



# Systems Change & Systems Thinking in Public Health

---

Module 1b

A Short Course in Systems Approaches to Healthy Eating & Active Living  
Using the I+PSE Conceptual Framework for Action

*Angie Tagtow, MS, RD, LD*



# Objectives



At the end of this module, you will be able to:

- Connect complex and adaptive problems to the need for deeper and more systemic change.
- Describe the benefits of systems thinking in addressing complex adaptive problems, including problems involving inequity.
- Utilize systems thinking tools to facilitate systematic reflection on a complex problem and opportunities to address it.



# Recommended Readings & Resources



- Foster-Fishman PG, Nowell B, Yang H. Putting the system back into systems change: a framework for understanding and changing organizational and community systems. *Am J Community Psychology*. 2007;39(3):197-215. doi:10.1007/s10464-007-9109-0
- Senge P, Hamilton H, Kania J. The dawn of system leadership. *Stanford Social Innovation Review*. 2015.
- Kalen Pilkington. It All Started in the Garden: A Systems Thinking Approach to Community-Based Urban Agriculture (11 minutes)  
[https://www.ted.com/talks/kalen\\_pilkington\\_it\\_all\\_started\\_in\\_the\\_garden\\_a\\_systems\\_thinking\\_approach\\_to\\_community\\_based\\_urban\\_agriculture](https://www.ted.com/talks/kalen_pilkington_it_all_started_in_the_garden_a_systems_thinking_approach_to_community_based_urban_agriculture)



# What Is A System?

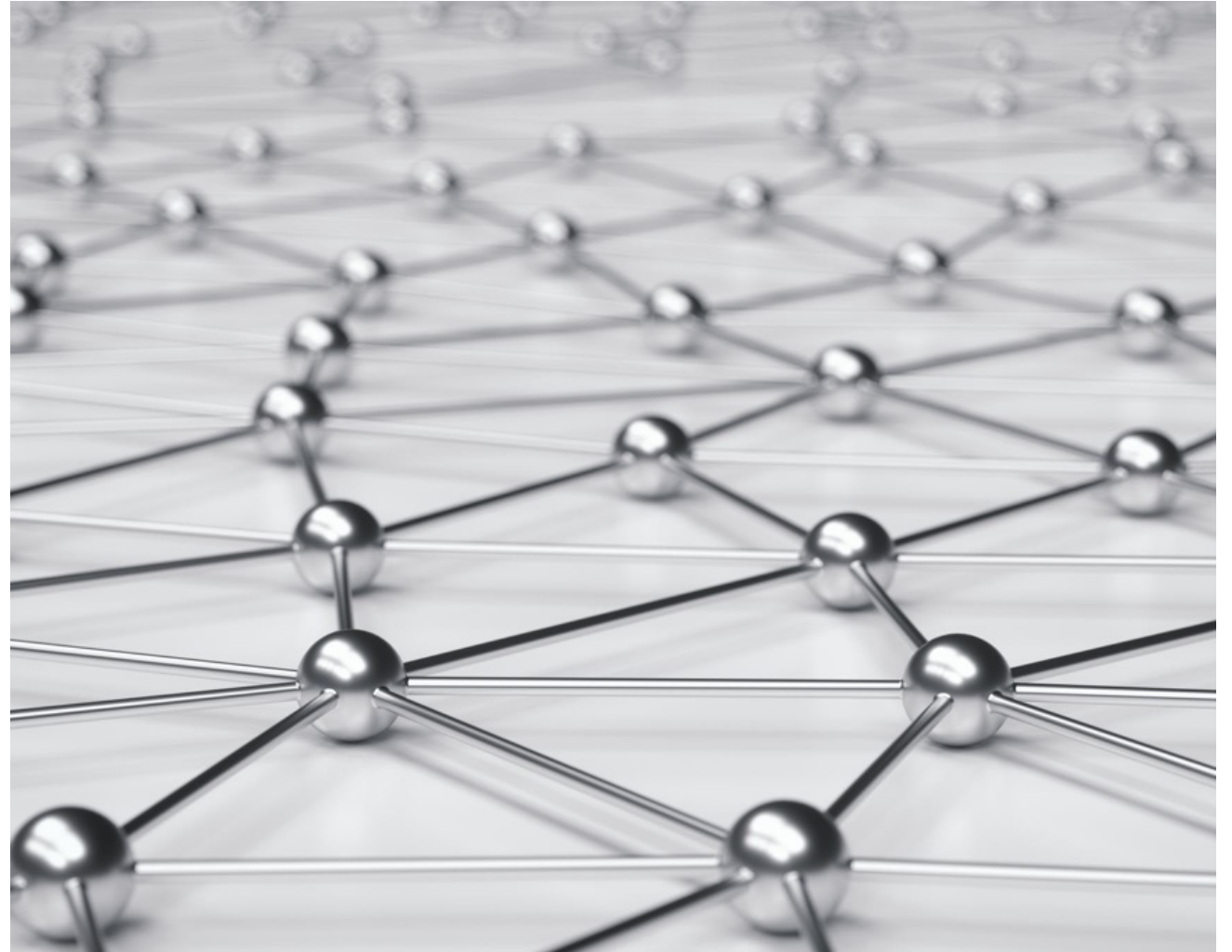
---

A human construct constituted by the...

**Elements**, that is, all the parts that make up the whole

Links between the parts, that is, the processes and **interrelationships** that hold the parts together in view of the whole

**Boundaries**, that is, the limit that determines what is inside and outside a system.







# Why Change Systems?

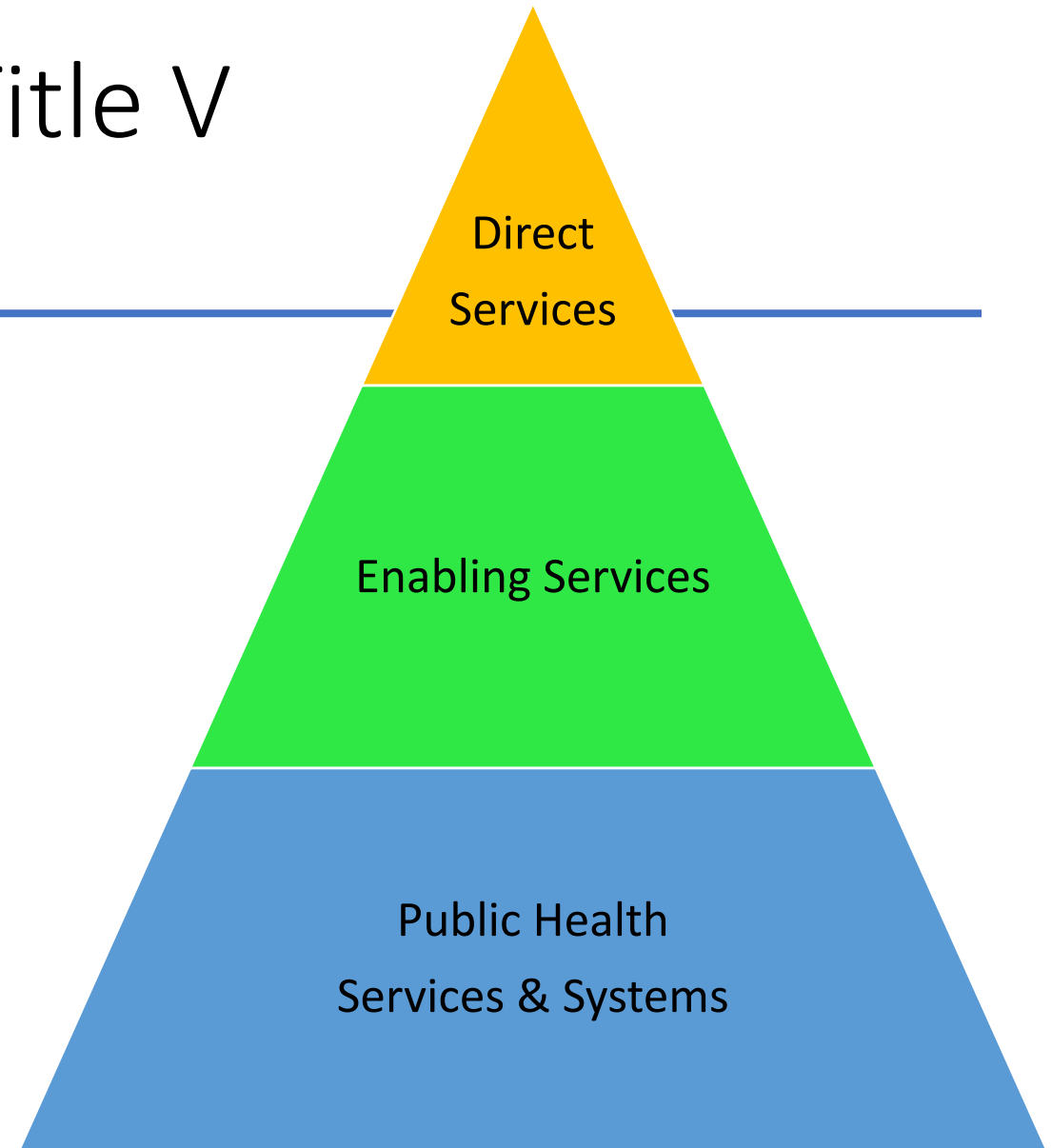
“...systems change refers to an intentional process designed to **alter the status quo** by shifting and realigning the form and function of a targeted system...

In most system change endeavors, the underlying structures and supporting mechanisms that operate within a system are altered, such as the **policies, routines, relationships, resources, power structures, and values**...are rooted in the assumption that significant improvements in the outcomes of a targeted population (e.g., reduced mental health problems in children) will not occur unless the **surrounding system (e.g., service delivery system) adjusts to accommodate the desired goals.**”



# A Systems Approach to Title V MCH Services


- 1) Assess and monitor health status
- 2) Investigate, diagnose, and address health problems and hazards
- 3) Communicate effectively to inform and educate the public on health
- 4) Strengthen, support and **mobilize community partners** to improve health
- 5) Develop and implement supportive health **policies, plans, and laws**
- 6) Improve and protect the public's health through legal and regulatory actions
- 7) Assure effective and equitable health **systems**
- 8) Build and support a diverse and skilled **public health work force**
- 9) Improve and **innovate** public health functions through program evaluation, research and continuous quality improvement
- 10) Build and support a strong public health organizational **infrastructure**





# Example of the Public Health System

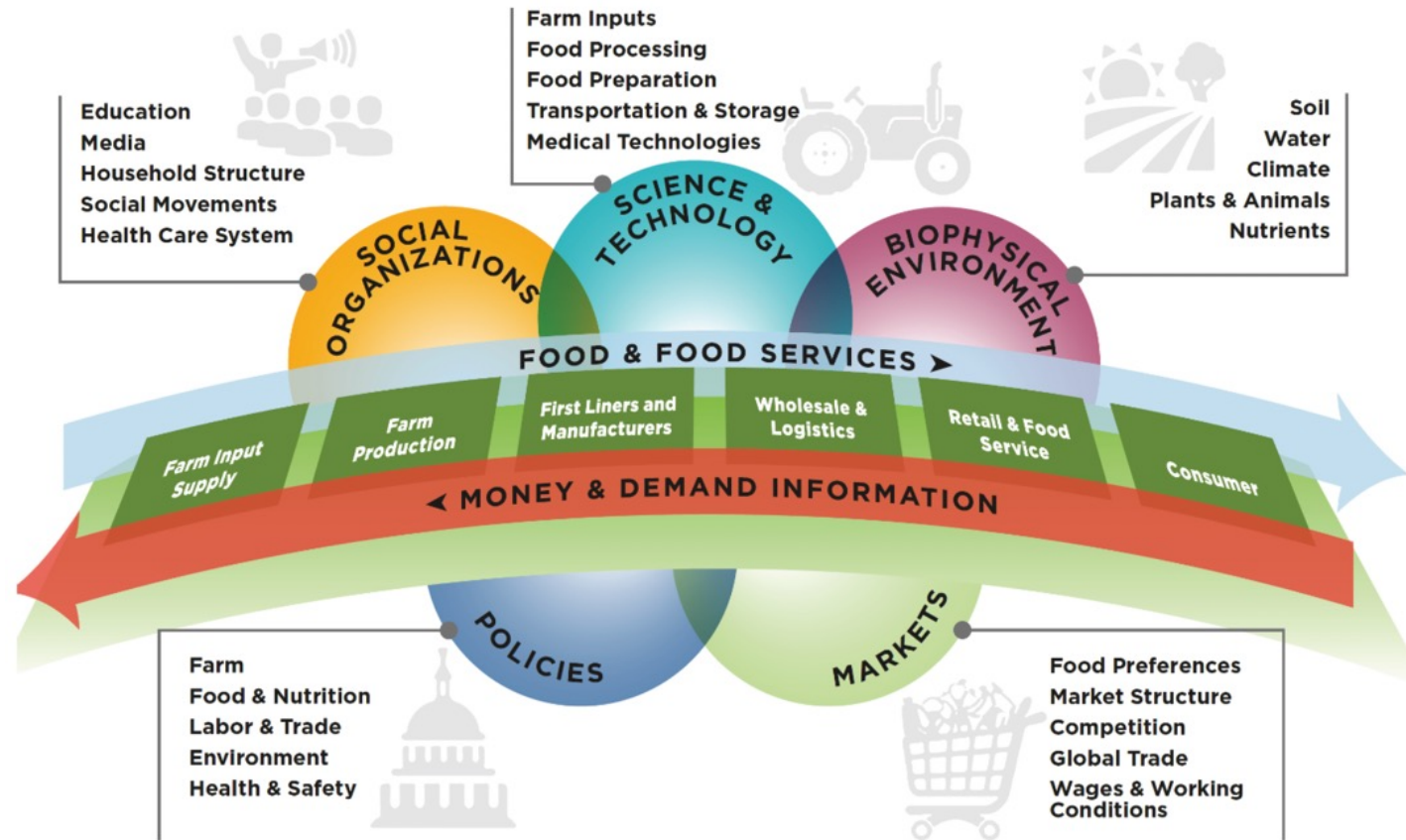


 “Nodes” or connection (access) points to resources (i.e., services) which are maintained (i.e., controlled) by that local entity

**Fig. 1 – Conceptual representation of a Public Health Grid.**



# Example of the Food System







# Policy, Systems, Environments = PSE

“This modern public health world that we are quickly moving into, one in which public health as the local governmental institution has a responsibility and an opportunity to lead our collective impact around improving the public’s health. This is a multi-sectoral approach that takes the opportunity to address **environmental, systems, and policy-level change.**”

Dr. Karen DeSalvo  
Former HHS Assistant Secretary for Health  
October 26, 2015



# What are Policy, System, and Environment (PSE) Approaches?

## Policy

**Organizational & Community Policy** – Changes to or the creation of procedures or organizational practices and the formation of interdisciplinary partnerships and collaborations

**Public Policy** - Changes to or creation of laws, ordinances, resolutions, mandates, regulations or rules

## Systems

**Infrastructure & Operations** - Changes to infrastructure that impacts all elements of an organization, institution, or framework

*\*Result of individual, policy PLUS environmental changes*

## Environments

**Built** - Modifications to physical spaces and settings in organizations, institutions, or public areas

**Natural** – Changes to ecological resources, landscapes, and ecosystems that impact soil, water, air, energy, climate, and biodiversity

**Social** – Addresses societal dynamics, historical relationships, and cultural practices and their influence on power, equity, diversity, and inclusion

# Charting a Course for Systems Change

We [nutrition community] must position ourselves for new and expanded practice roles to address **policy-, systems-, and environmental-**level interventions based on the **social ecological model**.

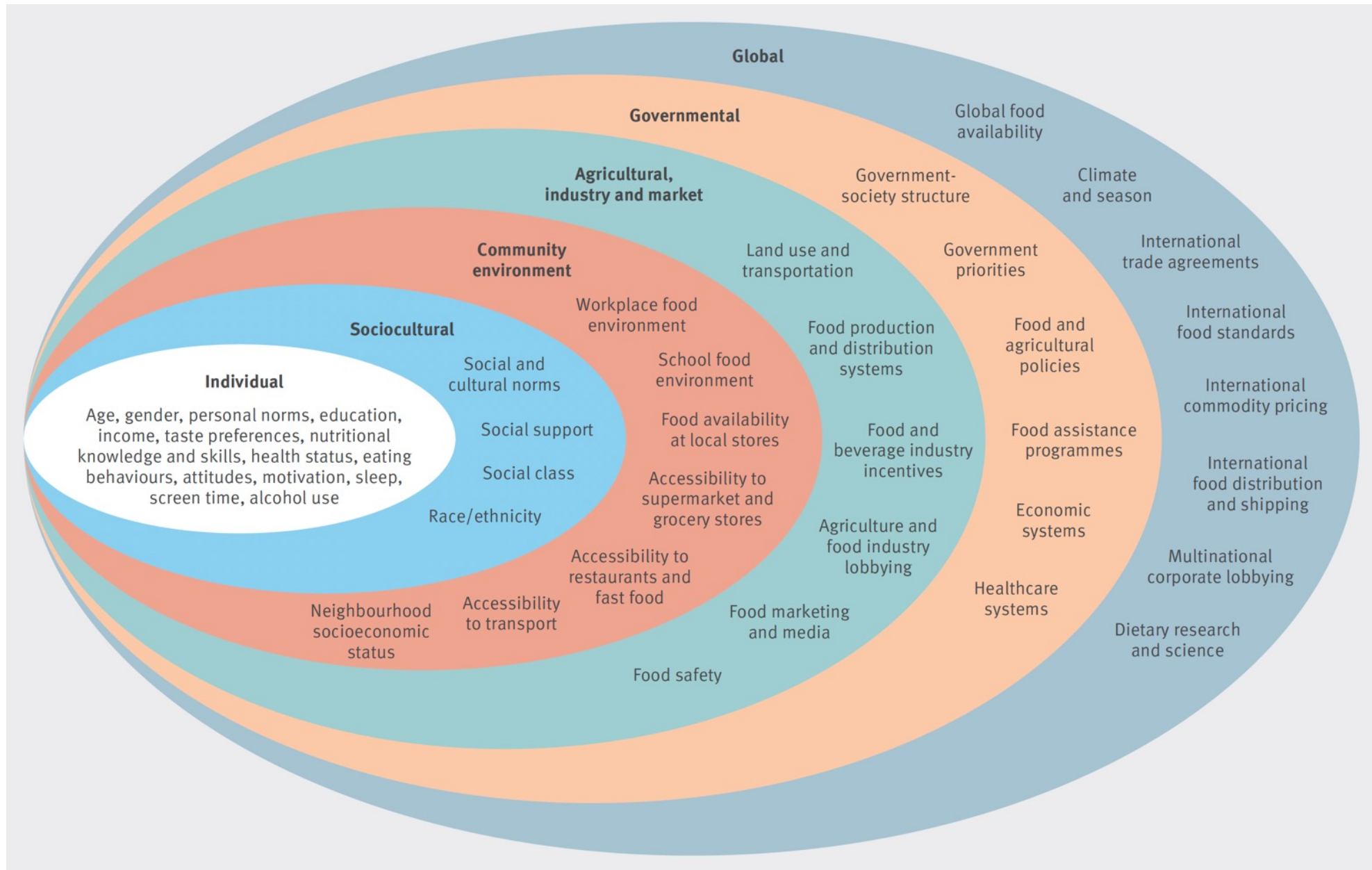
Kicklighter JR, et al. Visioning Report 2017: A preferred path forward for the nutrition and dietetics profession. *J Academy Nutr Diet.* 2017;117(1):110-127.





# Example of a Social Ecological Model and Nutrition Policy

*"Systems within systems"*

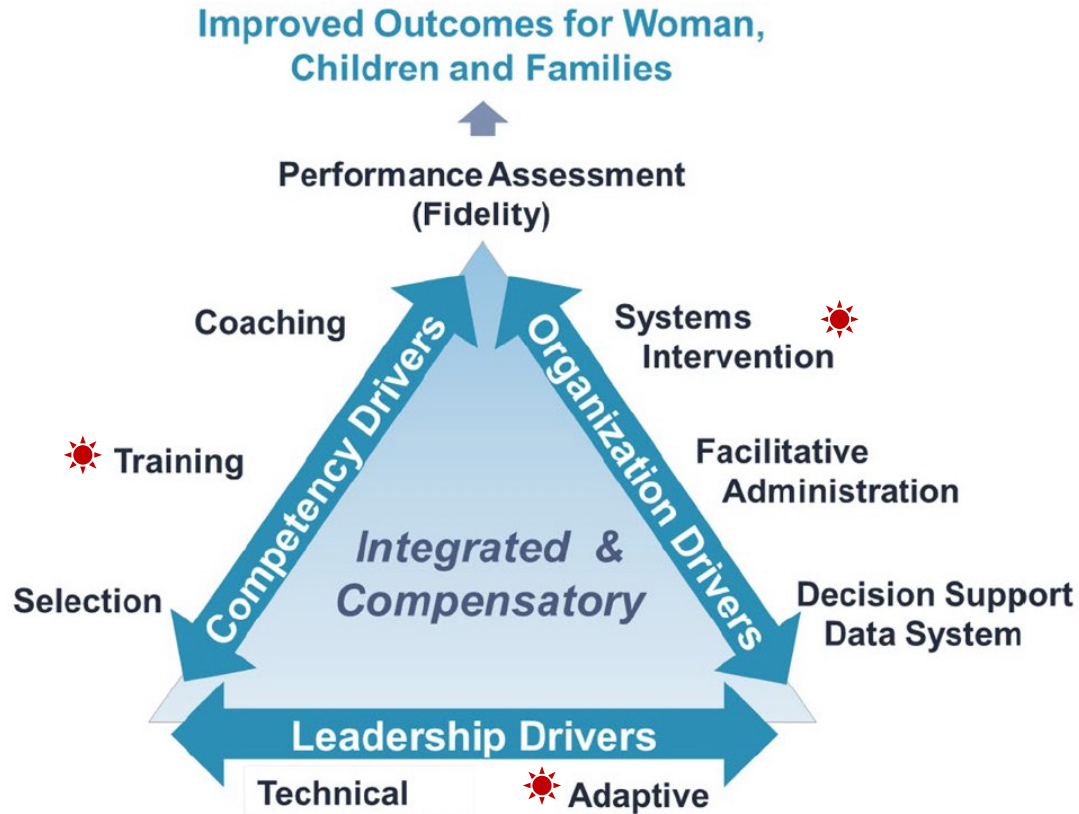


Mozaffarian D, Angell SY, Lang T, Rivera JA. Role of government policy in nutrition—barriers to and opportunities for healthier eating. *BMJ* 2018; 361 :k2426





# Systems Change & MCH



## Implementation Drivers Framework

- Organization
  - Systems Intervention
- Leadership
  - Adaptive
- Competency
  - Training

See best practices at Fleming WO, Apostolico A, Mullenix A, Starr K, Margolis L. Putting implementation science into practice: Lessons from the creation of the National Maternal and Child Health Workforce Development Center. *Matern Child Health J.* 2019; 23:722-732. <https://doi.org/10.1007/s10995-018-02697-x>

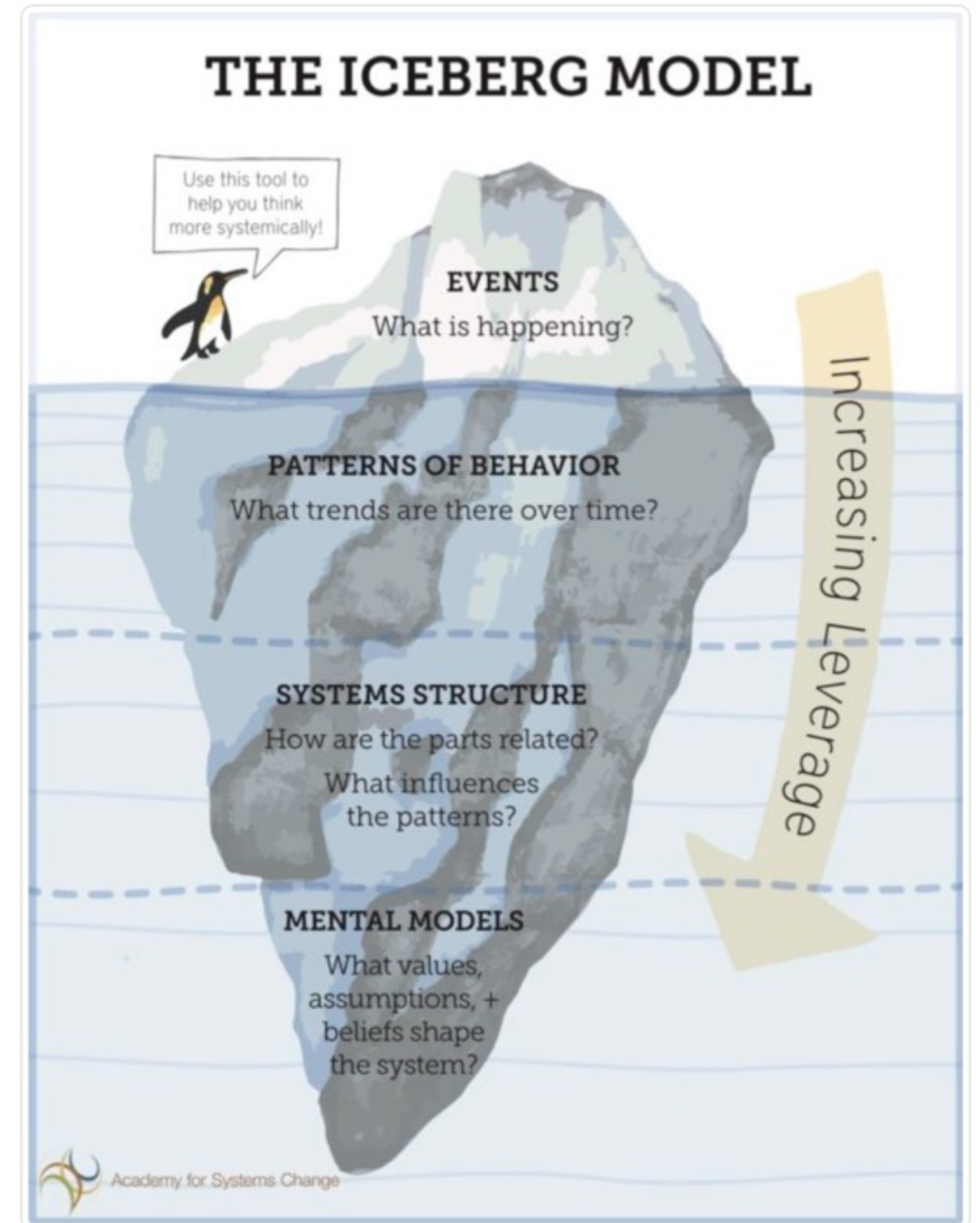
# How Do We “Nudge” Systems to Change?

System change requires looking below the water to examine **trends** over time, the **interrelatedness** of the parts, the factors that influence the **patterns**, and the **values and beliefs** that shape the system.

Looking below the water helps identify **leverage points** in which a small shift in one thing can produce a big change.

The Iceberg Model. Academy for Systems Change. Accessed on September 10, 2021 at: <https://www.academyforchange.org/2019/12/07/leverage-points-iceberg-model-economic-development/>

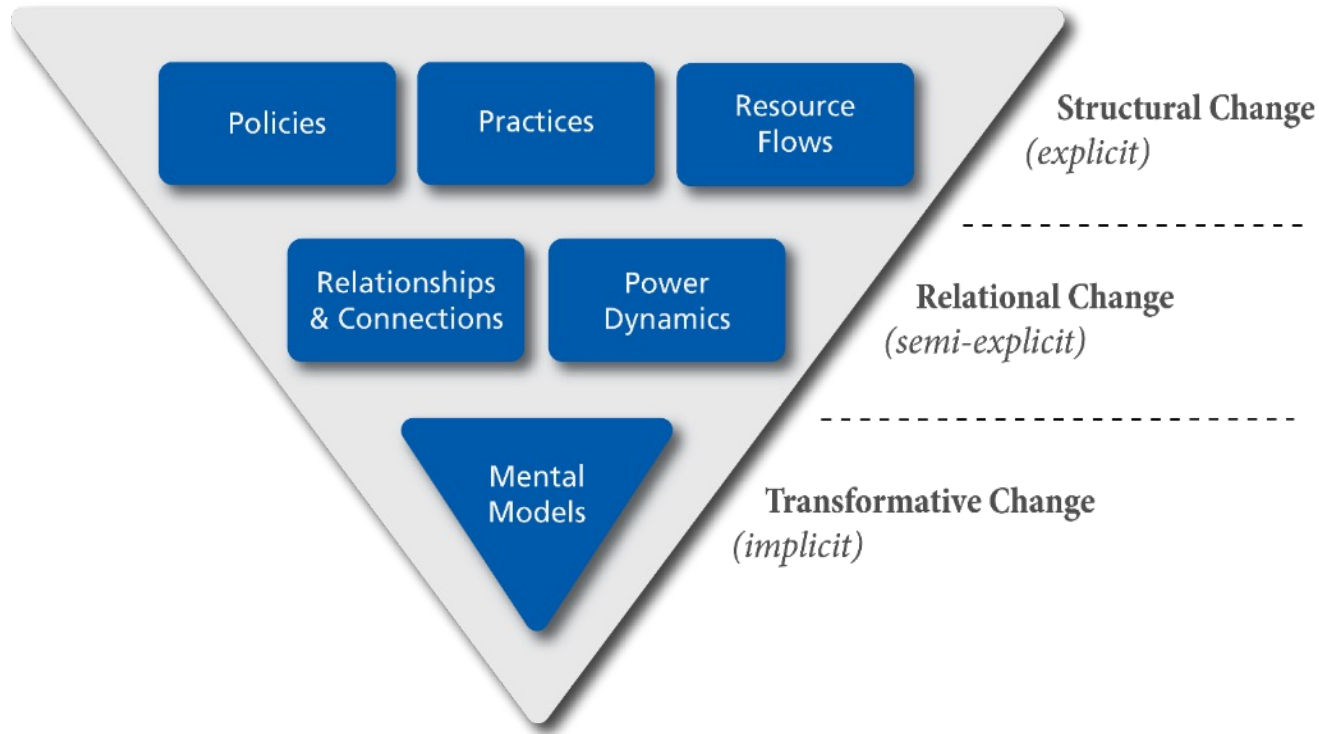
Donella H. Meadows, “Thinking in Systems. A Primer” (2008)





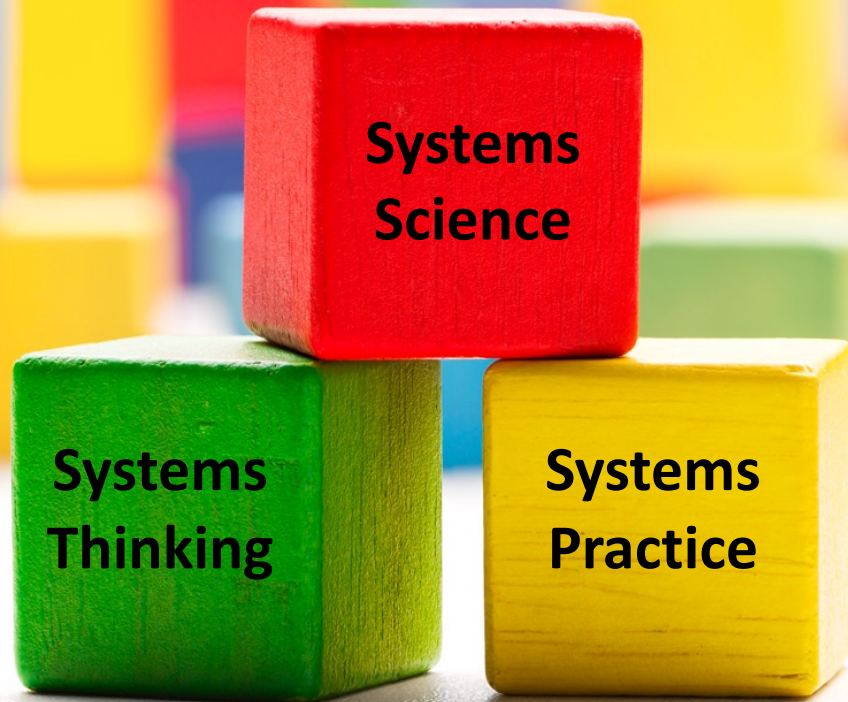
# Building Capacity for Systems Change

## Six Conditions of Systems Change



*“Shifts in systems conditions are more likely to be sustained when working at all three levels of change.”*

# Building Blocks for Systems Change



## Individual Capacity

- Professional development
- Adaptive, agile, courageous
- Leadership

## Organizational Capacity

- Adaptive, agile, resilient
- Action Learning

## Systems Praxis

- Systems Science
- Systems Theory
- Systems Practice
- Systems Leadership





# What is Systems Science?

“Systems science is an **interdisciplinary** field that is conceptually grounded in a concern with ‘**interrelationships** between parts and their relationships to a functioning whole.’” (Frerichs et al 2016)

“Systems science is a broad class of analytical approaches that aim to uncover the **behaviour of complex systems**...As a whole, systems methodologies are thought to enable researchers and decision makers to examine system **components**, and the dynamic **relationships** between them, at multiple levels, from cell to society.” (Carey et al 2015)



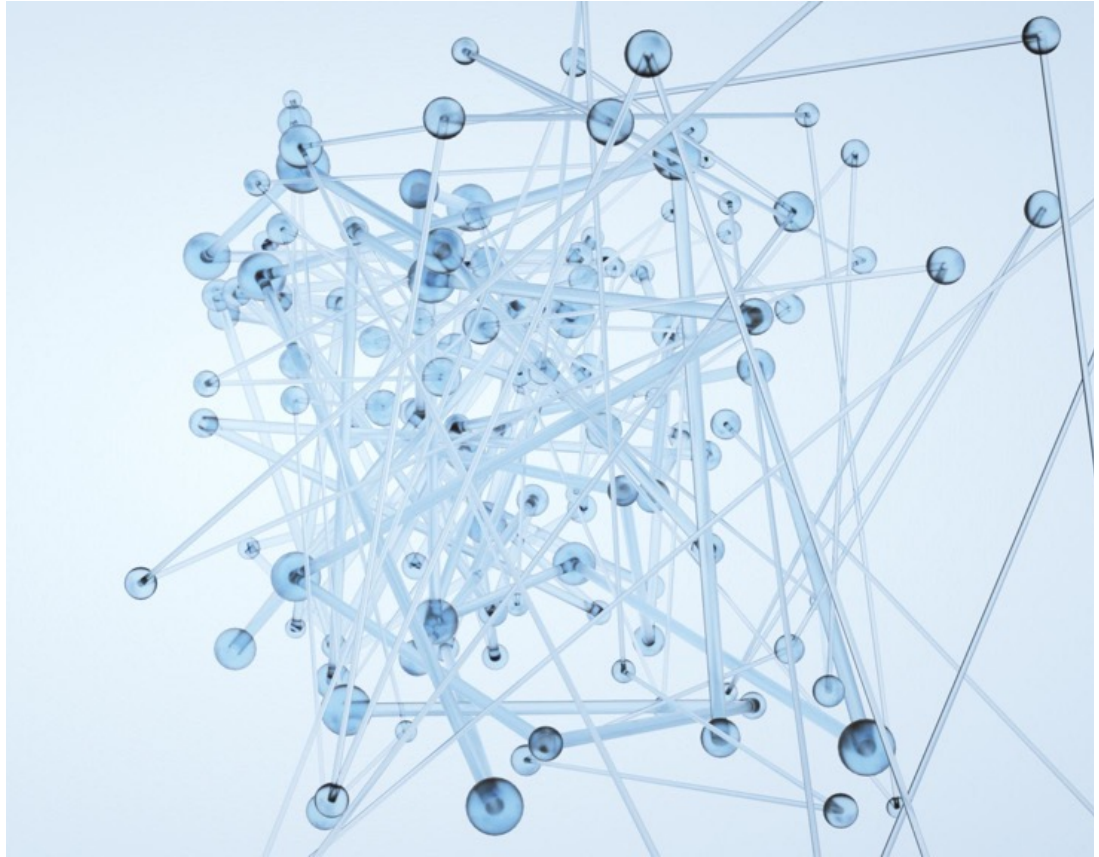
# Where's the Evidence?

## System Change Theories and Frameworks

- Community Organization Model
- Culture of Health Framework
- Diffusion of Innovation Theory
- General Systems Theory
- Life Course Theory
- Organizational Change Model
- PRECEDE-PROCEED Framework
- Social Determinants of Health
- Social-Ecological Model



# System Change Requires Systems Thinking



“Bringing **systems thinking** further into the current and future work of the public health practitioner requires an understanding of how **systems thinking** is being supported by a variety of **systems methods**.”



# What are the Principles of Systems Thinking?

- No consensus on a definition
  - Ongoing and iterative inquiry of “why” and “how?”
  - Identify the connections within and between systems
    - Interconnectivity
  - Identify patterns and gaps to inform multidimensional solutions
- Understand an issue within the context of a larger whole
    - Boundaries
    - Acquire diverse perspectives
    - Check assumptions, biases, mental models
  - Includes iteration and evolution
    - Cycles of action and reflection
    - Commitment to learning





# Systems Thinking Facilitates Seeing...

## Perspectives

- Raises ethical and power dynamics
- Assumptions that impact conceptualization, methods, and solutions
- Impacts engagement

## Boundaries

- Scope
- Defining what and whose boundary

## Interrelationships

- Interconnections between and among boundaries
- Circles of causality rather than linear perspectives
- Structures underlying dynamic complex situations (not a condition or behavioral elements)
- Alternate connections and opportunities, levers of change





# Why Systems Thinking in Practice?

“Systems thinking is needed...to navigate and **thrive** in a volatile, uncertain, complex, and ambiguous (VUCA) world...to think in new ways, to be **effective** leaders...and continually seek opportunities to **lead, learn, and grow.**”

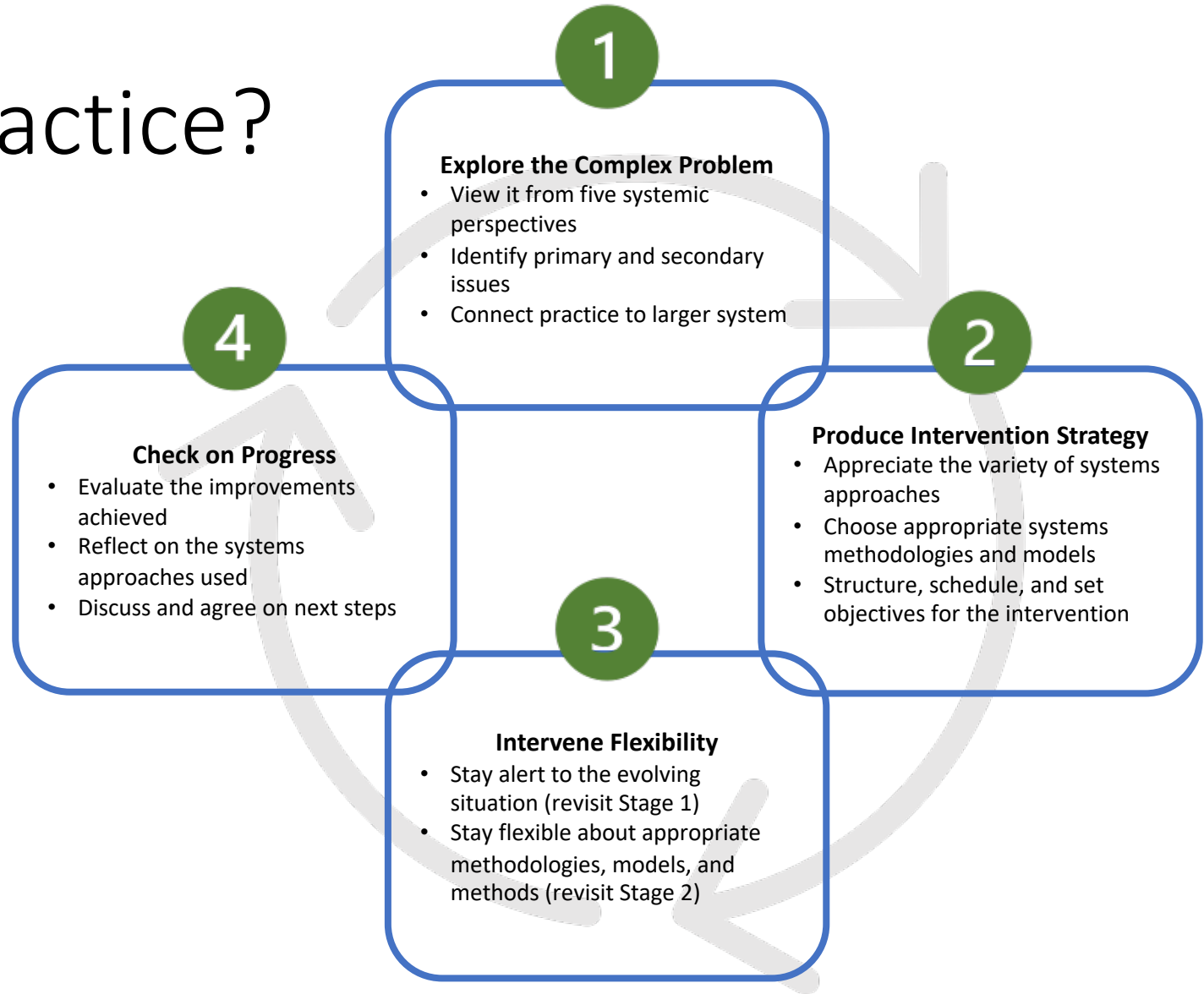
## Charting a Course





# What is Systems Practice?

Systems-based practice relies on an understanding of real-world complex problems, how your practice relates to the problem and the larger system (e.g., clinic, public health, healthcare), how to identify levers to change the system, apply multiple methods that intervene in and positively improve the system, reflect on process, and monitor changes.







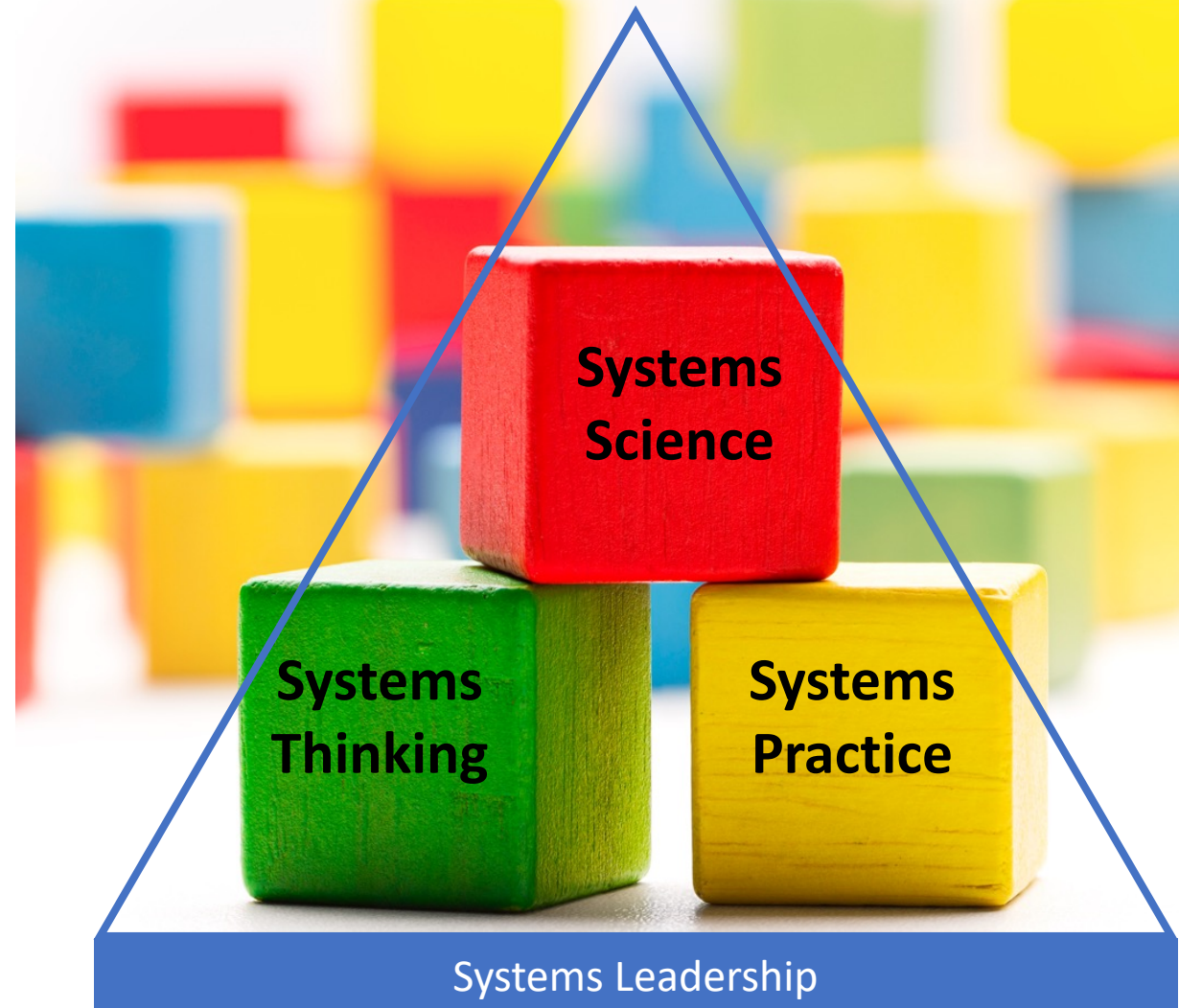
# How Do We Facilitate Systems Leadership?

Increase our ability to define systems, adaptive challenges *below the water*

Increase learning capacity to ask questions and dig deeper to find meaning

Increase resiliency among leaders and teams who learn over time

Design and address adaptive complex problems more effectively and with less effort







# Tools for Making Sense of Systems

*How to Think Systemically and Identify Levers for Change*



*“Balcony and the dance floor”*

## Perspectives

- SWOT or SOAR Assessments
- Interviews
- Environmental scan
- Asking assumptions

## Visual Depictions & Mapping

- “5 Whys”
- Rich Picture
- Fishbone/Ishikawa Model
- Causal Loop Diagram
- Social Network Analysis



# Example of the “5 Whys?”

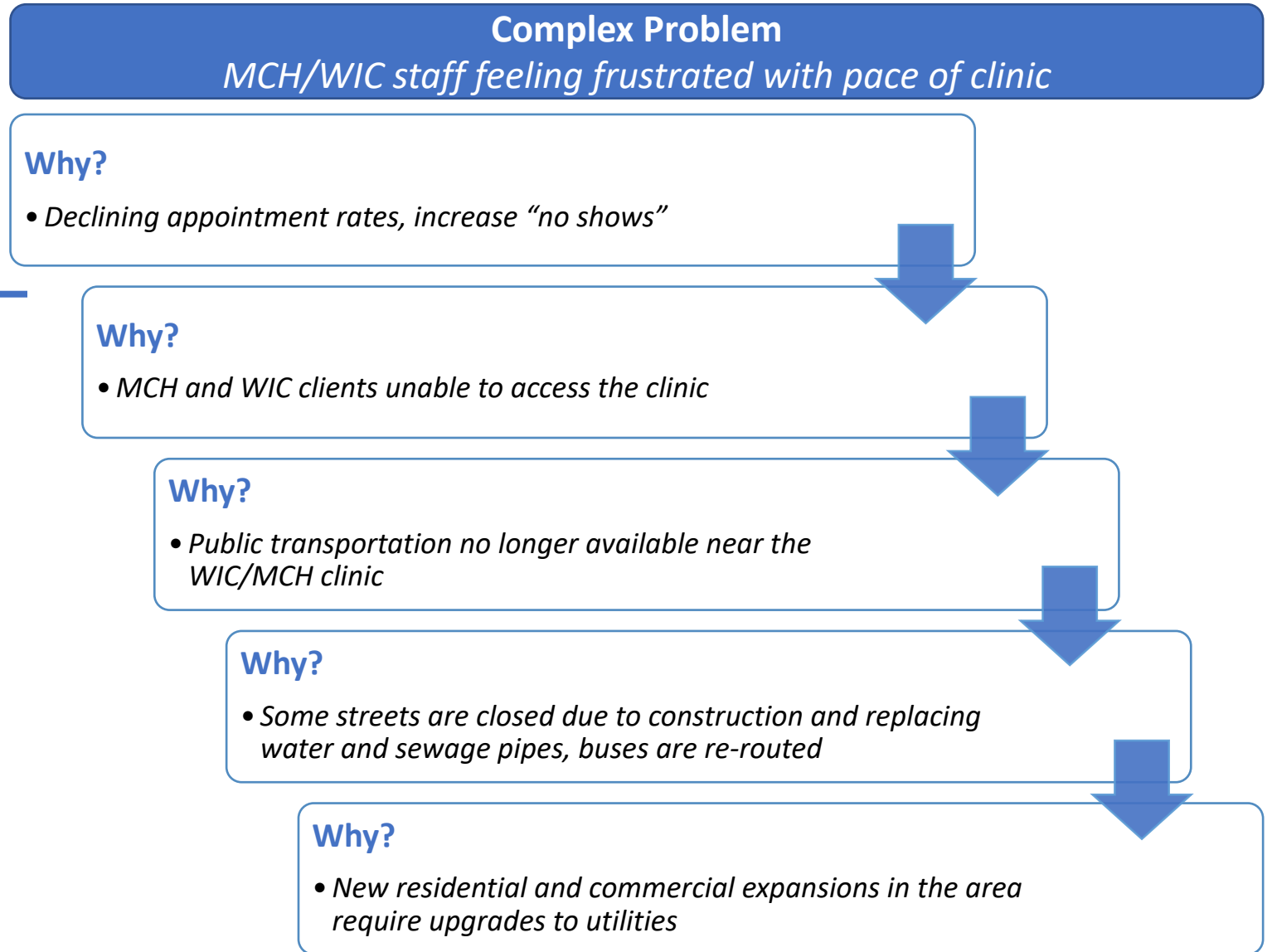
Problem-solving tool

Identify the root causes of a complex problem, not just the symptoms

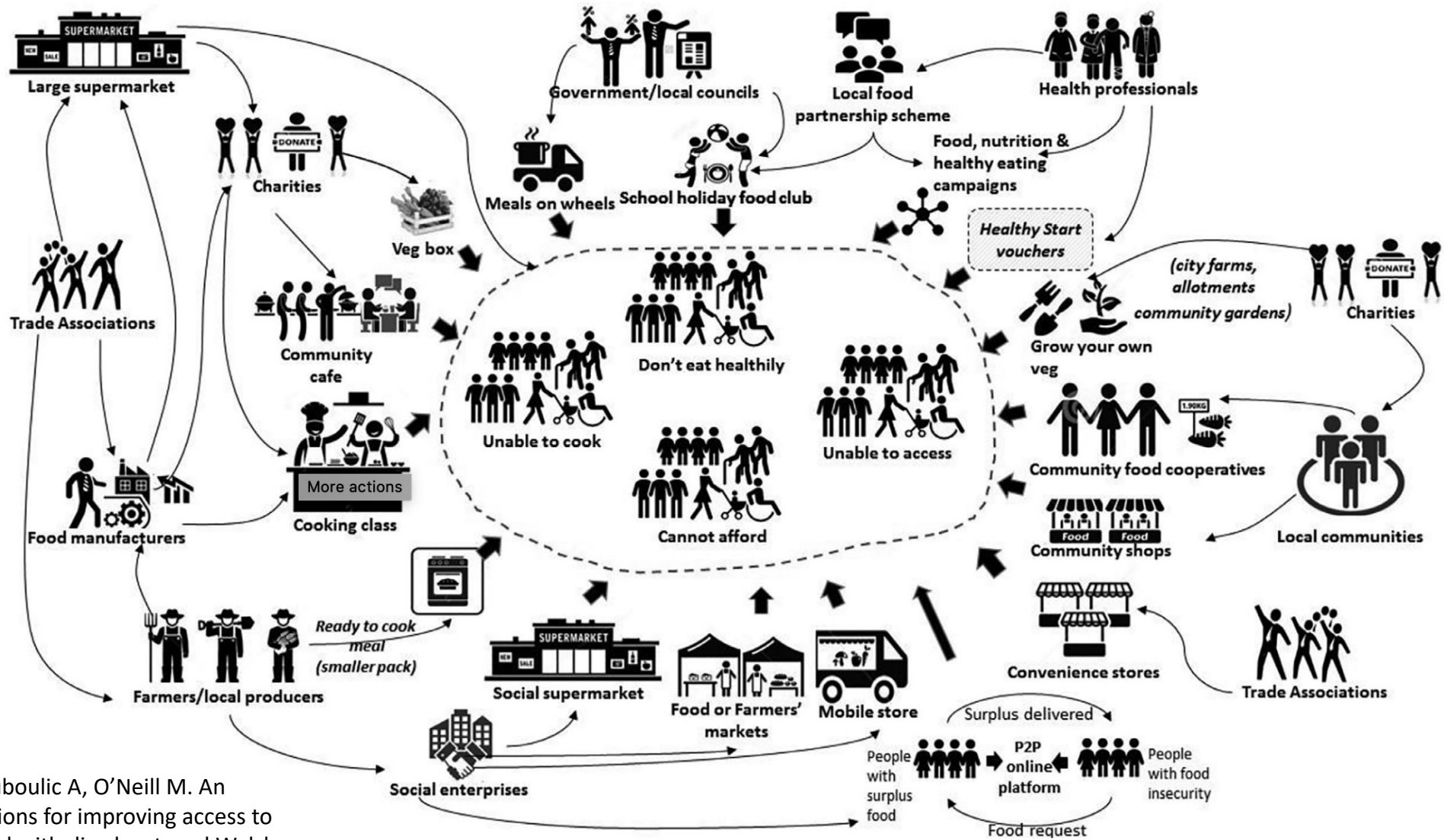
Identifies the evidence

Addresses assumptions

Contributes to quality improvement



# Example of a Rich Picture of Community Food Access



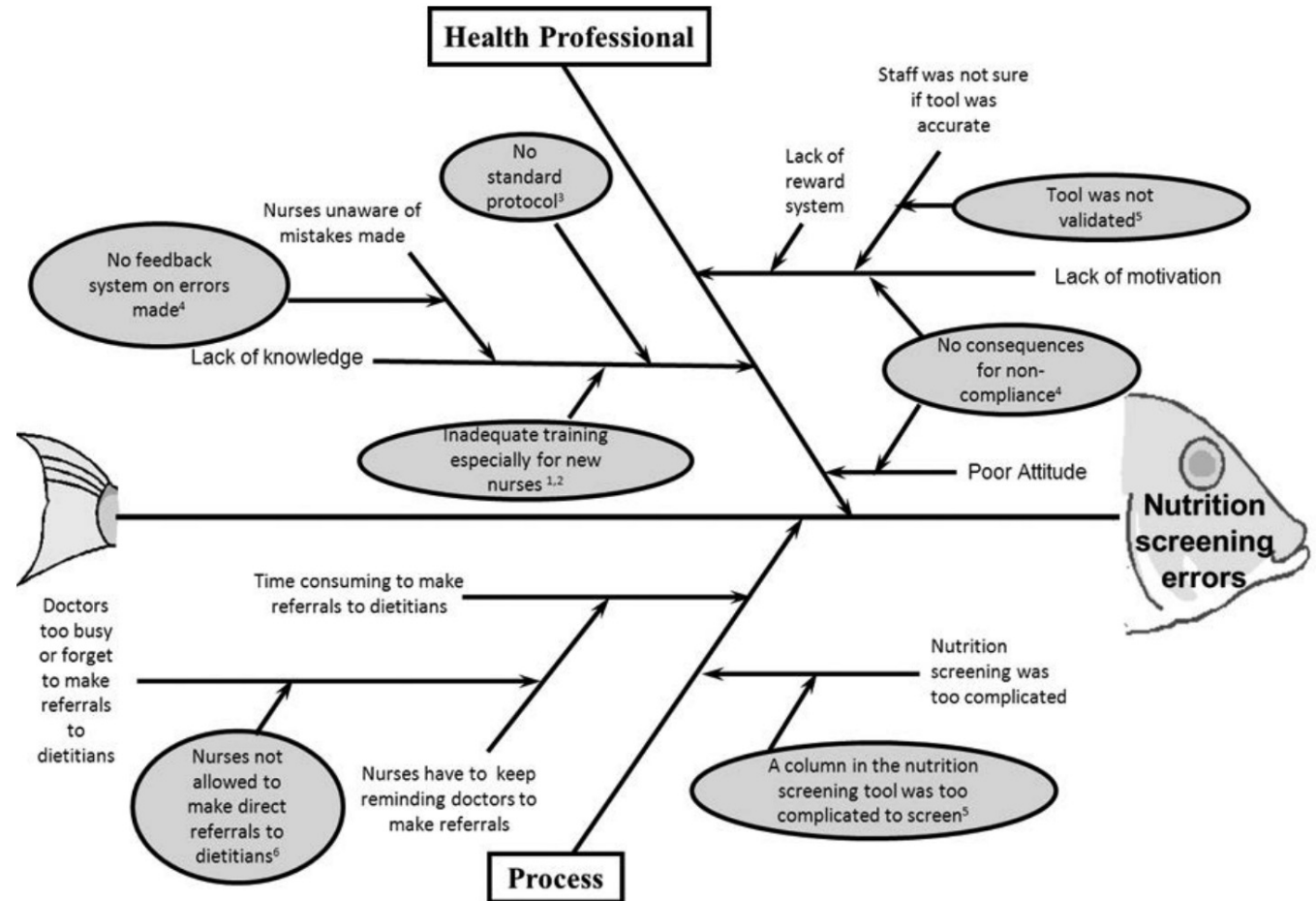
Source: Wang Y, Touboulis A, O'Neill M. An exploration of solutions for improving access to affordable fresh food with disadvantaged Welsh communities. *Euro J Operational Res.* 2017:1-19.

Fig. 3. Rich picture of food provision initiatives.

# Example of a Fishbone Model (Ishikawa Model) to Identify Causal Factors or Root Causes

Lin Lim S, et al. Improving performance of nutrition screening through a series of quality improvement initiatives. *Joint Commission J Qual Patient Safety*. 2014;40(4):178-186.

## Root Causes Identified in Fishbone Diagram to Improve the Performance of Nutrition Screening



1-4 Root causes were determined after the audit in 2009.

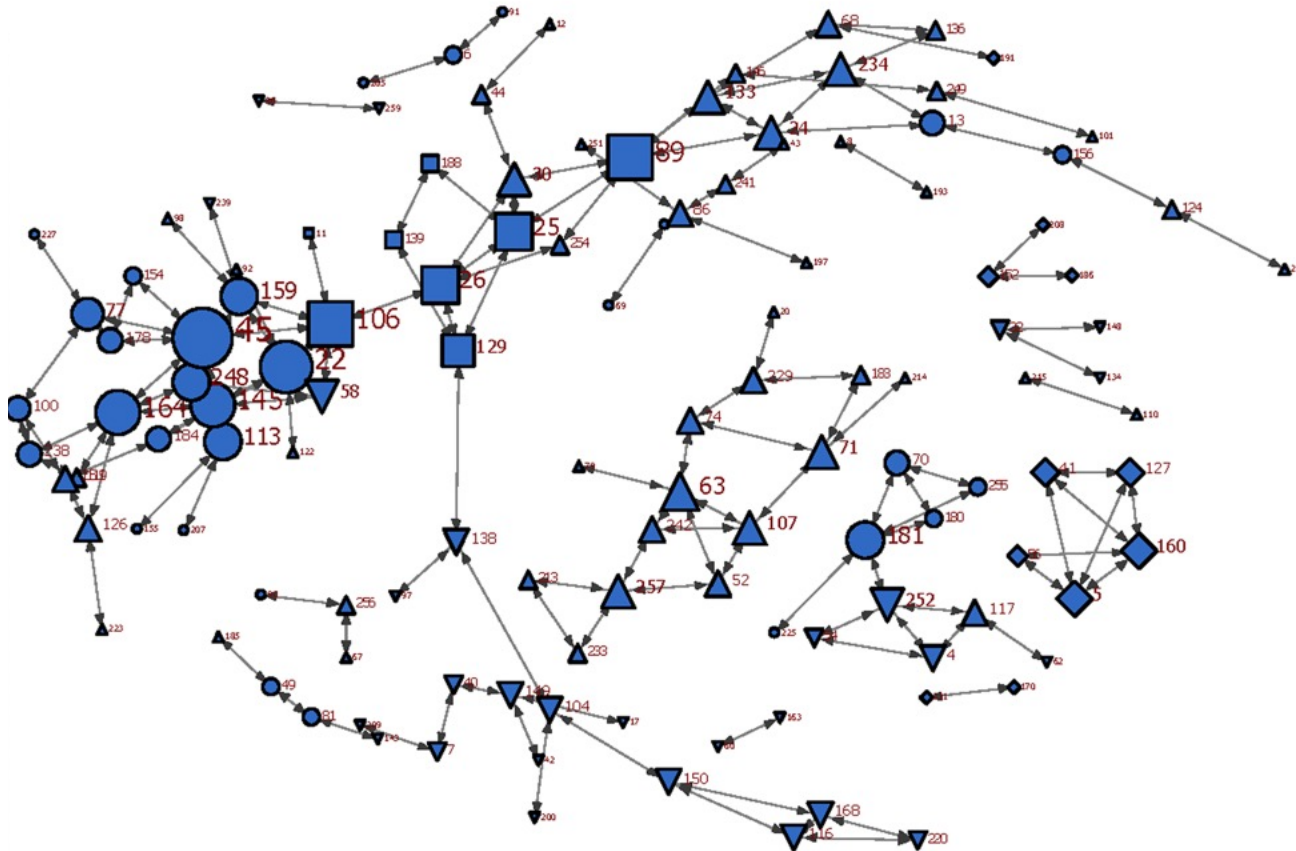
5-6 Root causes were determined after the audit in 2010.

1-6 These root causes led to the interventions listed in Table 1 (page 183).

**Figure 1.** The root causes for nutrition screening errors were determined in a brainstorming session in which this fishbone diagram was used. The root cause analysis was used to identify five key gaps: (1) inadequate training for nurses, (2) no standard screening protocol, (3) no feedback system on errors, (4) a complicated screening tool and (5) nurses' inability to make direct referral to dietitians.



# Example of a Social Network Analysis



A social network analysis offers a visual depiction of “**who is at the table.**”

It includes methods to assemble and analyze the **relationships** among actors such as people, programs, departments, organizations, and countries.

It illuminates **patterns of connections** and relationships which may influence how individual, organizations, or communities respond to new information.



# Leadership Element



Systems thinking is an extension of our training in science, theories, methods, and tools to better see and understand various **perspectives**, identify the **boundaries** or scope of complex issues, and to identify the **interrelationships** and **levers for change** to effectively address complex adaptive problems.



## Key Take Aways

---

- ✓ Connect the work you do to the system in which you work
- ✓ When faced with a complex problem, ask “Why?” five times to develop a deeper understanding
- ✓ To apply systems thinking in practice, use visuals to map relationships or identify factors that influence the complex problem
- ✓ Use systematic reflection to identify opportunities to leverage change that will have a positive impact on the system

