

# *Emerging hot issues in D&I research*

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"Prediction is very difficult,  
especially if it's about the future."

—Nils Bohr, Nobel laureate in physics

A few sample issues of interest...

# Systems Approaches

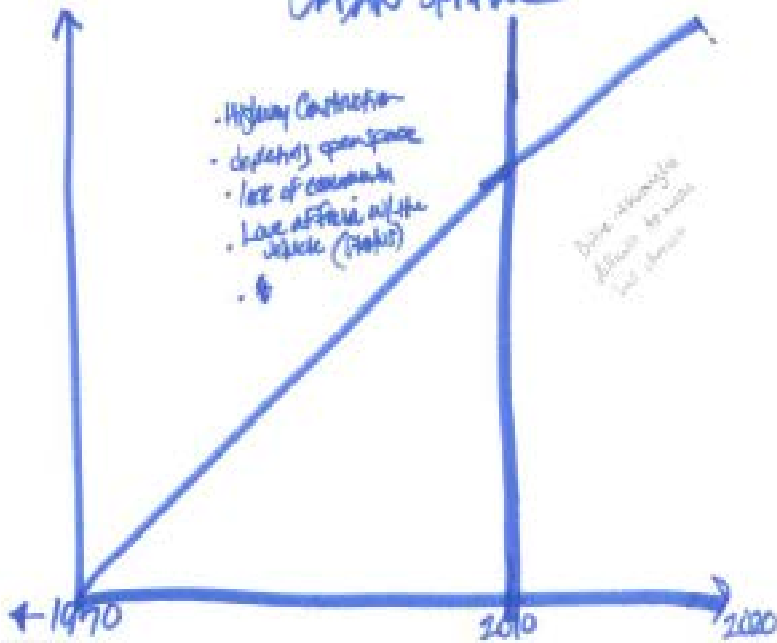
- A multilevel (ecological) perspective of health
- Group model building
- Micro-simulation
- Agent based modeling

# Group model building

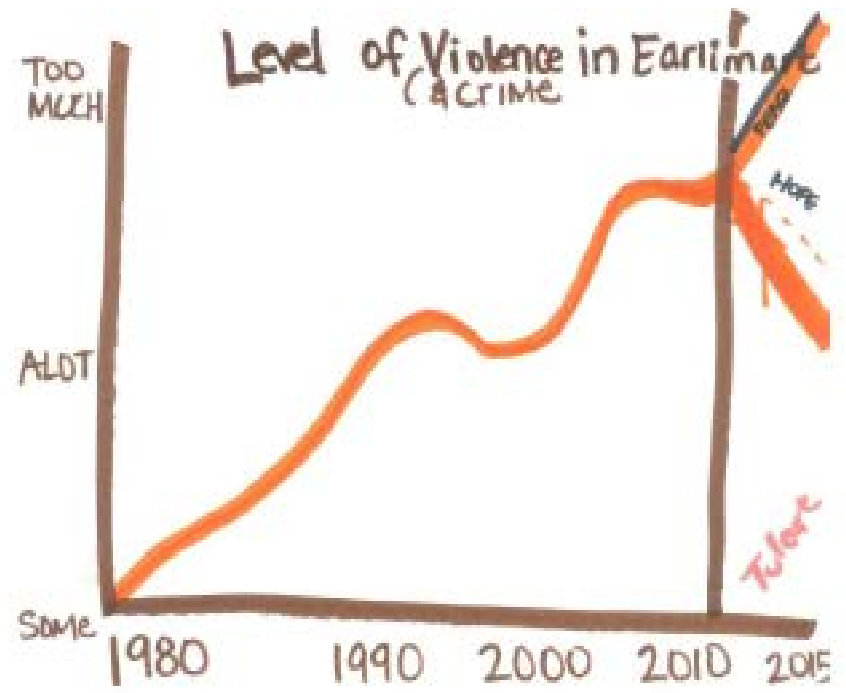
- Development of conceptual systems science models with community representatives
- Roots in community-based participatory approaches
- Understand complex interactions of social, political, economic, environmental, and health conditions
- Foster co-learning, trust, and capacity building among all partners
- Create greater balance between knowledge generation and intervention for the mutual benefit of all partners
- Resulting in
  - Behavior Over Time Graphs
  - Causal Loop Diagrams

# Behavior Over Time Graphs

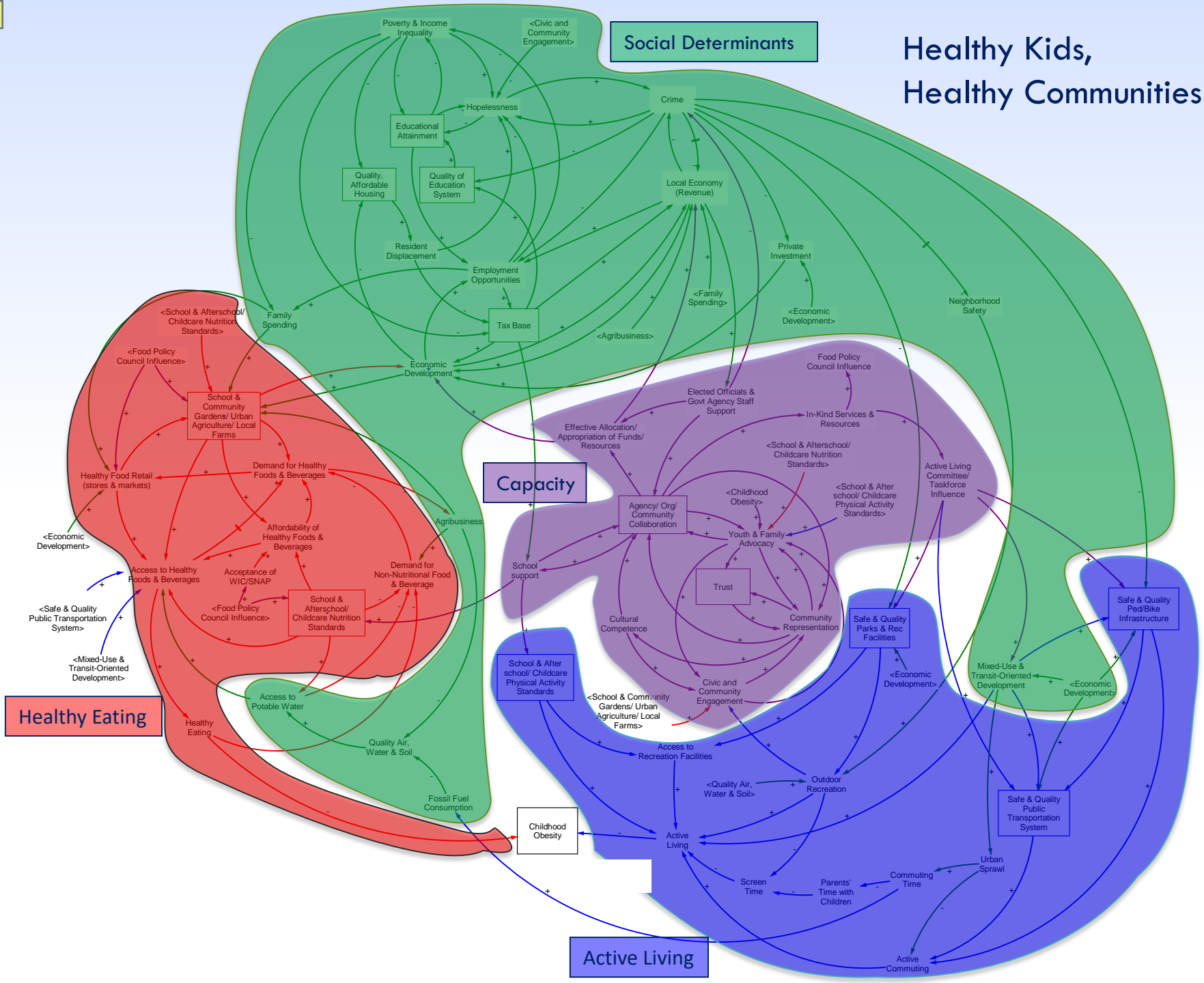
## URBAN SPRAWL



## Level of Violence in Earliest (a crime)



# Healthy Kids, Healthy Communities



De-adoption or  
mis-implementation



# Implementation failures are complicated

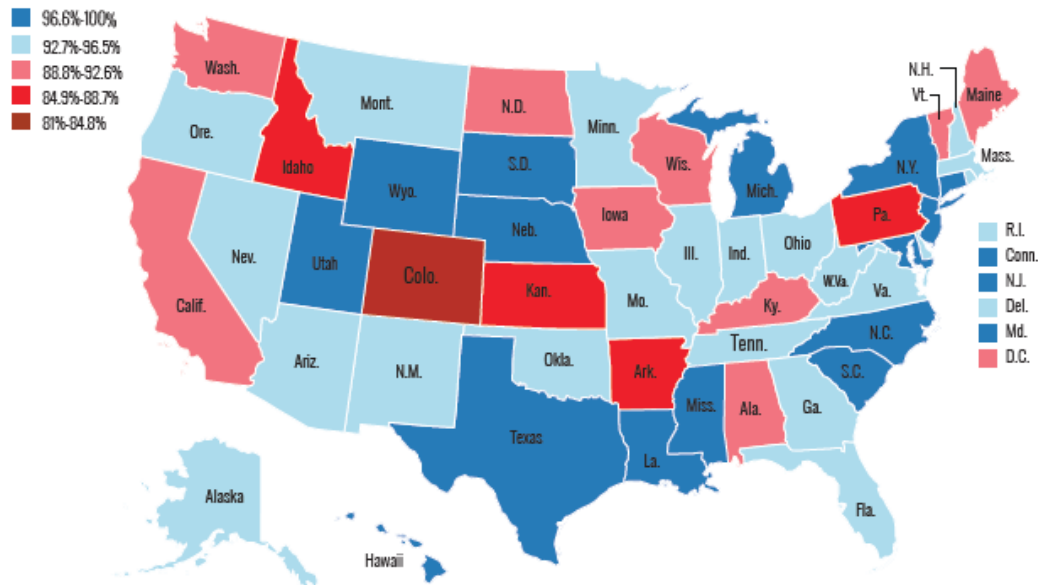
Adult Smoking Prevalence by State



SOURCE: Behavioral Risk Factor Surveillance System, 2010

## Vaccination Rates by State

Percentage of kindergartners vaccinated by state, 2013-2014 school year



# In Health Care

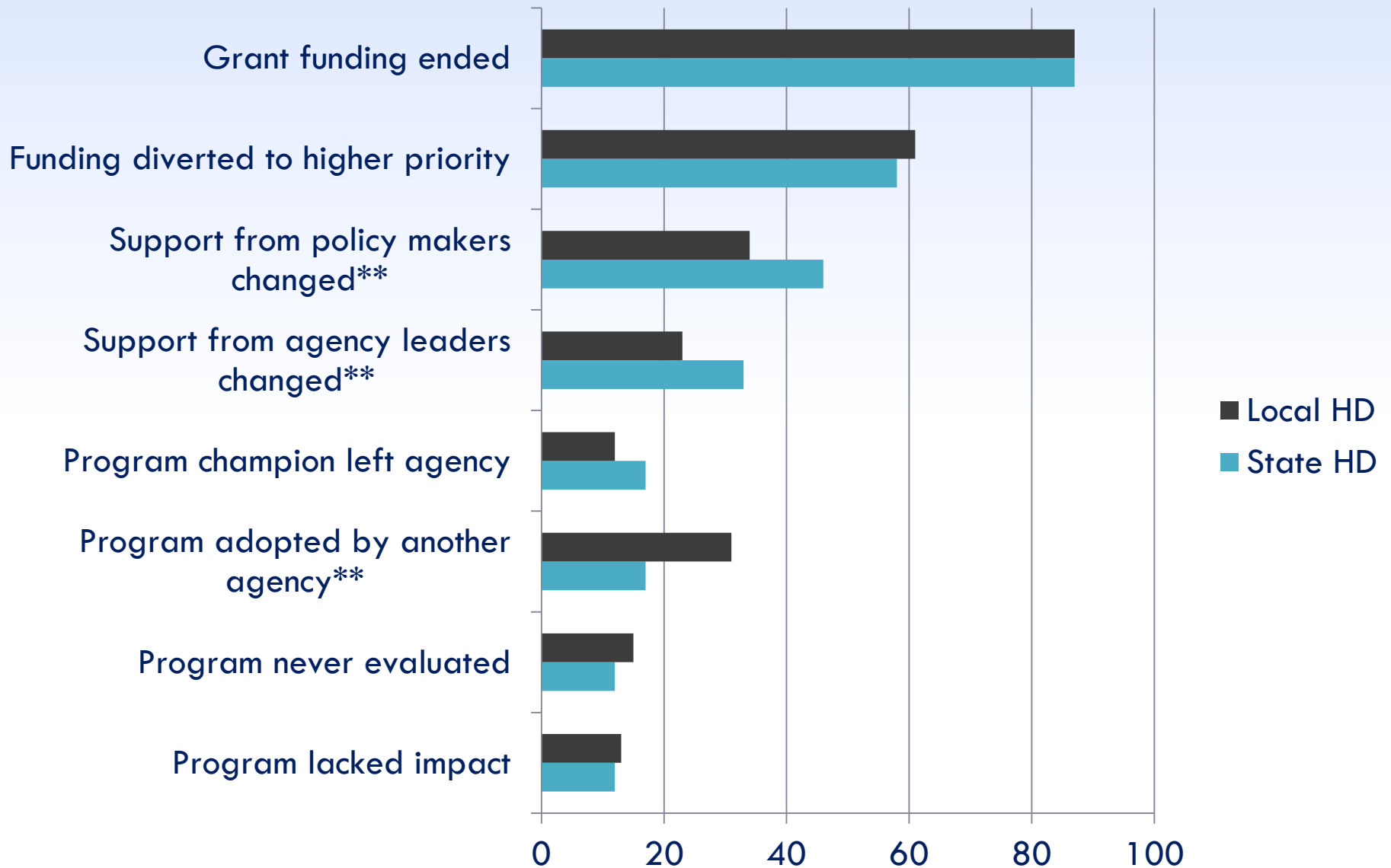
- Underuse is the lack of provision of necessary care (e.g., no aspirin prescribed after myocardial infarction)
- Misuse is the provision of wrong care (e.g., incorrect medication dosing)
- Overuse is the provision of medical services with no benefit or for which harms outweigh benefits (e.g., treating a simple infection with antibiotics)
  - Up to 30% of US health care spending

# Overall findings\*

Variable	Respondents reporting programs ending that should have continued			Respondents reporting programs continuing that should have ended		
	State health department <i>n</i> =277	Local health department <i>n</i> =398	Other agencies combined <i>n</i> =269	State health department <i>n</i> =277	Local health department <i>n</i> =398	Other agencies combined <i>n</i> =269
Overall	36.5 (30.8, 42.3)	42.0 (37.1, 46.8)	38.3 (32.3, 44.3)	24.7 (19.6, 29.9)	29.4 (24.9, 33.9)	25.0 (19.7, 30.3)

\*Percentage and 95% confidence intervals.

# Most common reasons for termination\*



\*Ranked as 1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup> most common reason

\*\*Statistically different at  $p < 0.05$

Too often, effective interventions are not scaled up...  
(e.g, the ExpandNet framework)



# Social networks as intervention targets

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# Following Valente's paper in Science (2012)

- Ways to intervene on networks
  - Identify champions
    - Common; not usually done with great care
    - Counting frequency not ideal– centrality is important
    - Bridgers rather than “leaders”
  - Segmentation– identify groups as targets, not individuals
    - Core-periphery structures may be important

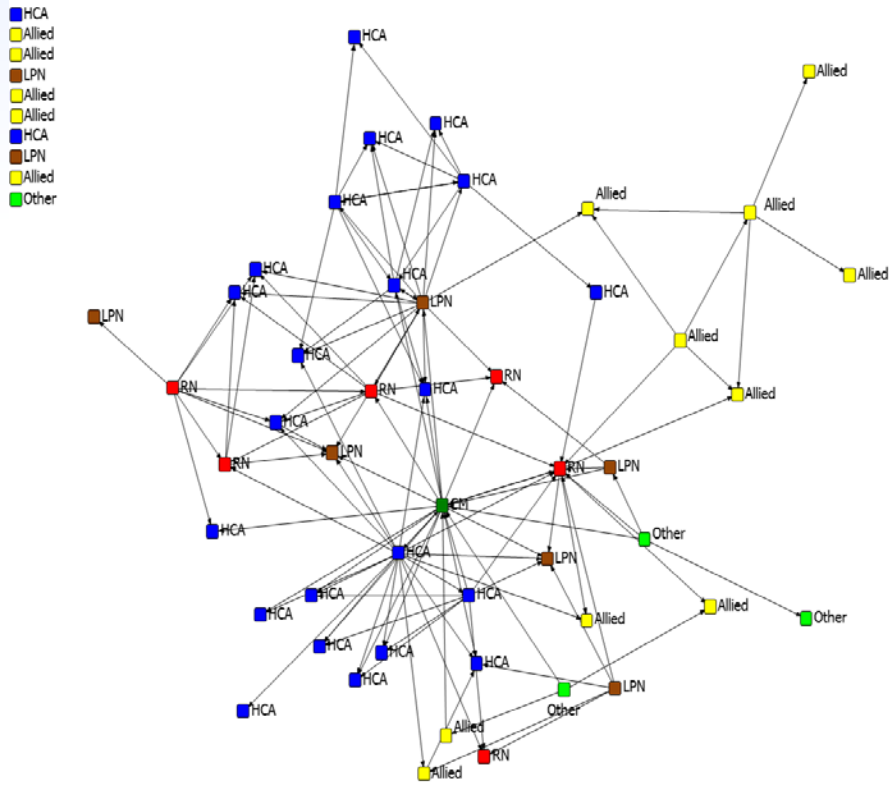
# More approaches using social networks

- Induction (going viral)
  - Knowing the network structure could help induce
  - Measuring network structure important to monitor
- Alteration— change the structure of the network
  - Adding/deleting nodes; adding/deleting links; rewiring

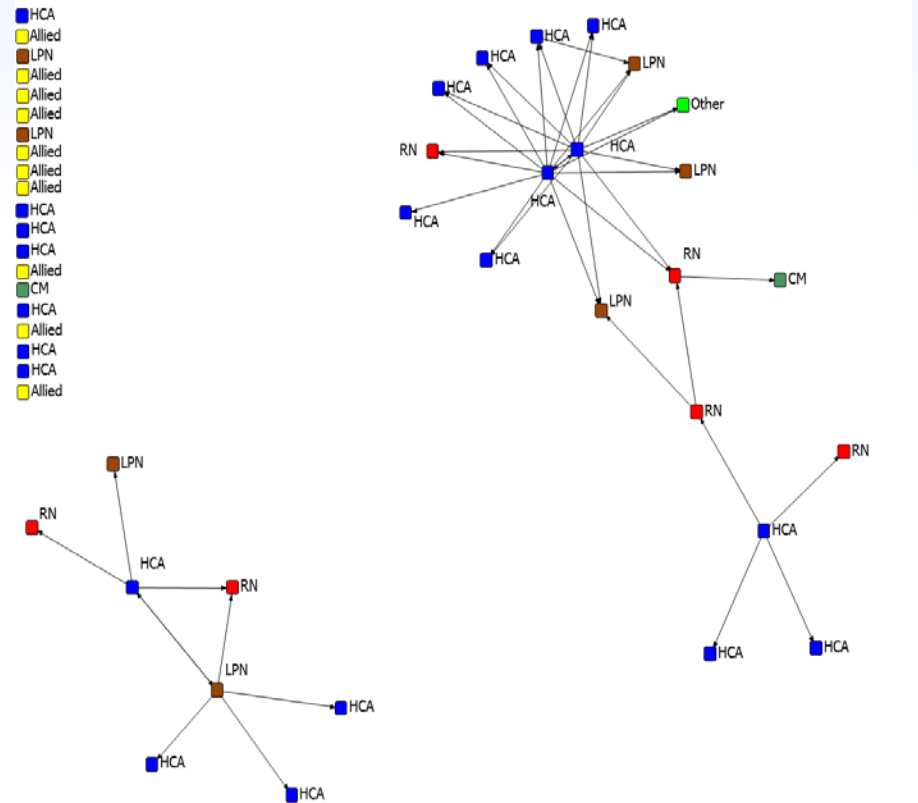


# A tale of two units

## Unit 1



## Unit 2



# Small group exercise

- Divide into 6 groups
  - Groups 1, 3, and 5 take Unit 1
  - Groups 2, 4 and 6 take Unit 2
- Based on your assessment of this unit, select one or more network strategies you would use to promote uptake of an evidence based practice
- 5 minutes in groups
- 5 minute debriefing

# Debriefing

# Questions and discussion

