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

Kristen Hassmiller Lich (klich@unc.edu)
Angela Rosenberg
Lewis Margolis

MCHB Joint Interdisciplinary Training Meeting
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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...
• 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...
The challenge

• 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...
Energy Expenditure

% OBESE OR UNDERWT

Food intake: Nutrient density

“Causal Web”

The challenge...

- 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

• Systems with a large number of parts
• Do not change over time
• Difficult to understand as a whole
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
Globalization of markets
Development
Media programs & advertising

Transport
Urbanization
Health
Social Security
Media & Culture
Education
Food & Nutrition

Public Transport
Public Safety
Health Care
Sanitation
Manufactured/Imported Food
Agriculture/Gardens/Local markets

Leisure Activity/Facilities
Labour
Infections
Worksite Food & Activity
Family & Home
School Food & Activity

Energy Expenditure

Food intake: Nutrient density

“Causal Web”


Slide adapted from D. Finegood
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
- Nonlinear relationships
- Feedback loops
Tendency: Linear Thinking

A Traditional linear representation of student performance

Teacher's Perception of Student Needs

Teacher Time Allocation

Student's Perceived Need for Help

Student Performance

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

– Nonlinear relationships

– Feedback loops

➔ Our “mental models” are wrong!!!
The result

AN ELEPHANT IS LIKE A BRUSH

AN ELEPHANT IS LIKE A ROPE

AN ELEPHANT IS LIKE A TREE TRUNK

AN ELEPHANT IS SOFT AND MUSHY

(SOURCE: Drew Jones, Sustainability Institute)
Policy resistance

• 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

Many Agendas

Many Different Measurements

Independent Activities

Sporadic Communication

Many funders, Thin infrastructure

Common Agenda

Shared Measurement

Mutually Reinforcing Activities

Continuous Communication

Backbone Organization
Slide adapted from D. Finegood

“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)
• **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 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...)

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
Systems Science Approaches

• 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

- Parent Representatives
- Dept. of Education
- Medicaid/CHIP
- Early Head Start
- Dept. of Social Services
- Part C
- Family Voices
- CSHCN
- Early Childhood Mental Health
- Early Childhood Start
- Home Visitation Program
- Immunization Program
- State Pediatric Society
- Title V
- Service Providers

Part C Early Intervention Network (current)
Process Flow Diagramming

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

At 14-15, initiate a jointly-developed transition plan with youth and family

At 12-13, discuss transition policy with youth and family

Meet patients' acute care needs

Transition age youth/young adults

At 18, implement adult care model

Incorporate transition planning in chronic condition management

At age 16-17, review and update transitions plan and prepare for adult care

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

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Dynamic hypotheses and simulation models

System structure shapes behavior over time

(Source: http://www.cdc.gov/healthbound/)
Systems science tools support learning about alternate futures.

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...

• 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

- **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

• 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?
System support maps

• As you map your system supports, what is your role/identity?
  – Who are you, both name/initals 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? START WITH ONE RESPONSIBILITY
  – 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?
Role (context) and responsibilities
Needs, resources, and wishes
System Support Maps 2
Role (context) and responsibilities

Steve (father)

Steve's son Philip is a 15-year-old boy with autism and mental retardation.

Problems/lining up resources here

Most Important Responsibilities

- financial
- physical safety
- health
- education
- safety from legal retribution

- physical therapy
- psychotherapy
- diet

National MCH Workforce Development Center
Needs, resources, and wishes 2
(20 minutes)

CIRCLE OF CARE FRAMEWORK
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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  - Changes that shape a focal variable (X)
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Causal loop diagramming

Insurance expansion

Providers trained in caring for patients in transition

Normalization of care plan co-creation and ongoing use

Number of adult primary care providers who will accept new transition-age patients (SHCN)

Adult primary care providers' comfort taking on more complex young adults

Health of young adults with SHCN

Emergency department visits
Collective work plans!
DISCUSSION: HOW SHOULD WE TRAIN IN SYSTEMS THINKING/SCIENCE?

(30 minutes)
How do we train?

• 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!

• 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

• 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

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

**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