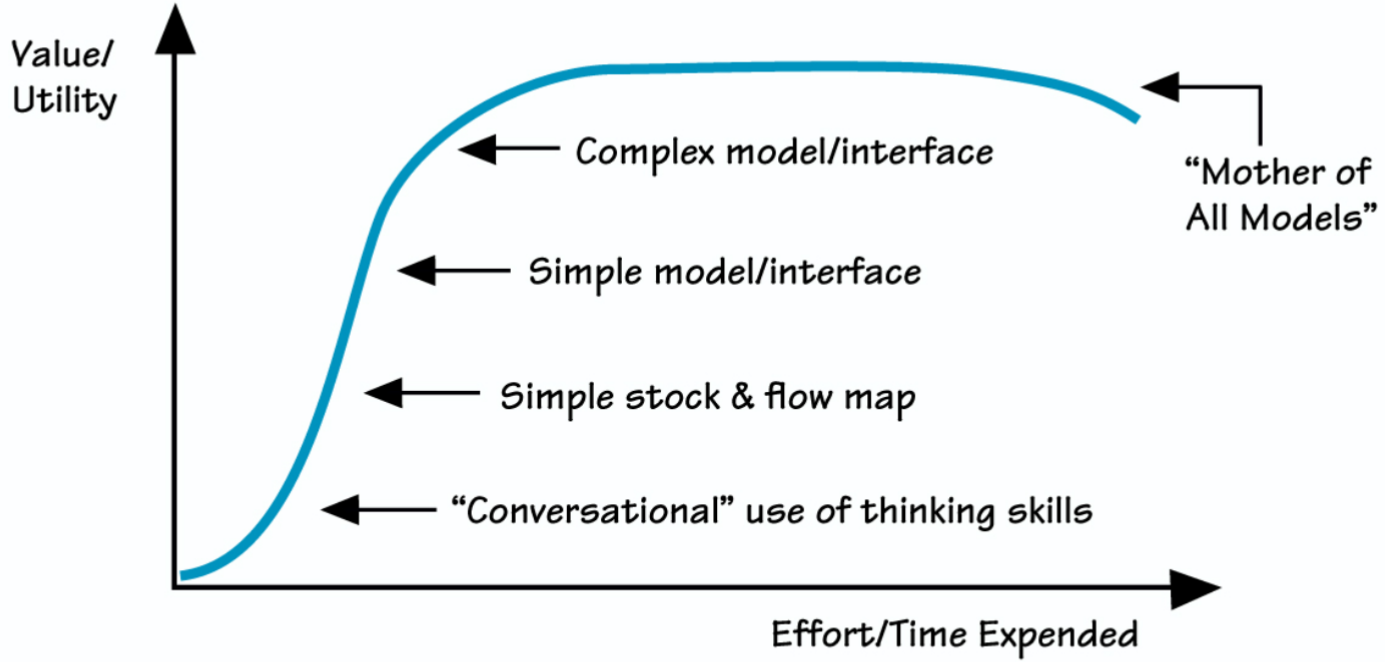
THE RETURN ON INVESTMENT OF SYSTEM DYNAMICS



There is significant value to be gained at relatively low cost from the application of basic system dynamics skills. Once you move past simpler applications, diminishing returns can quickly set in. As the complexity of the model increases, the amount of effort, skill, and time required to underwrite that complexity increases disproportionately relative to the amount of value derived!

Source: The Systems Thinker

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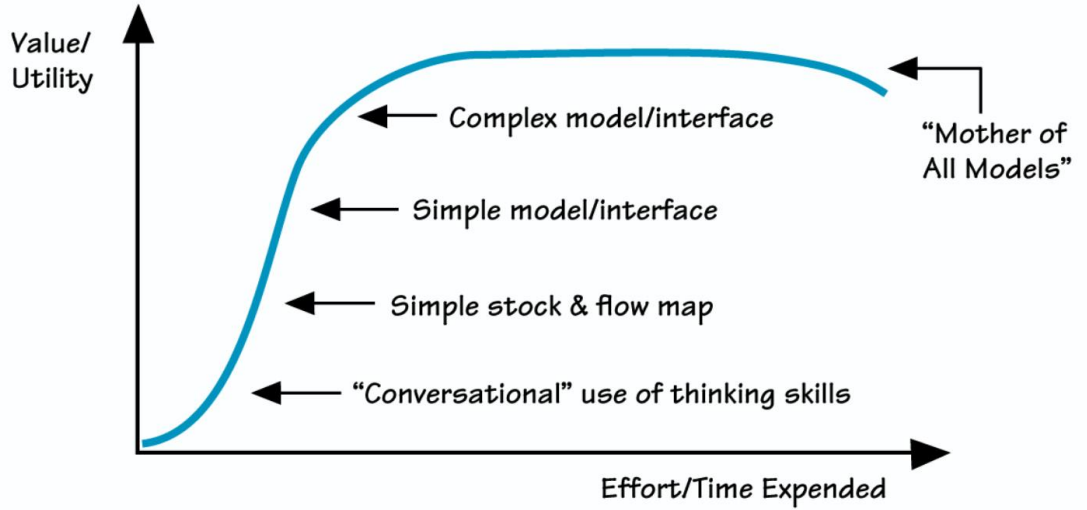
Main Focus

'Mapping' 'Understanding'

[a] Unified Modelling Language



DISCUSSION/ REFLECTION

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- Can you provide suggestions to improve the concept map of system influences on injurious falls among older people?
- Is ANZ Falls Soc part of the system? Where? What function?
- How might you use a whole systems approach in your own work?

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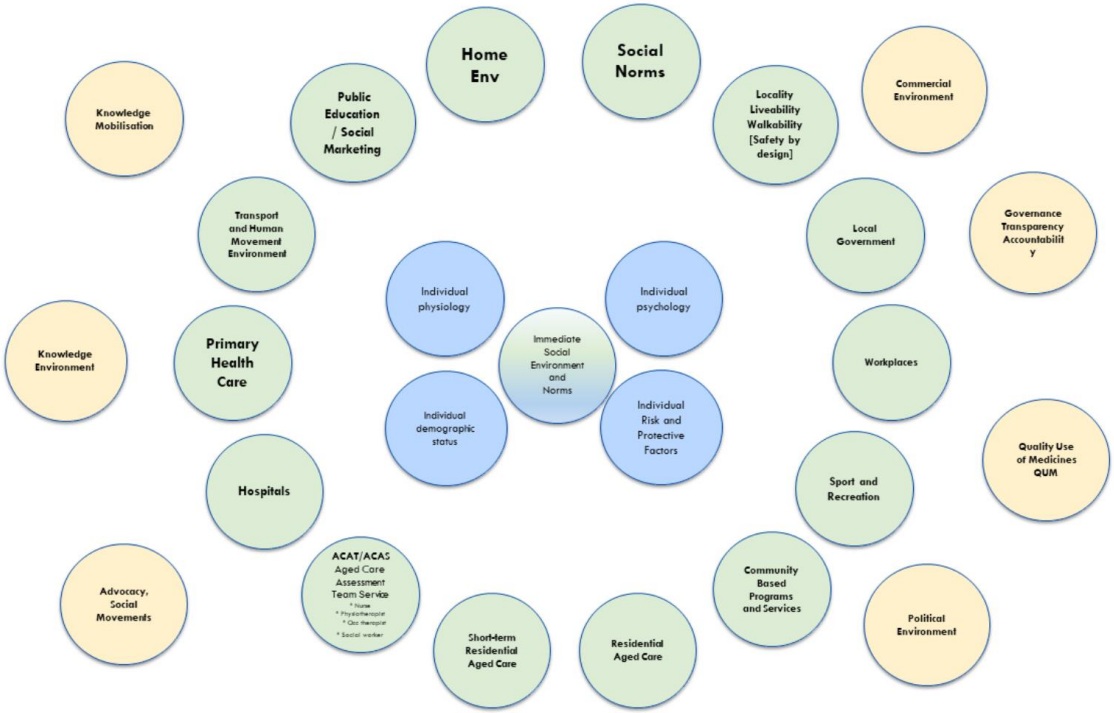

Systems Map - influences on injurious falls in older people_NSW Draft Concept Version 1.0

PARTICIPATE!

Help develop the next version of the Systems Map - thinking at the **NSW** and/or **National** level.

Send your suggestions to: william.bellew@sydney.edu.au

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william.bellew@sydney.edu.au

@billbellew

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