National **MCH** Workforce Development Center

Advancing Health Reform Implementation

Helping MCH Trainees Understand Their Roles in Systems Development and Change Management as Keys to Health Transformation

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MCHB Joint Interdisciplinary Training Meeting

January 24, 2015

1. **Intro to systems and systems science methods** key terms defined (25 minutes)
2. **See & Do system support maps** to document the system from different perspectives (40 minutes)
3. **Create a circle of care framework** to integrate perspectives across stakeholders (20 minutes)
4. **Meet causal loop diagrams,** which can help uncover/discuss system "ripple effects" (5 minutes)
5. **Discuss training implications** for introducing systems thinking to our trainees and the field (30 minutes)

(20 minutes)

INTRODUCTION TO SYSTEMS, SYSTEMS PROBLEMS, AND SYSTEMS SCIENCE

The challenge…

The challenge

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- Think about an effort you might undertake:
  - … to improve understanding of the life-course factors shaping…
    - Obesity, or
    - Mental health…
  - Or, to mobilize around the causes of a systems problem like:
    - Too many kids ending up in the criminal justice system,
    - Or without a medical home…

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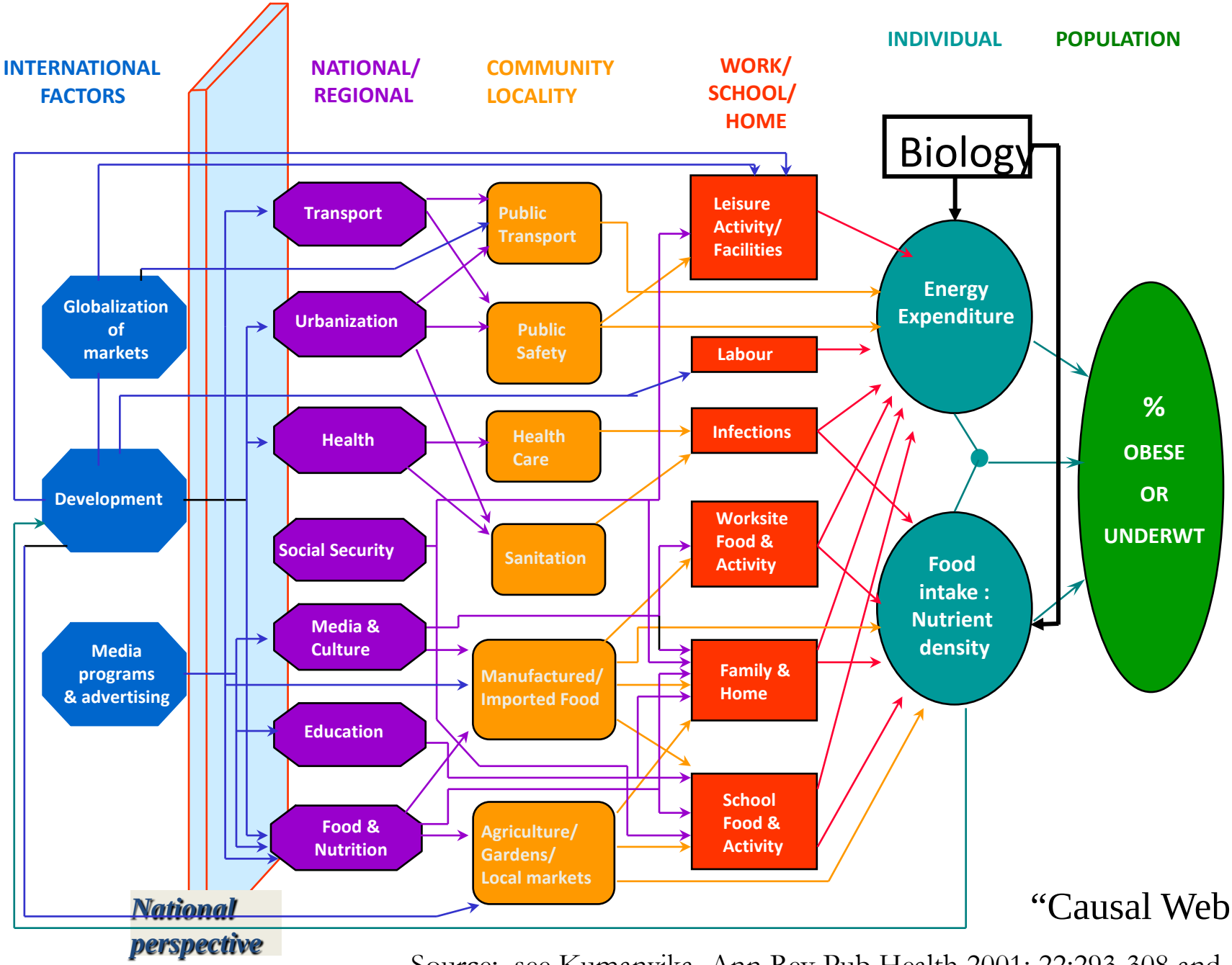

"Causal Web"

Source: see Kumanyika Ann Rev Pub Health 2001; 22:293-308 and http://www.cdc.gov/pcd/issues/2009/jul/09_0013.htm

Slide adapted from D. Finegood

The challenge…

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- Think about an effort you might undertake to:
  - improve understanding of local problems like obesity, mental health, system gaps, …
  - design a sustainable intervention to…
  - establish realistic targets for…
  - build a coalition to tackle …

Detail complexity

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- Systems with a large number of parts
- Do not change over time
- Difficult to understand as a whole

Dynamic complexity

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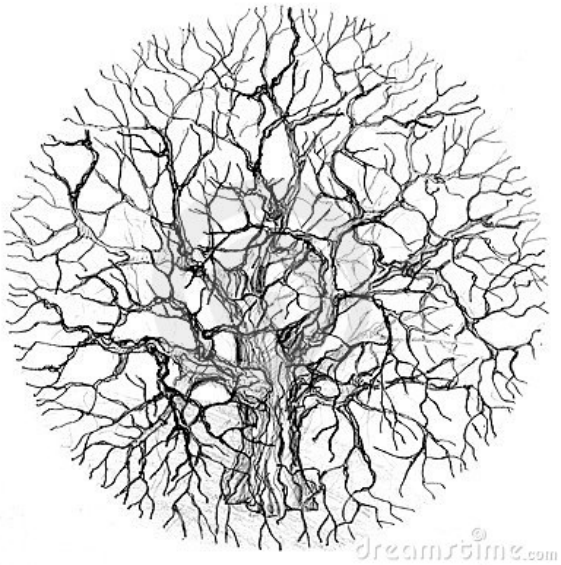
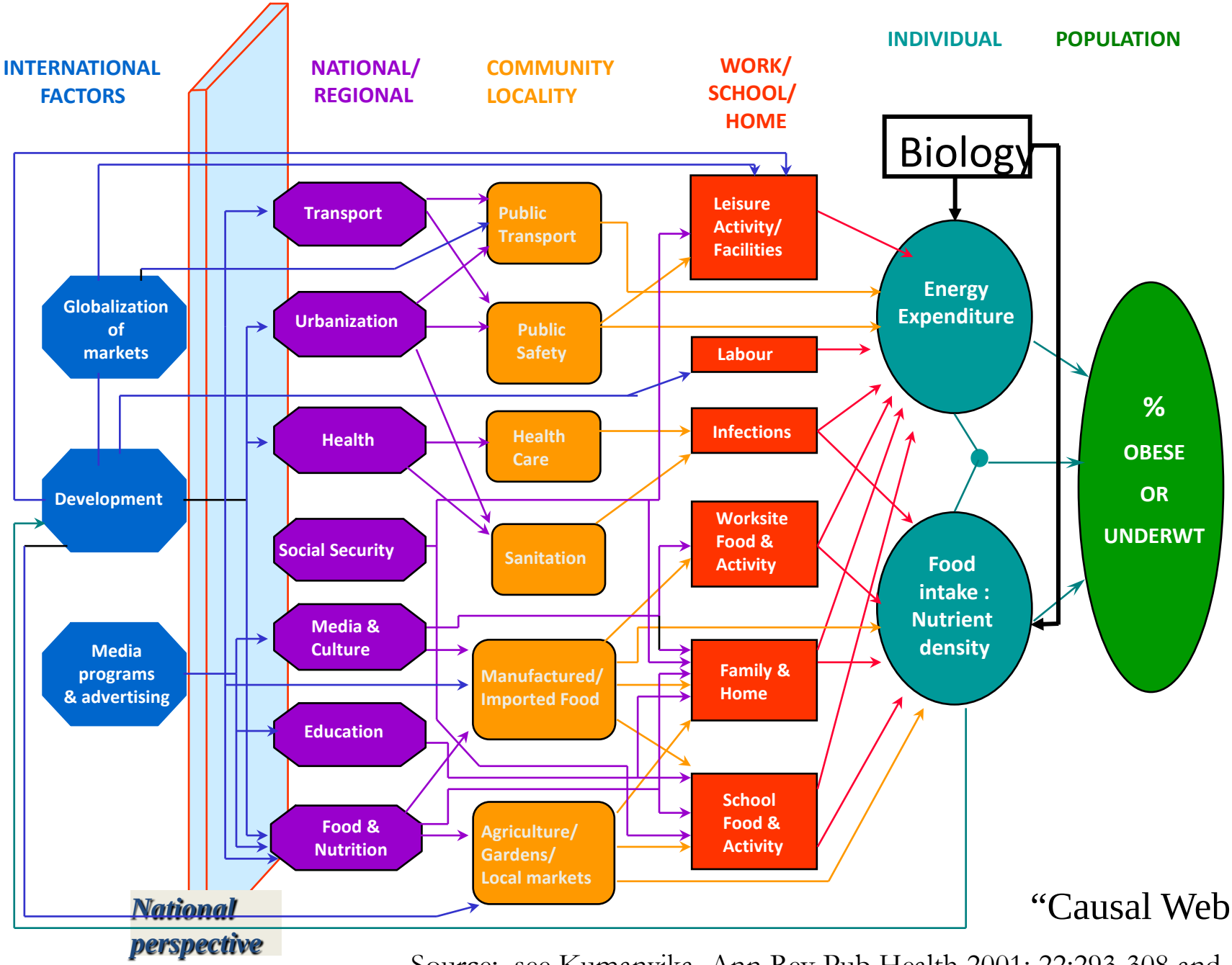
Dynamic complexity leads to counterintuitive behavior of complex systems because:

- Things change over time
- Lag time between cause and effect
- **Big, messy, interconnected web of causation**





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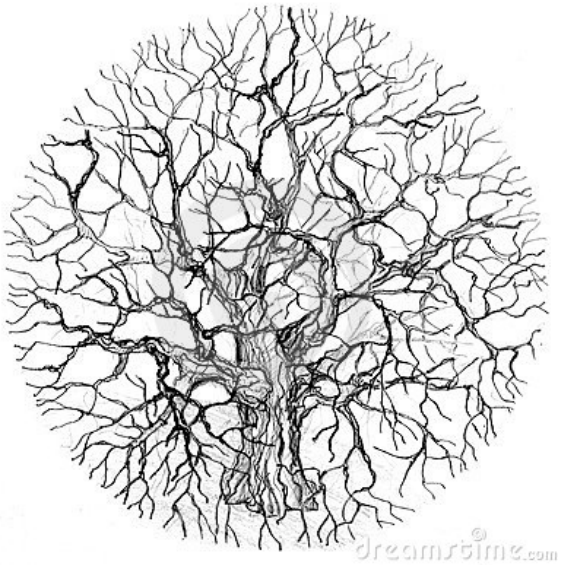
- **Nonlinear relationships**
- **Feedback loops**



Tendency: Linear Thinking

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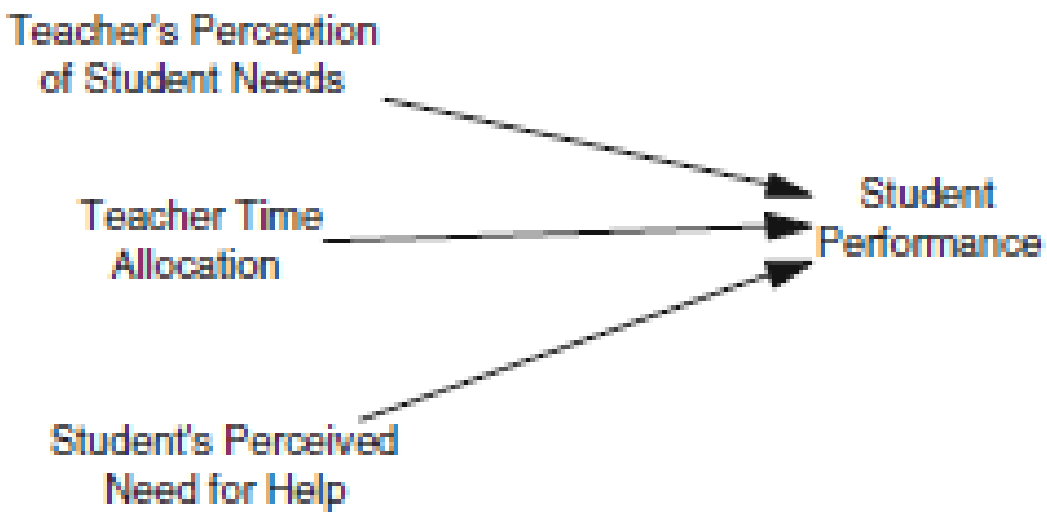
A Traditional linear representation of student performance



Hirsch GB, Levine R, and Miller RL (2007). Using system dynamics modeling to understand the impact of social change initiatives. *Am J Community Psychol* ; 39:239-253.

Required: Feedback Thinking

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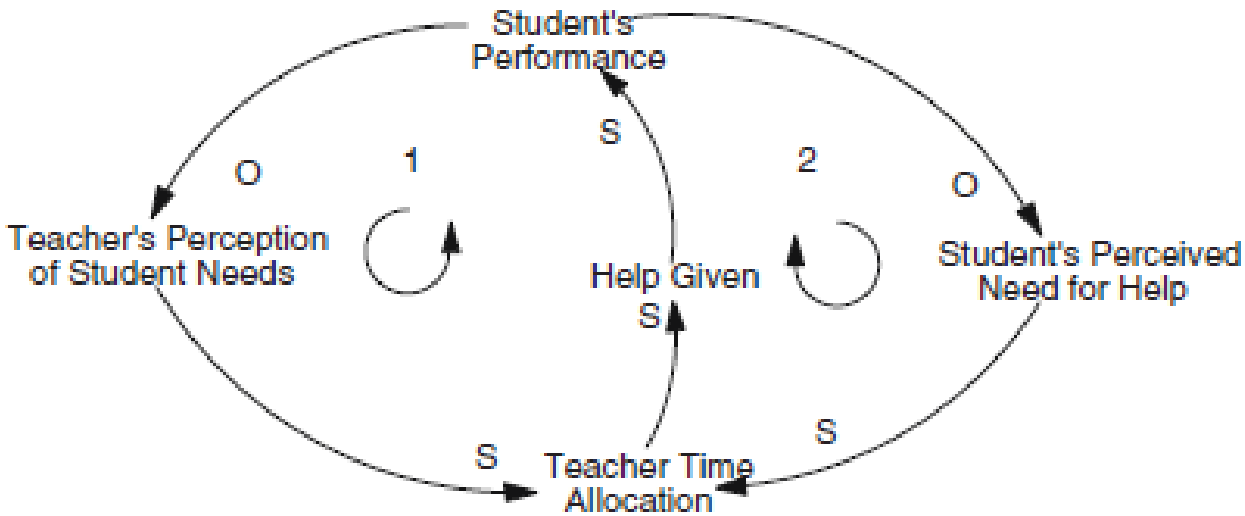
B System dynamics feedback loop (non-linear) representation of student performance



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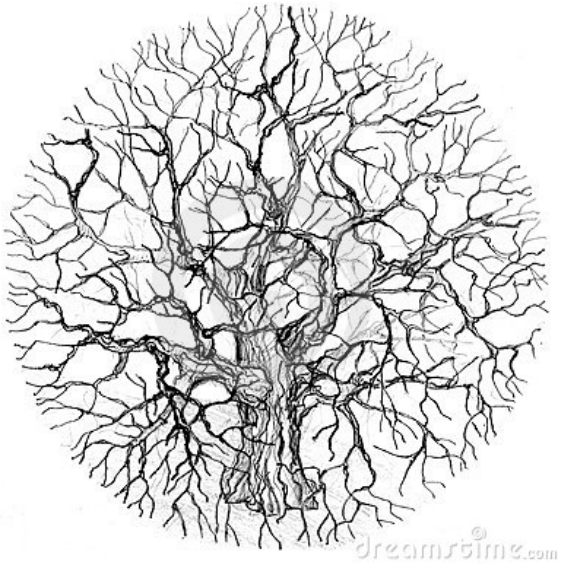

➔ **Our "mental models" are wrong!!!**

The result

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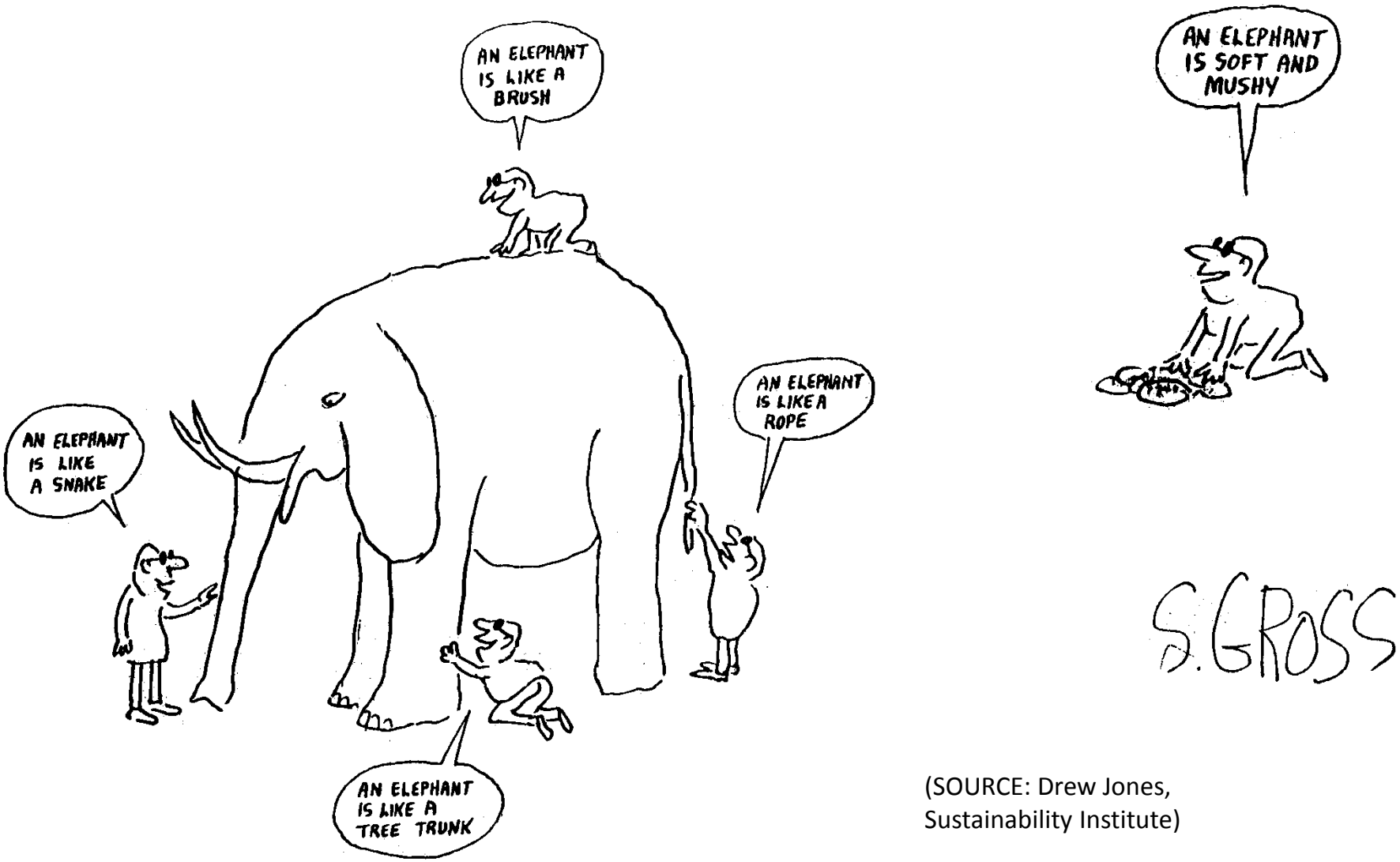

(SOURCE: Drew Jones, Sustainability Institute)

Policy resistance

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- Low tar and low nicotine cigarettes actually **increase** intake of carcinogens, CO, etc.
- Paving dirt roads in mountain areas leads to **decrease** in safety; similarly, anti-lock brakes create safety **decrease** for some
- Fourth highest cause of death in U.S. is medical **treatments**
- Despite widespread use of labor-saving devices, Americans have **less** leisure today than 50 years ago
- US policy of fire suppression has **increased** the size and strength forest fires in many areas
- Road building programs designed to reduce congestion have **increased** traffic, delays, and pollution.
- AND…?????

Five Conditions for Collective Impact

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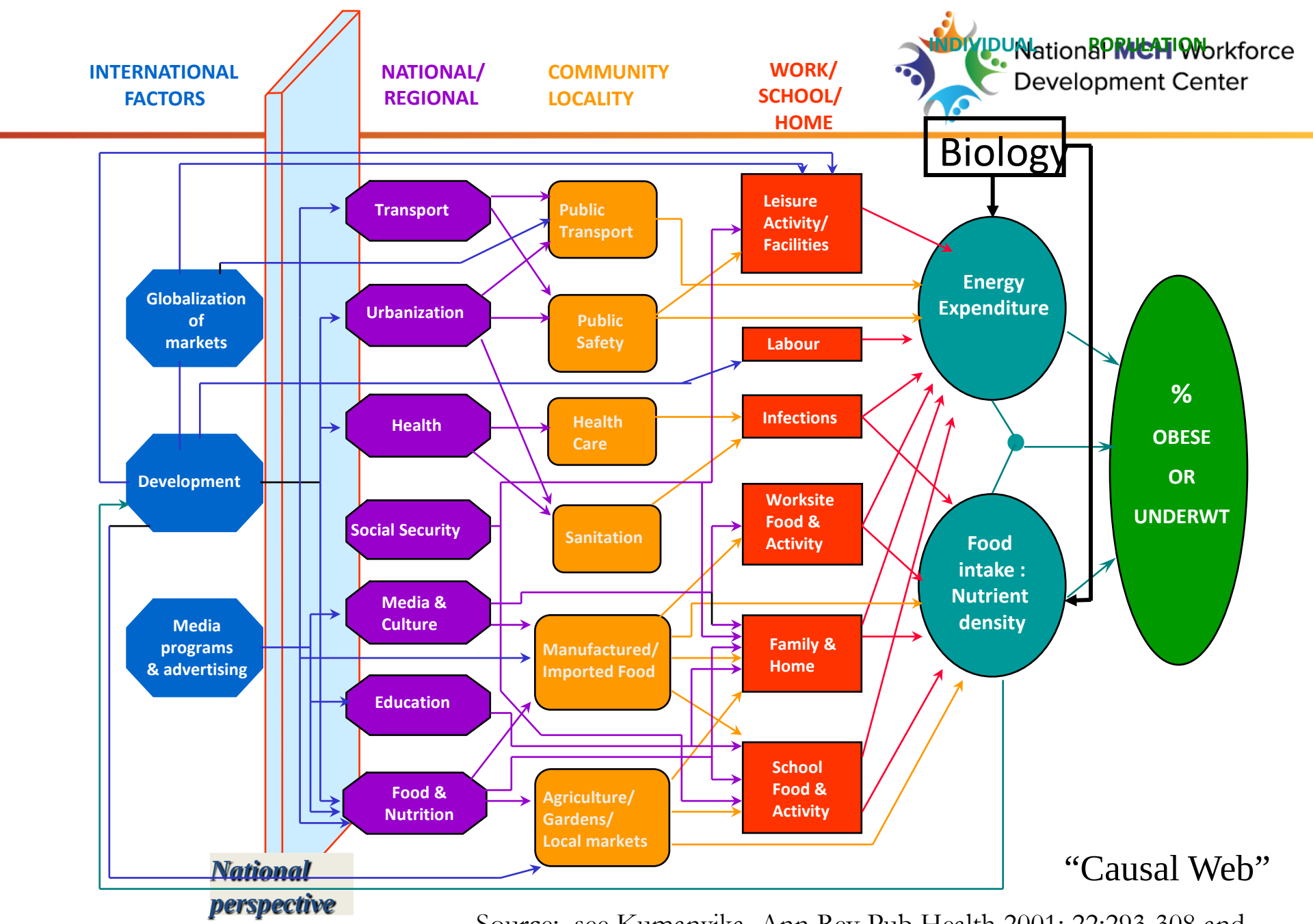
Many Agendas	?	Common Agenda
Many Different Measurements	?	Shared Measurement
Independent Activities	?	Mutually Reinforcing Activities
Sporadic Communication	?	Continuous Communication
Many funders, Thin infrastructure	?	Backbone Organization



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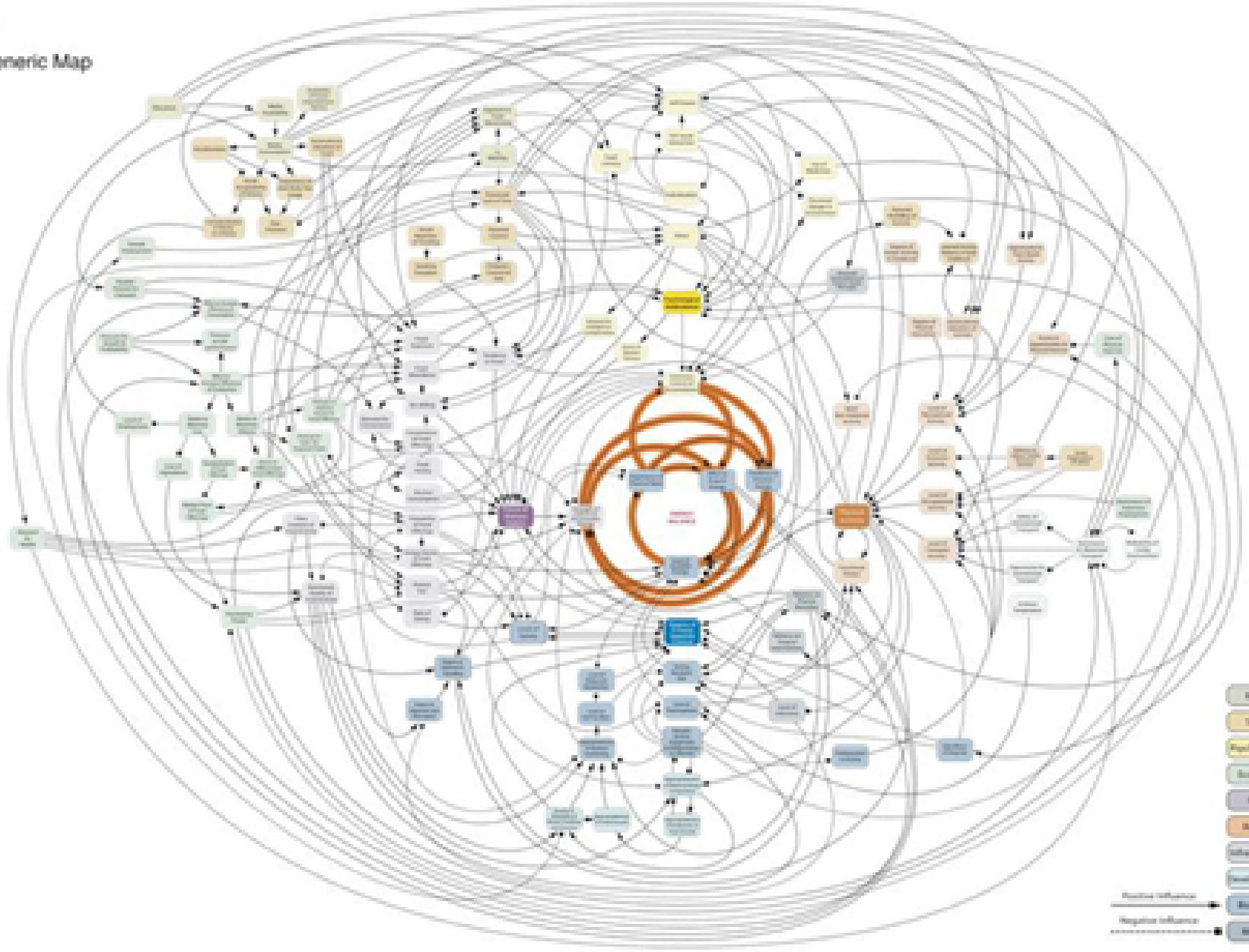
Map 0

Full Generic Map



Source: Foresight - Tackling obesities: future choices - http://www.foresight.gov.uk/Obesity/Obesity_final/Index.html

Systems science

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- **"Systems science is** an interdisciplinary field that studies the interconnected factors that shape the behavior of complex systems that occur across many domains – including nature, business, science, public health, and society."

(Hassmiller, Ginexi, Osgood, Mabry, 2013)

Systems

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- **A system is:** "A functional whole, composed of a set of components, coupled together to function in a way that might not be apparent from the functioning of the separate component parts."

  (Levine and Fitzgerald, 1992)

- Many different **kinds of "systems"** to in which we might intervene:
  - The state health department
  - Perinatal systems of care
  - Forces shaping how states react to federal Health Care Reform
  - Social determinants of health influencing infant mortality in your state, or
  - Life-course determinants of adolescent health (MCH x chronic x infectious disease…)

Systems Science Approaches

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- Qualitative
  - Systems mapping

    Process flow diagramming

    Circle of care modeling

    System support maps

    Network mapping

    System dynamics causal loop diagramming … and MORE!
- Quantitative
  - System modeling

    Simulation (discrete event simulation, system dynamics…)

    Statistical approaches

    Business case modeling/Return-on-Investment (ROI)/cost-effectiveness analysis … and MORE!

PARTNER Network Analysis

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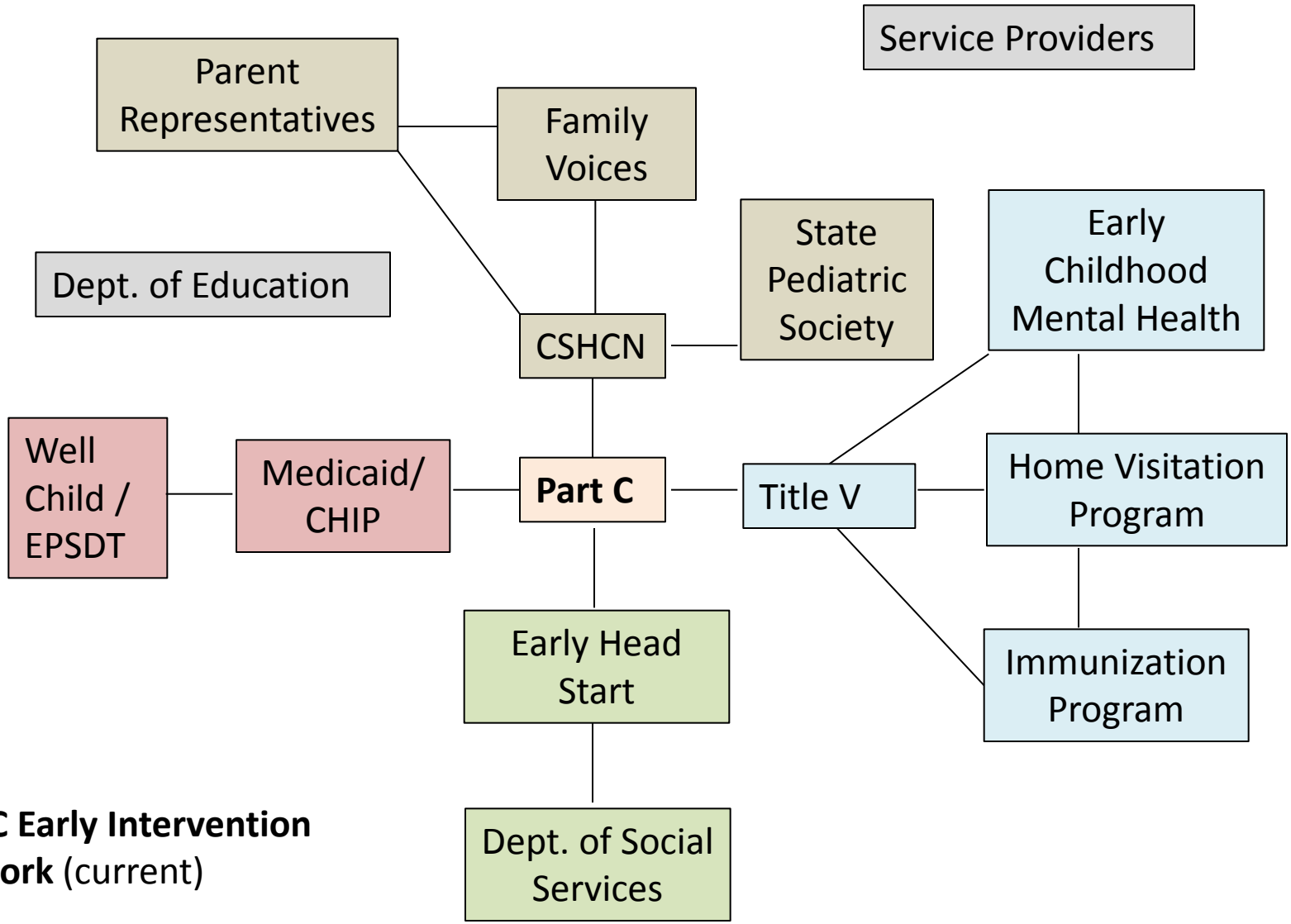

Part C Early Intervention Network (current)

Process Flow Diagramming

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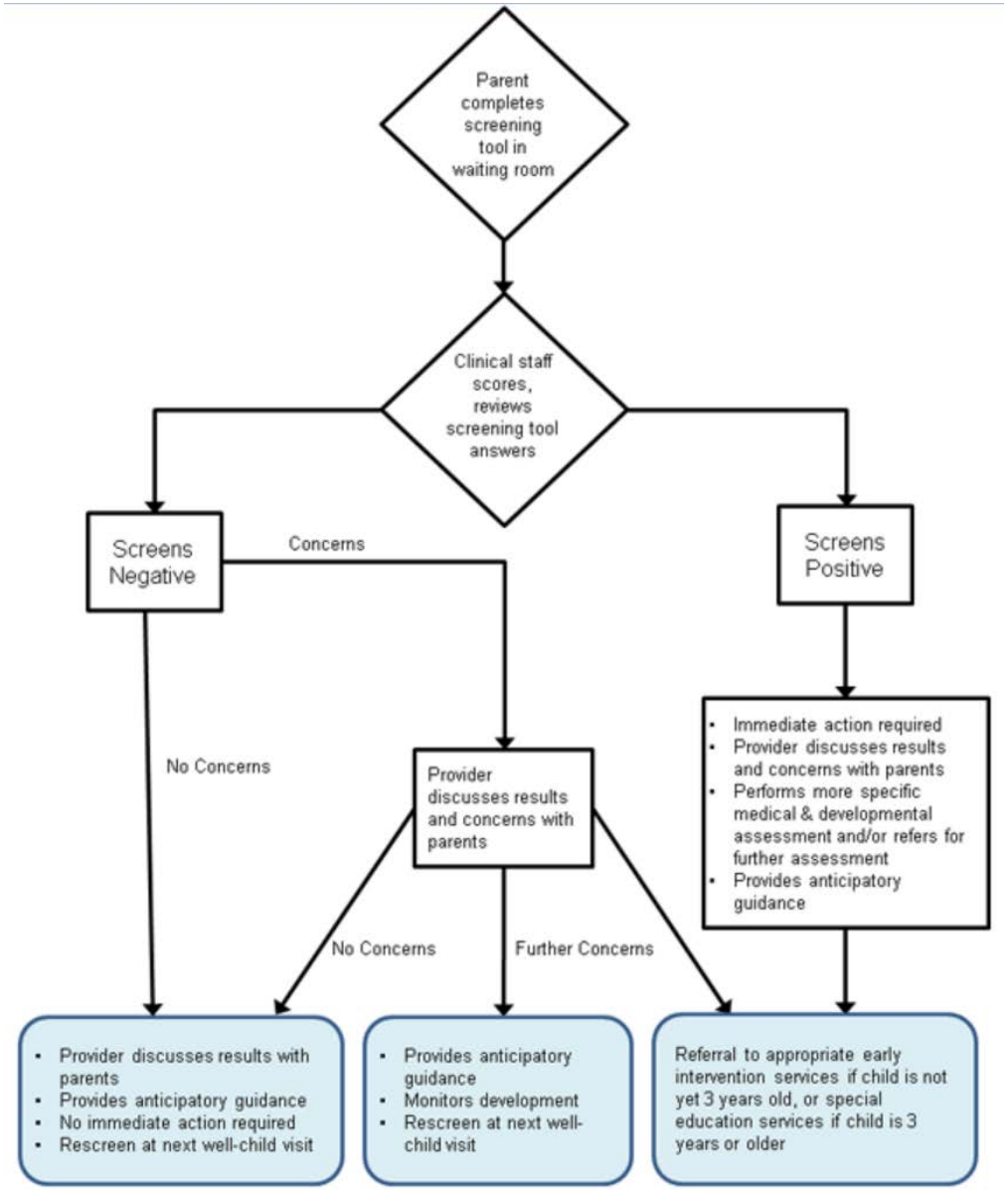

http://www.cdc.gov/ncbddd/childdevelopment/screening-hcp.html

Process Flow Diagram

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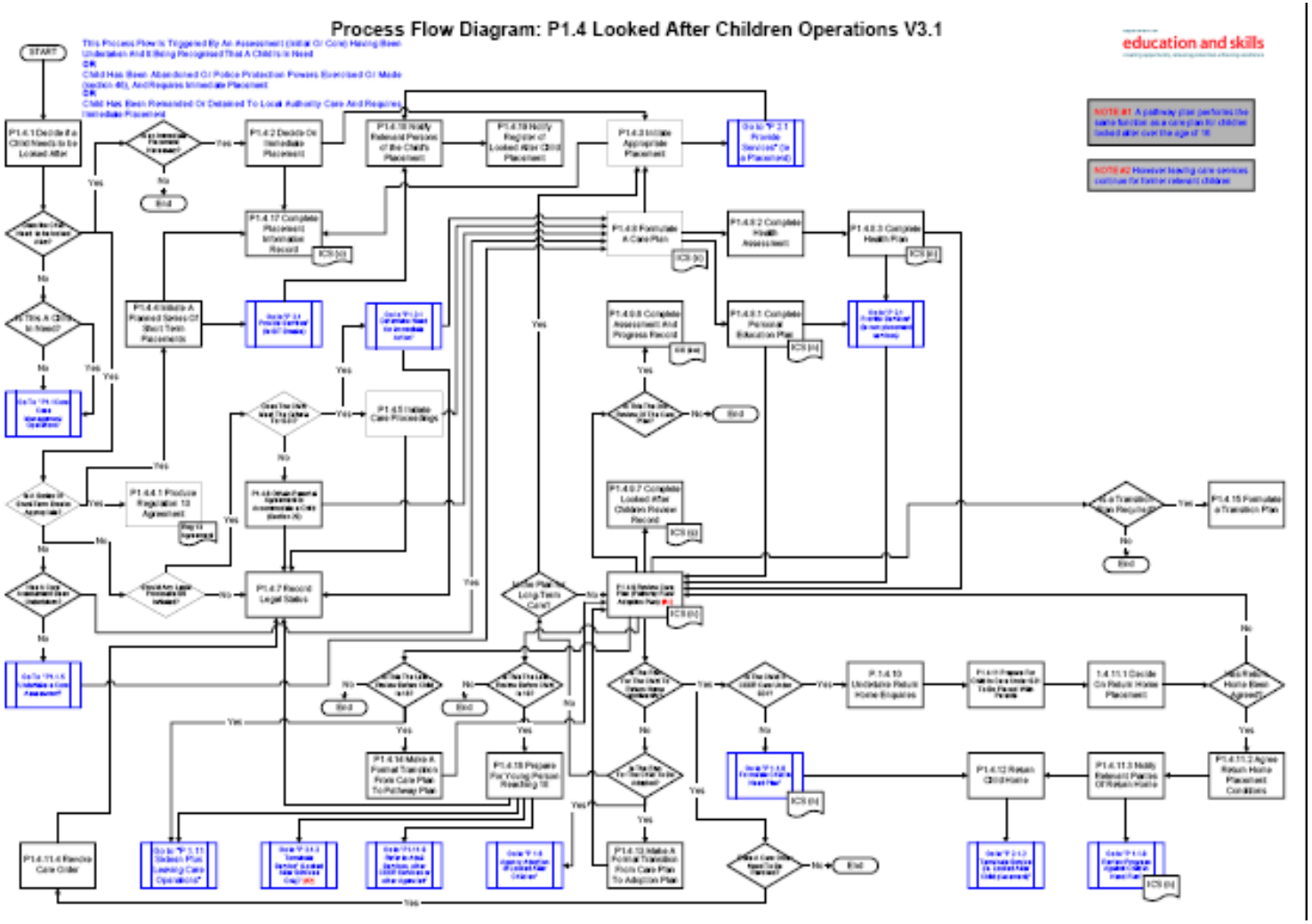

REFERENCE: http://www.dfes.gov.uk/qualityprotects/pdfs/lookedafterchildrenops.pdf

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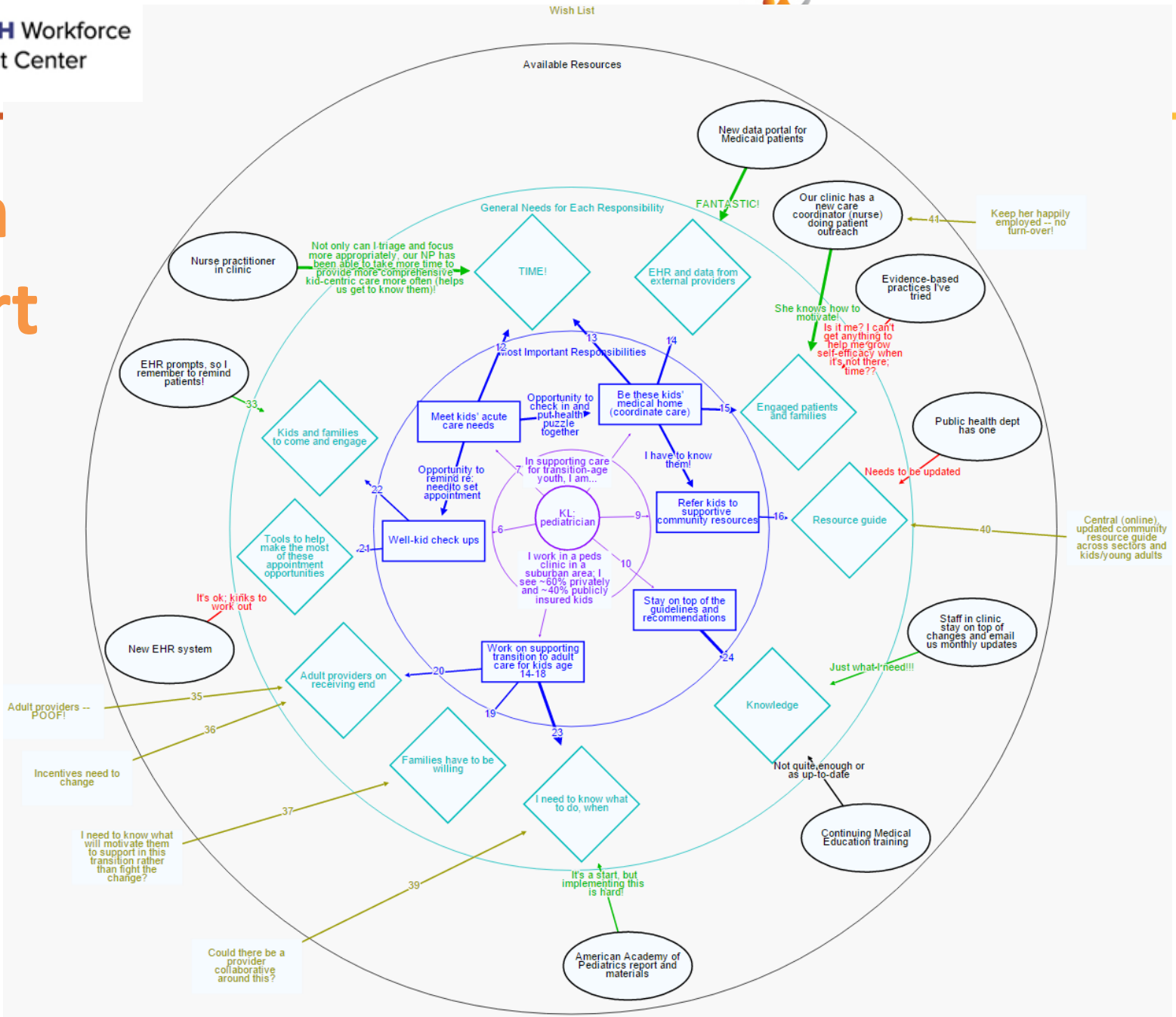
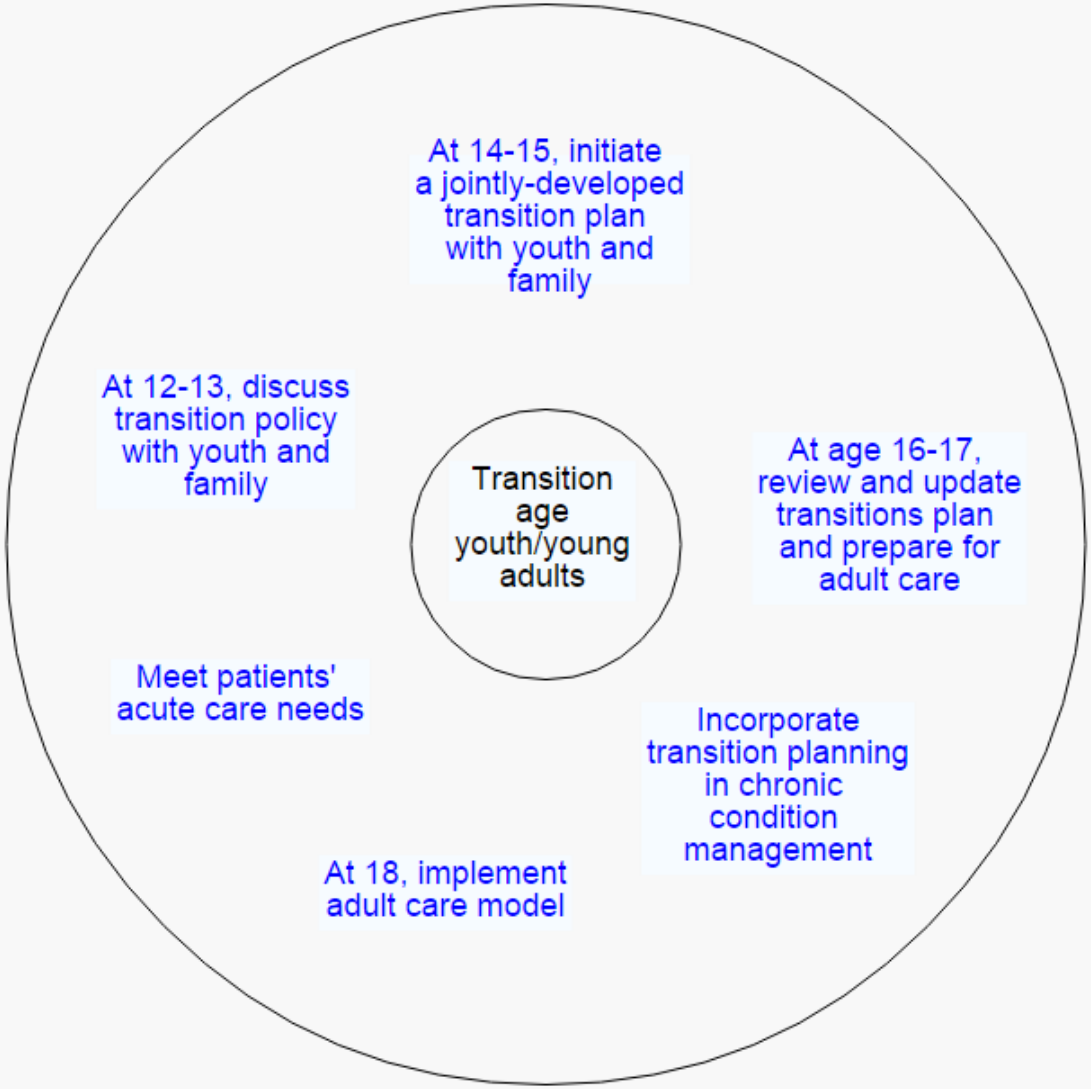
System Support Maps



Circle of Care framework



- Starts with target population in center
- In next ring, lay out what needs to be done
- Example at the right based on AAP report (Pediatrics 2011):

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

Guidance for the Clinician in Rendering Pediatric Care

Clinical Report—Supporting the Health Care Transition From Adolescence to Adulthood in the Medical Home

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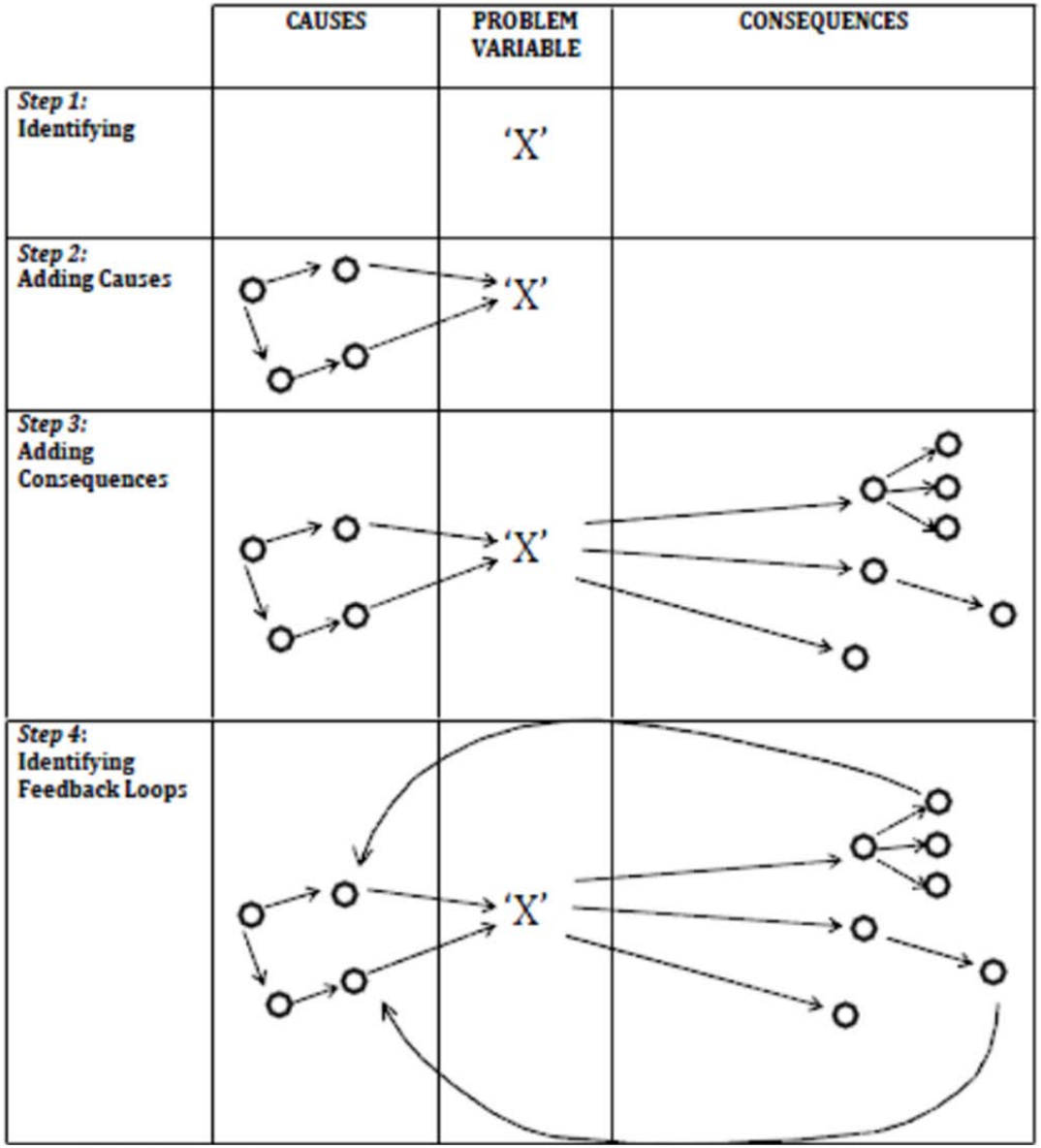
Circle of care framework

- Outer circle lays out what is needed to support the broader system (across stakeholder/ roles)

Causal loop diagramming



- Document "ripple effects" in the system
  - Changes that shape a focal variable (X)
  - Downstream consequences of changes in focal variable
  - Feedback loops
- Vennix (1996)
  - "Group Model Building: Facilitating Team Learning Using System Dynamics."

Dynamic hypotheses and simulation models

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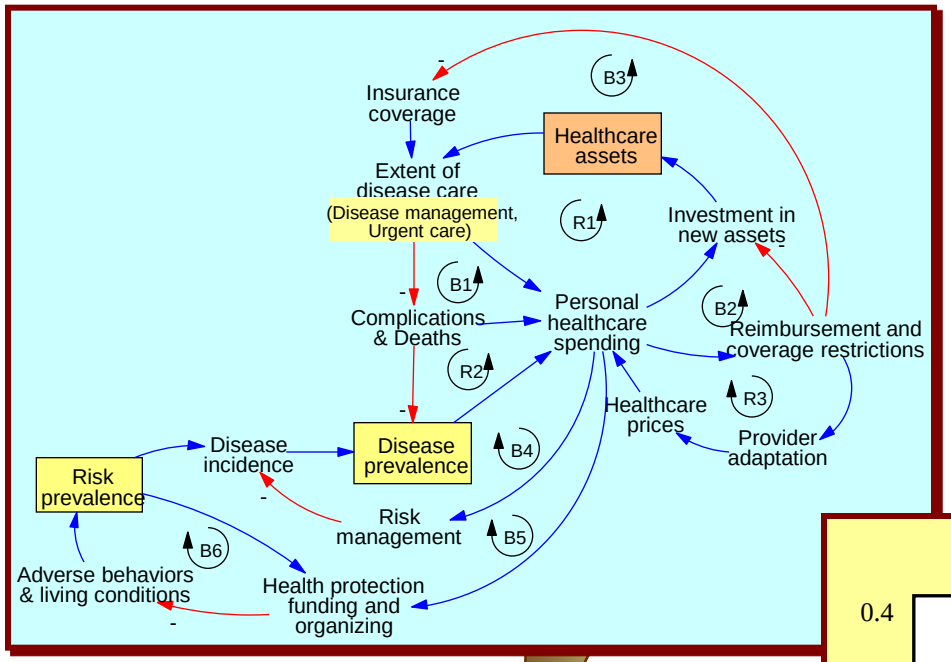
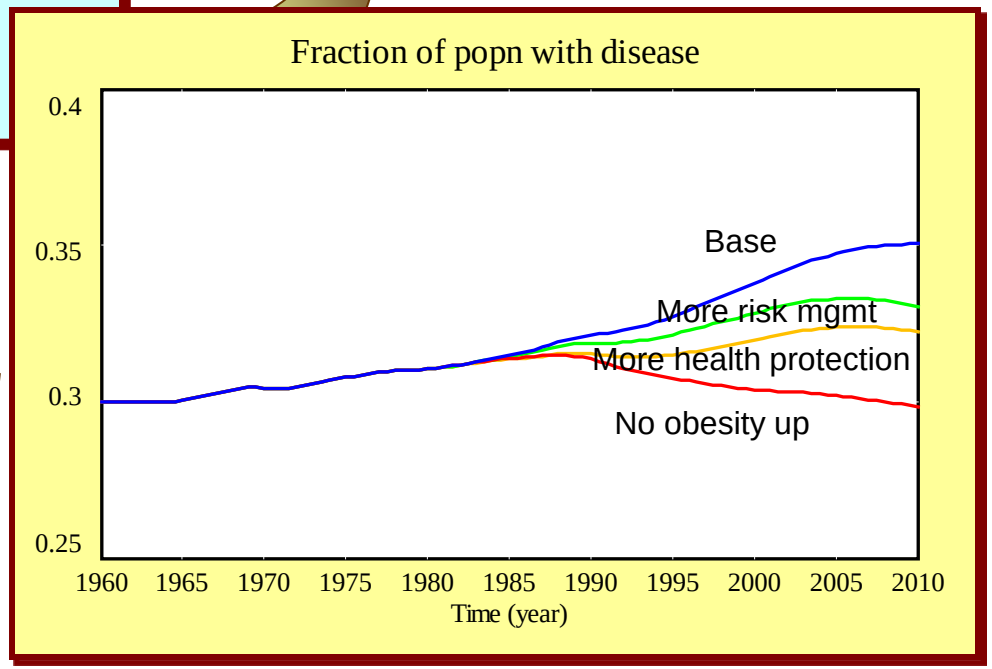


Learning with the model improves our intervention



System structure shapes behavior over time

(SOURCE: Homer & Milstein http://www.cdc.gov/healthbound/)

Systems science tools support learning about alternate futures

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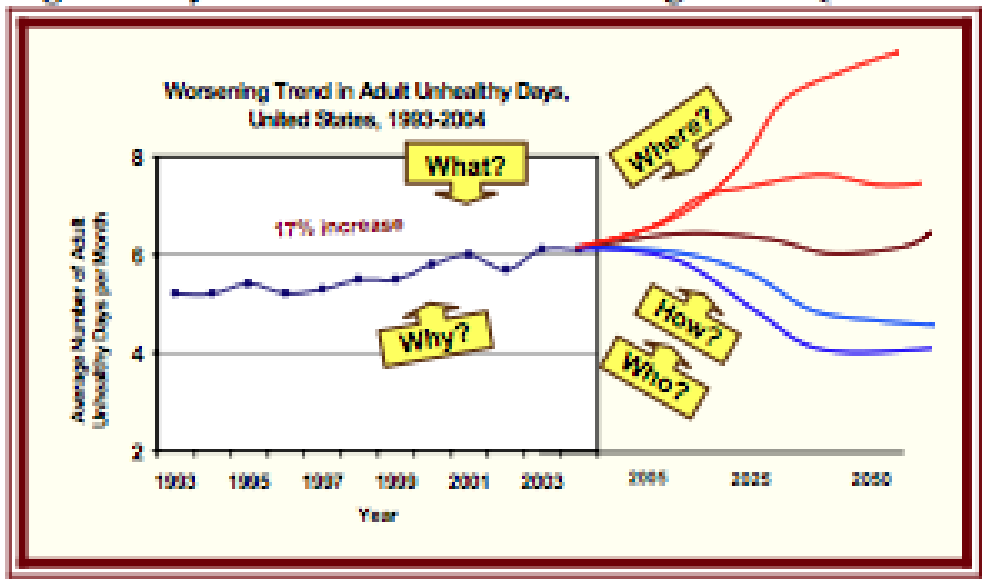
What Questions Does it Address?

Five general lines of inquiry guide this kind of model-assisted inquiry.

- What aspects of a system's behavior are of concern?
- Why are those features changing in those ways at those times?
- Where is the system headed if no new action is taken?
- How else can the system behave, if different decisions are made?
- Who has the power to move the system in a more desirable direction?

Figure 1 Dynamic Models Address Navigational Questions



(SOURCE: http://www.sustainer.org/pubs/SI06JonesBO1Final.pdf)

Why Use System Dynamics Methods…

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- Help us develop a **shared understanding** of the system
- Teach us to **think differently** about how systems behave (that is, in terms dynamics, circular causal feedbacks, accumulations, etc)
- Allow stakeholders to **view the larger system** they are embedded within
- Provide a **framework for integrating** what we know, and determining importance of what we don't know
- Support identification of **high impact leverage points**
- Offer a virtual world in which to **"try out" and compare policies**

(40 minutes)

SYSTEM SUPPORT MAPS

System support maps

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- **System support maps** offer a guided approach to help stakeholders think about and document a system from their perspective
- To construct **system support maps**, you should:
  1. Clarify the system you want to study (set a boundary/scope)
  2. Identify the stakeholders/roles to include
  3. Get paper and markers or use our online tool (under development)
  4. Ask people to carve out time and reflect; you might want to walk them through the exercise or give instructions and turn them loose

System support maps

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- As you map your system supports, what is your **role/identity**?
  - Who are you, both name/initials and role you represent?
  - Share any context/detail that helps ground your map
- What are your most important **responsibilities**?
  - What do you see as the most important 5-8 responsibilities you face in your role right now?
- What do you **need**?
  - For each responsibility, what do you most need to succeed (in general terms – time, patience, knowledge, access to providers, etc)?
- What **resources** have you used?
  - For each need, what resources have you tried in the past year (providers, community organizations, websites, etc)?
- What do you **wish** for?
  - … to improve any resource you use or address any unmet need?

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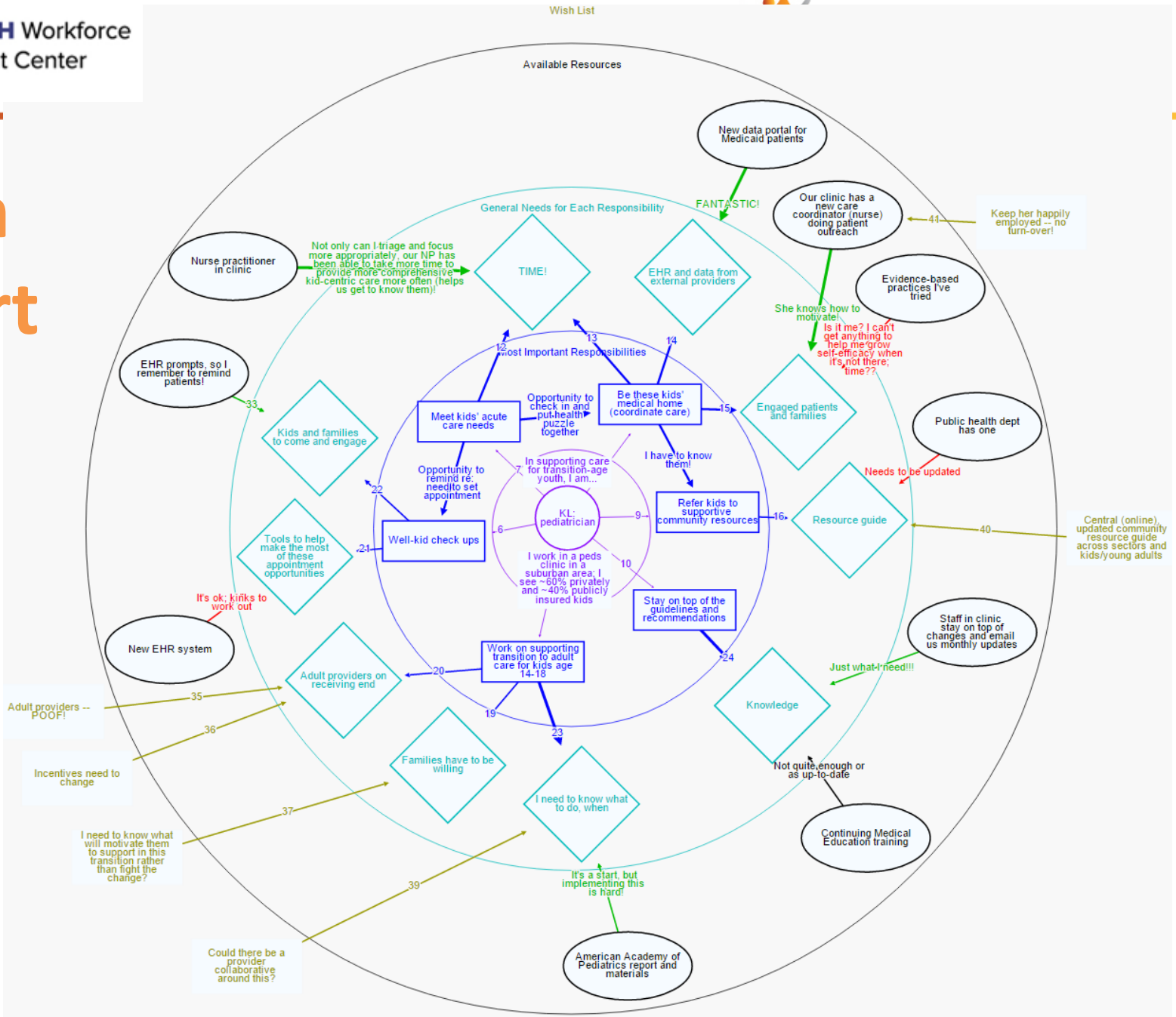

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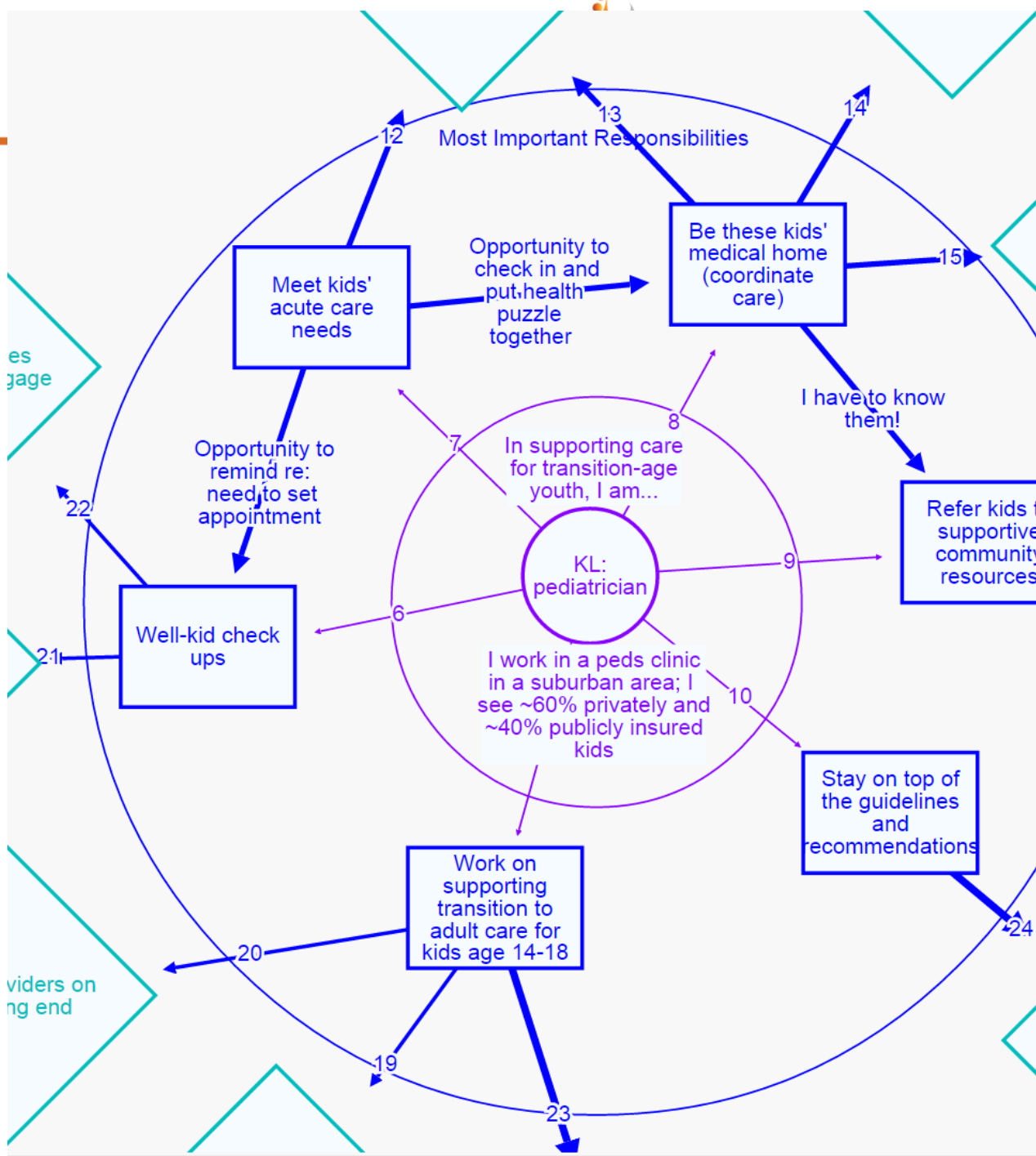
Role (context) and responsibilities



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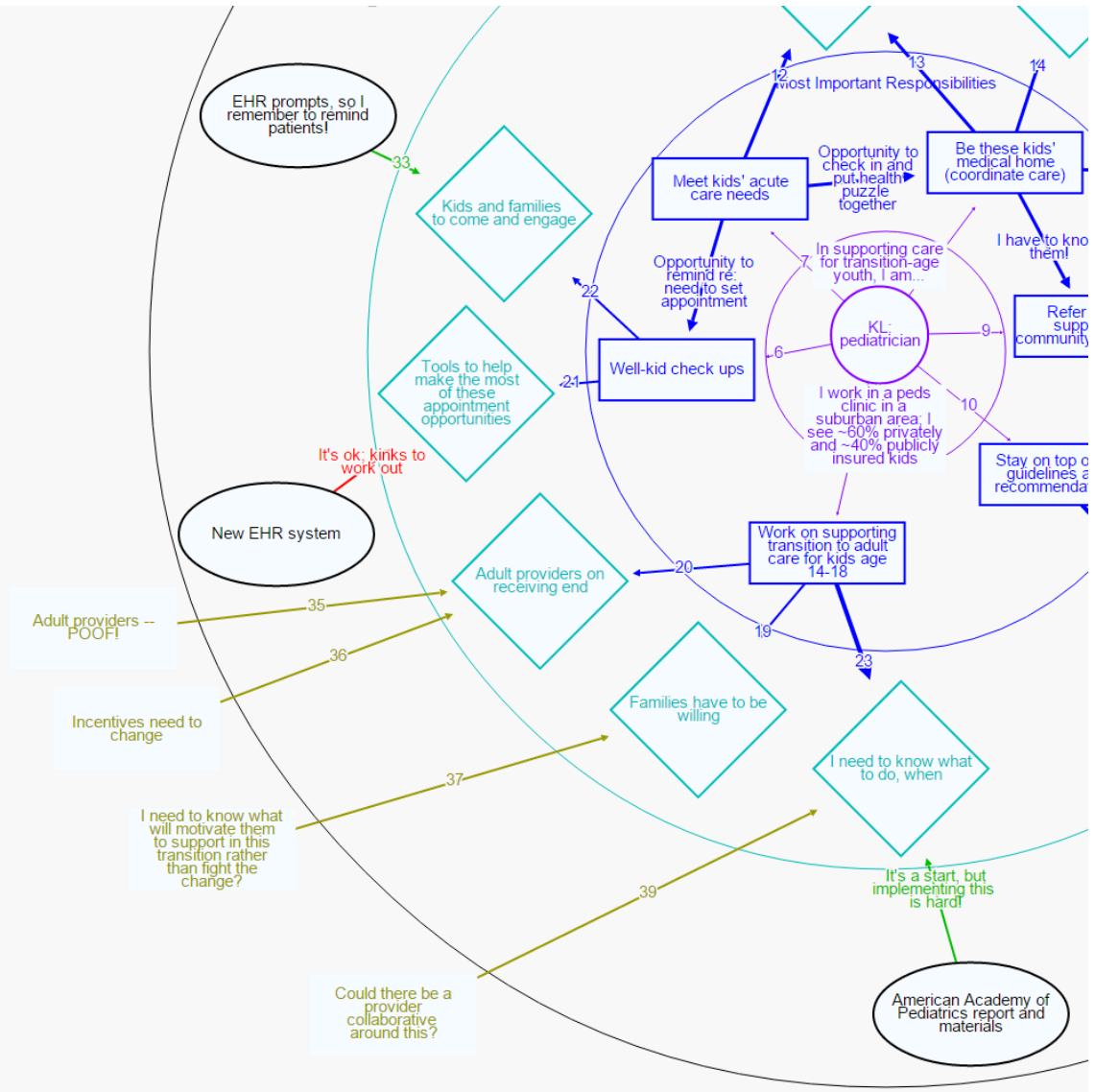
Needs, resources, and wishes



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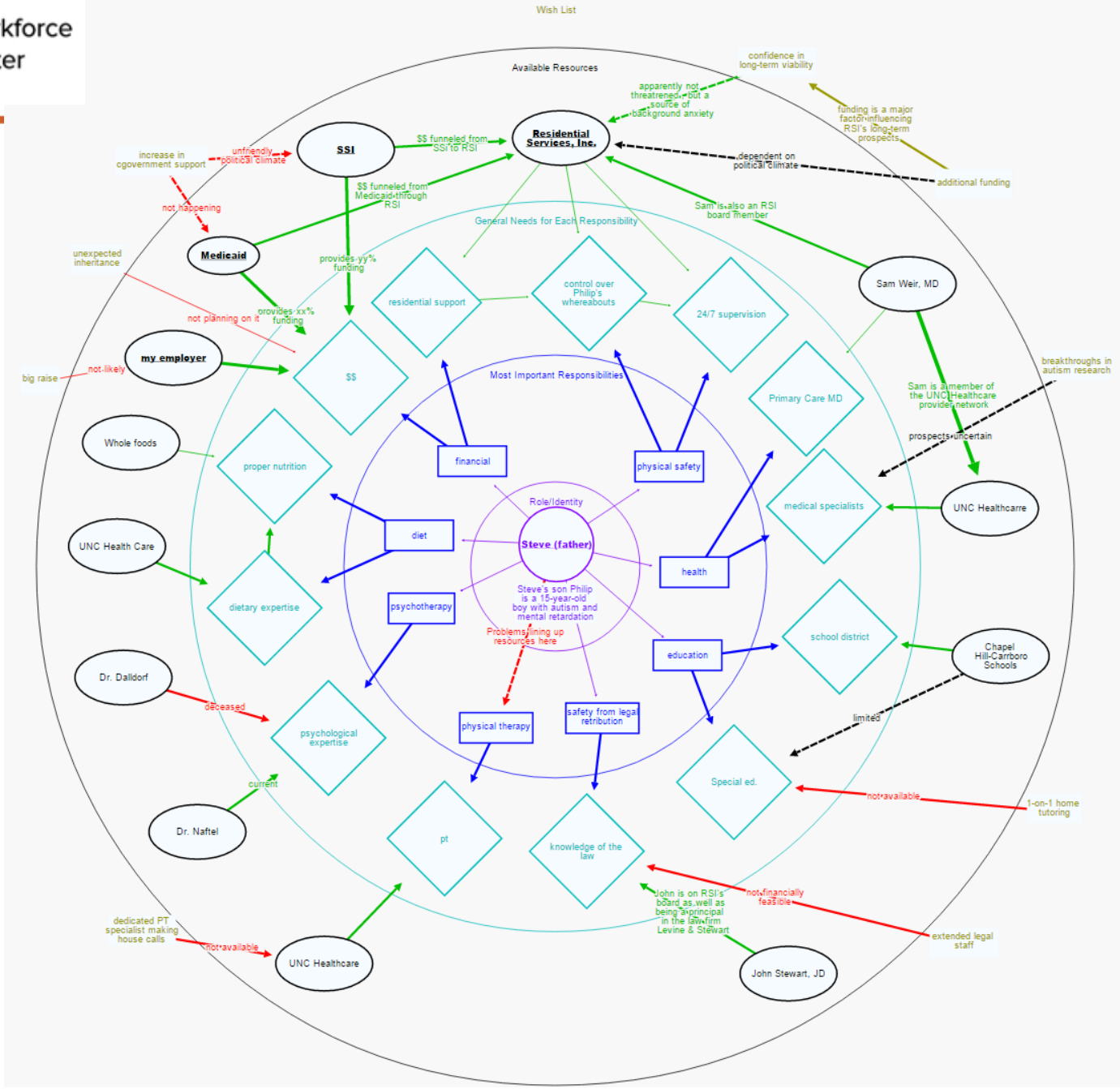
System Support Maps 2



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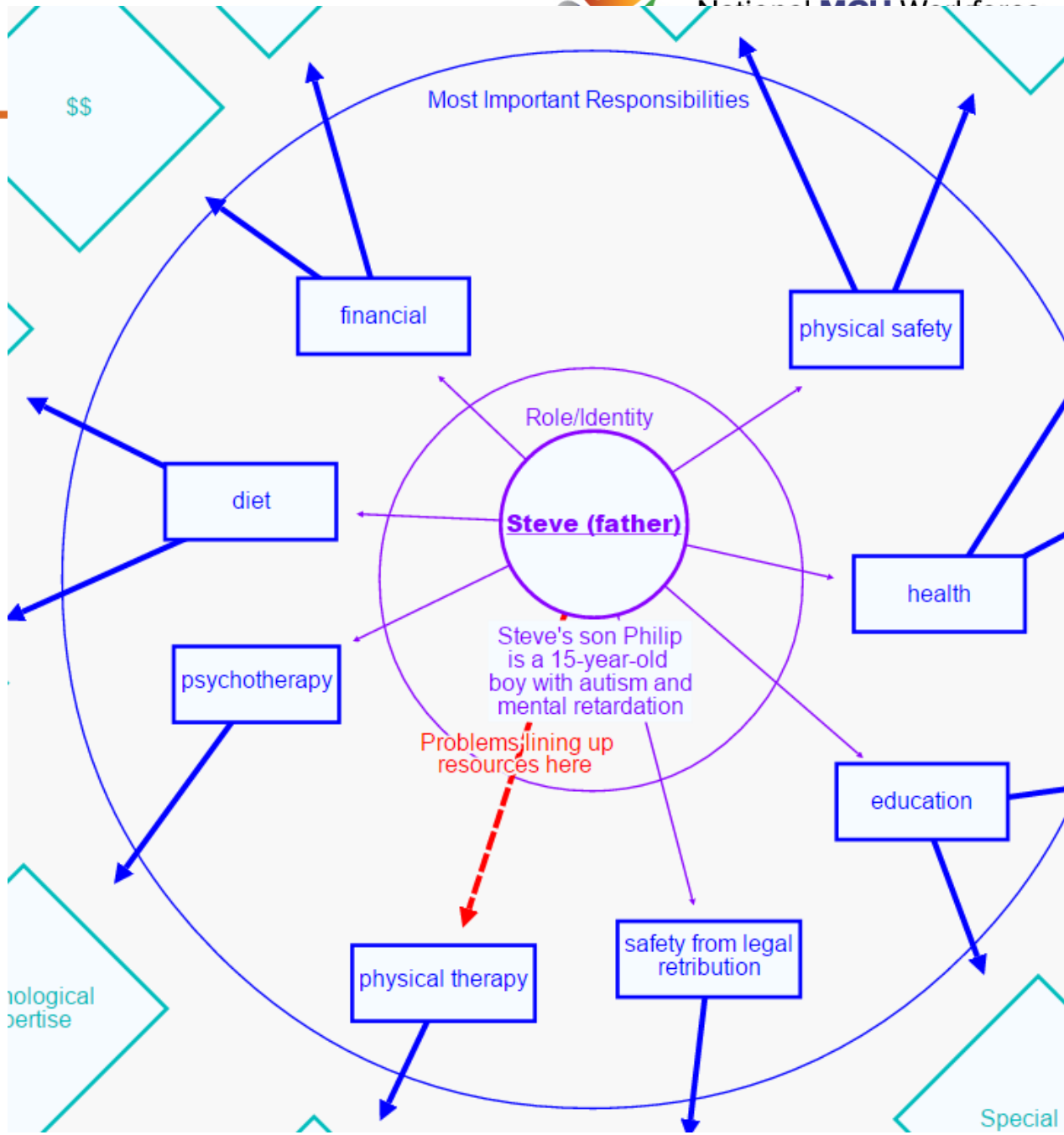

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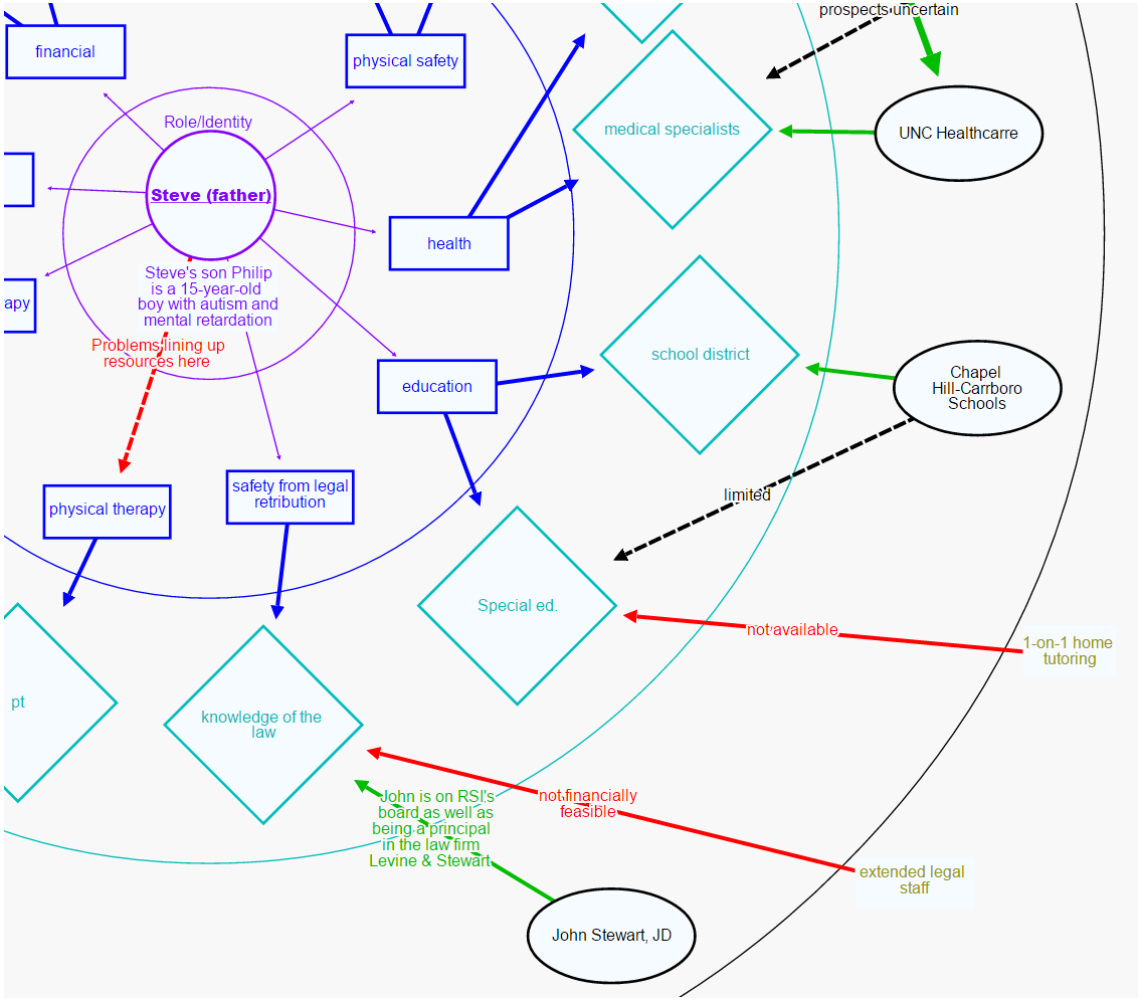

(20 minutes)

CIRCLE OF CARE FRAMEWORK

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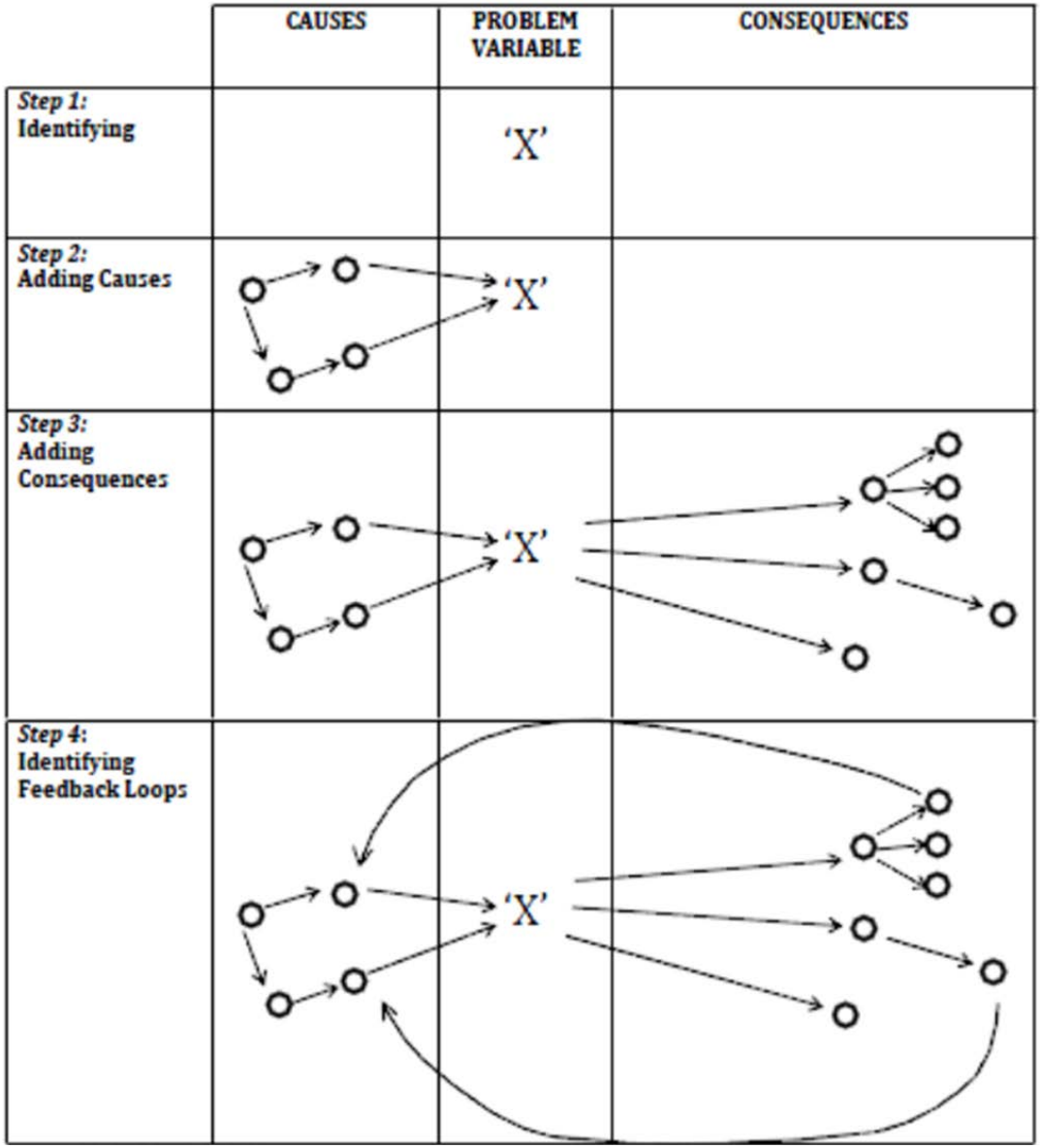
Circle of care framework

- Outer circle lays out what is needed to support the broader system (across stakeholder/ roles)

(5 minutes)

MEET CAUSAL LOOP DIAGRAMMING

Causal loop diagramming



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Causal loop diagramming

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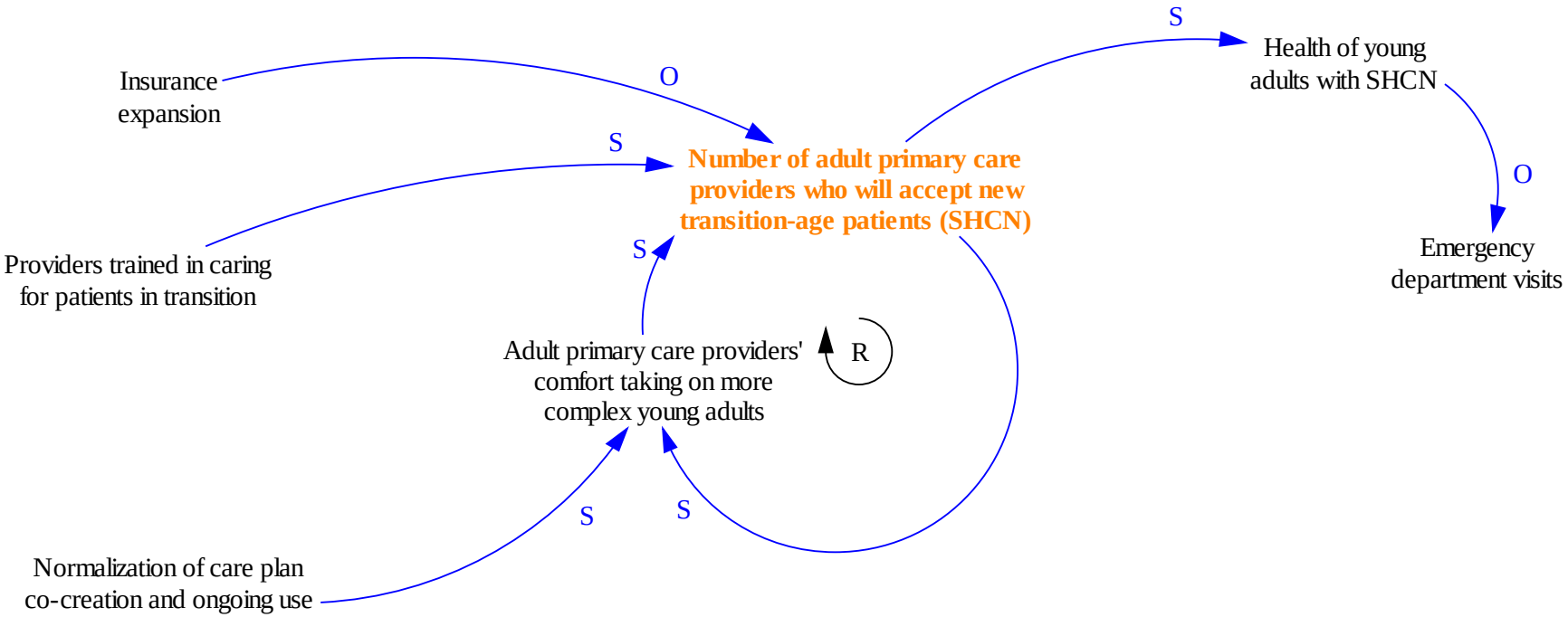

Collective work plans!

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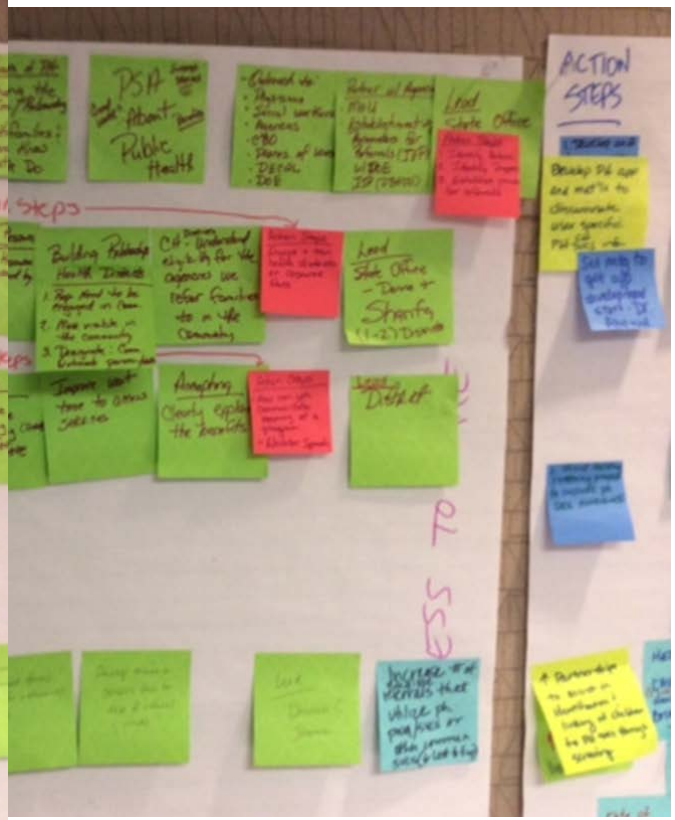

(30 minutes)

DISCUSSION: HOW SHOULD WE TRAIN IN SYSTEMS THINKING/SCIENCE?

How do we train?

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- Opportunities to insert systems thinking into your existing training/didactics
- Dedicated courses

- What we're doing at UNC
  - Intro to public health disciplines (through a systems thinking lens)
  - National MCH Workforce Development Center course, trainings
  - PhD, specializing in decision science within Dept of Health Policy and Management

- **What do you think?**

Stay in touch!

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- We'd be happy to talk more!
- Kristen Hassmiller Lich – klich@unc.edu
- National MCH Workforce Development Center:
  - http://mchwdc.unc.edu
  - http://www.amchp.org/Transformation-Station/Pages/Home.aspx

The Center's Mission

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- Advance workforce development for state and territory Title V programs and partners in the context of health transformation
- Build capacity in four areas of health transformation:
  - Access to Care
  - Change Management (Population Health Management)
  - Quality Improvement
  - Systems Integration
- Prepare future workforce for success

Academic-Practice Partnership

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Academic Partners

- The Gillings School of Global Public Health at The University of North Carolina at Chapel Hill
- Georgia State University, Georgia Health Policy Center
- Howard University, College of Arts and Sciences
- National Implementation Research Network
- North Carolina State University, Industrial Extension Services
- University of Illinois at Chicago, School of Public Health
- University of North Carolina School of Medicine

Practice Partners

- Association Of Maternal and Child Health Programs
- National Academy for State Health Policy
- The Catalyst Center
- Center for Public Health Quality

Health Transformation Resources from the Four Cores

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Access to Care – Health transformation resources specific to Title V needs

- ACA 101 Modules
- State Assessment Tool

Quality Improvement – Extended application of QI methods and tools to current state challenges

- Process Flow Diagramming
- Plan-Do-Study-Act cycles
- Root Causes Analysis
- Impact Matrix

Change Management – Adaptive leadership skills for Title V in health transformation environment

- Webinars
- Value Proposition Activities

Systems Integration – Frameworks to analyze complex systems and tools to move complex projects forward

- Causal Loop Diagramming
- Circle of Care Modeling
- Systems Dynamics
- Group Model Building
- Network Analysis