Public Health Systems: A Social Networks Perspective

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Acknowledgments

- The Robert Wood Johnson Foundation's Public Health Systems Research Initiative

- Local health department directors, key informants, and survey respondents in 8 communities

- State and Regional health department representatives

Presentation Outline

- Public health systems
- Context, Mechanisms, & Outcomes: Sources of variation in public health systems
- Research design & methods
- Results
- Conclusion & Discussion

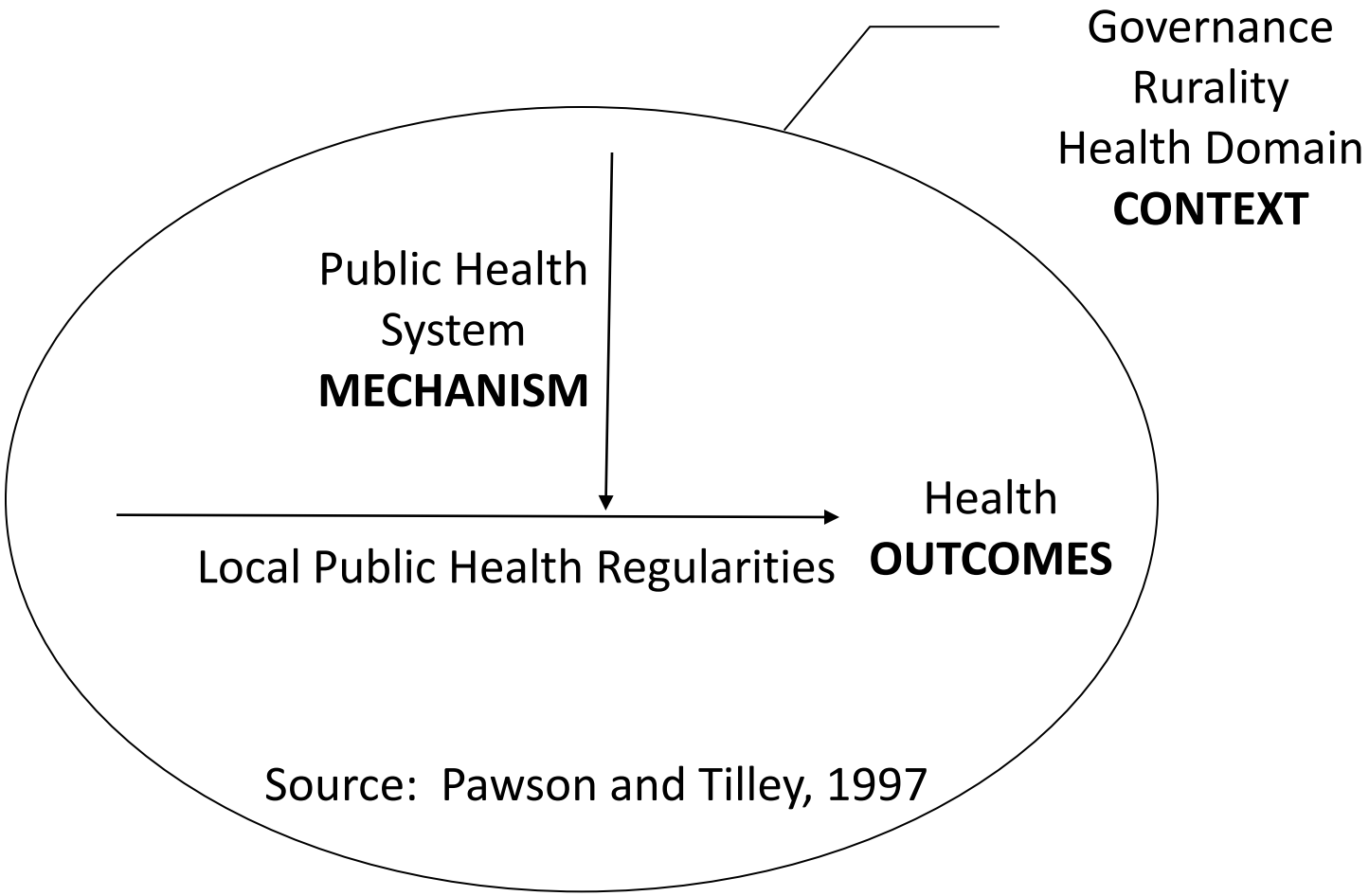
Public Health Systems

- “the full complement of public and private organizations that contribute to the delivery of public health services for a given population, including governmental public health agencies as well as private and voluntary entities”
  - Mays, Halverson, and Scutchfield 2003, 180
- “the human, informational, financial, and organizational resources, including public, private, and voluntary organizations and individuals, that contribute to the public's health”
  - NACCHO, 2003)

Public Health Systems Research

- As public health systems
  - Turning Point Collaboratives
  - Zahner's and Varda's work on characterizing systems
  - National Public Health Performance Standards Program assessment by a representative community group
- Research related to public health systems
  - Networks within local health departments (Merrill)
  - Effects of public health funding (Mays)
  - Generic rather than domain specific
  - De-contextualized – does not take into account state public health governance
  - Inclusion of rural communities rare

Context, Mechanism, Outcomes



Research Questions

- How does state public health governance affect participation (density) in public health systems?
  - Centralized / Decentralized
- How does community size affect participation?
  - Non-core / Micropolitan
- How does health status affect participation?
- How does organizational participation (centrality) differ across domains?
  - How central are LHDs across domains?
  - Adolescent health, senior health, preparedness

Study Design

- Retrospective, interview and survey
- Purposive extreme sampling: 8 rural communities sampled to contrast
  - Centralized & decentralized state public health governance
    - States from a similar region with similar public health expenditures
  - Community size: Non-core and micropolitan
  - Domains: Adolescent health, senior health, preparedness
  - Adolescent health and senior health sampled to contrast health status

Methods: Site Visits, Key Informant Interviews, Survey

- Site visits
  - LHD directors assisted in organizing
  - Structured interview protocols
  - 12 to 14 key informants in each community
  - Interviewees helped identify survey sample
- Survey: within each health domain measured
  - Networks
    - assessment, assurance, advocacy, and co-funding organizational networks in adolescent and senior health
    - assessment or planning, equipment purchase, training, and response to an emergency networks in preparedness
  - use of information for assessment, assurance activities, evaluation of performance
- Response rate 63% (142/225)

Measuring Public Health System Networks

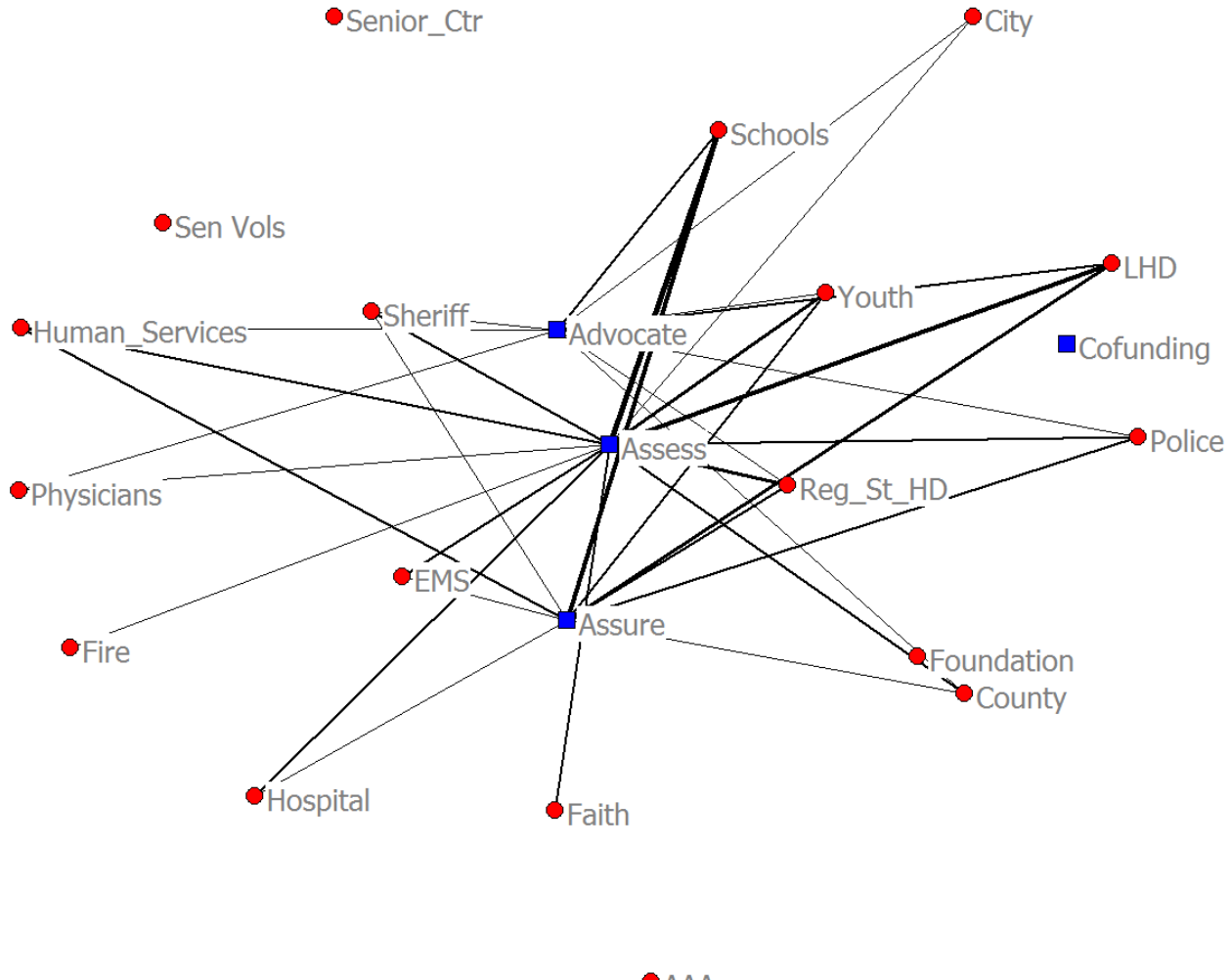
Over the past year, which of the following types of organizations have you or your organization worked with in each activity (check all applicable circles)

Organization	Assessment	Assurance	Advocacy	Funding
…	O	O	O	O
Fire	O	O	O	O
Hospital	O	O	O	O
LHD	O	O	O	O
Police	O	O	O	O
…	O	O	O	O

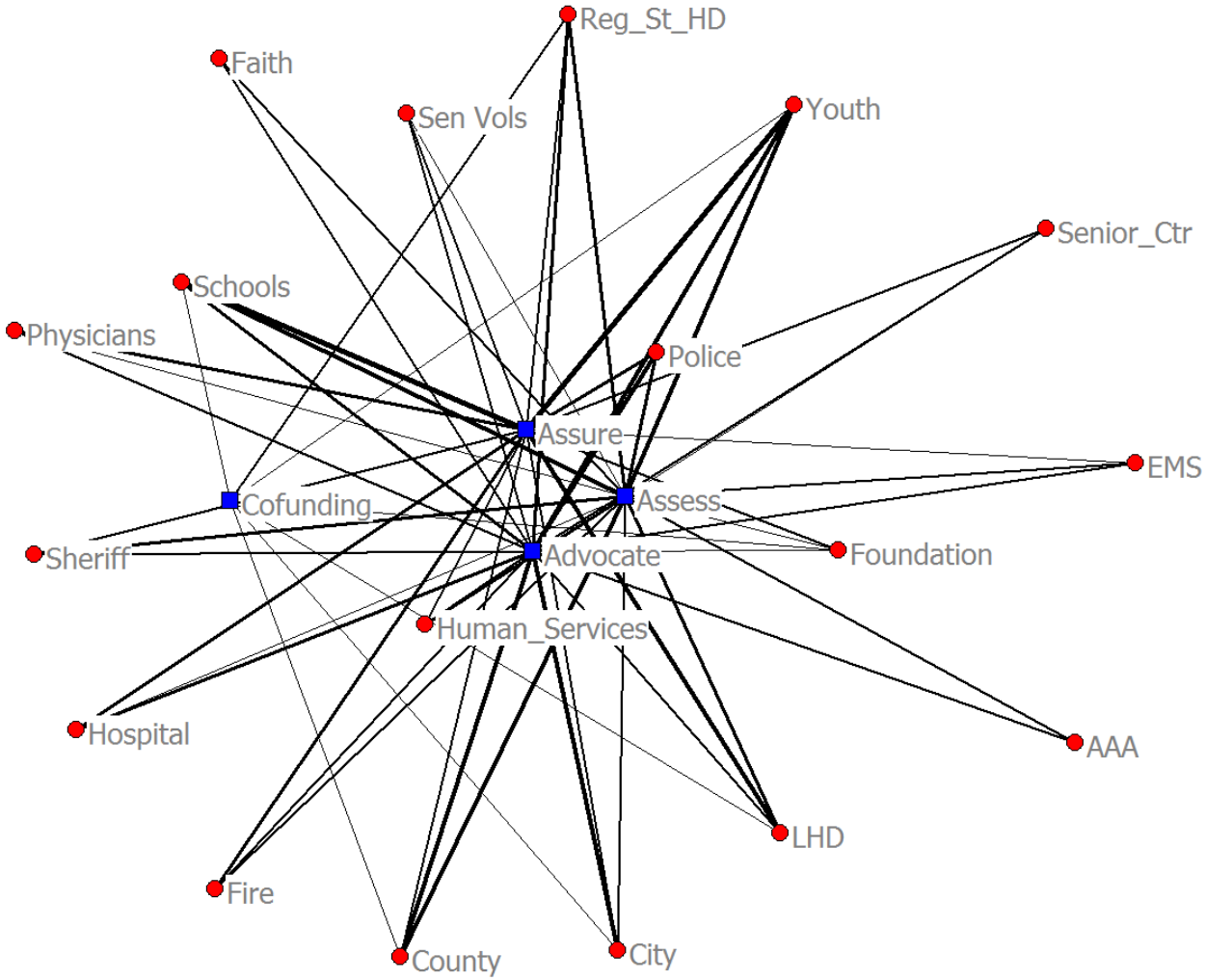
Analysis

- 96 networks: 8 communities * 3 domains per community * 4 networks per domain
- Graphical analysis: UCINET two-mode graphs
- Multivariate analysis using a negative binomial regression to regress the number of times each organization was mentioned on
  - Density: Governance * Community size * Domain
  - Density: Health status in domain
  - Centrality conditional on density: Organization * Domain
  - Community random effect (because of correlated errors)
  - Over-dispersion allowed for

Organizational Participation in Risky Youth Behavior Activities – Non-core



Organizational Participation in Risky Youth Behavior Activities – Micropolitan



Density: Governance * Community Size * Domain

Governance	Community Size	Domain	Predicted Density
Centralized	Non-Core	Adolescent Health	1.36 (1.18,1.57)
		Senior Health	1.55 (1.35,1.77)
		Preparedness	1.89 (1.67,2.16)
	Micropolitan	Adolescent Health	1.25 (1.08,1.44)
		Senior Health	0.72 (0.59,0.87)
		Preparedness	1.44 (1.25,1.65)
Decentralized	Non-Core	Adolescent Health	0.74 (0.61,0.88)
		Senior Health	1.14 (0.99,1.33)
		Preparedness	1.44 (1.25,1.66)
	Micropolitan	Adolescent Health	2.63 (2.36,2.92)
		Senior Health	2.47 (2.21,2.75)
		Preparedness	2.59 (2.31,2.89)
F for Governance*Size*Domain 74.87 ($p < .001$)			

Governance * Size Interaction

- In micropolitan areas, counties in decentralized state had greater interaction
  - Entrepreneurial activity?
- In non-core areas, counties in centralized state had greater interaction
  - Core funding?

Density: Collaboration Area

Collaboration Area	Predicted Density
Assess	2.75 (2.61,2.91)
Assure	2.25 (2.08,2.44)
Advocacy	2.18 (2.01,2.37)
Training	1.63 (1.44,1.84)
Responded	1.46 (1.29,1.66)
Equipment Purchase	0.71 (0.61,0.84)
Co-funding	0.65 (0.57,0.75)
F for Collaboration Area 117.26 ($p < .001$)	

Density: Health Status

Health Status			
Governance	**Community Size**	**Domain**	**Estimate (T-Statistic)**
Centralized	Non-Core	Adolescent Health	-0.21 (-5.86)*
		Senior Health	0.71 (6.16)*
	Micropolitan	Adolescent Health	-0.06 (-2.01)*
		Senior Health	0.47 (3.28)*
Decentralized	Non-Core	Adolescent Health	3.16 (5.06)*
		Senior Health	-0.02 (-0.29)
	Micropolitan	Adolescent Health	-0.11 (-1.65)
		Senior Health	-5.37 (-2.64)*
* p < .05, F for Governance*Size*Domain*Health Status 15.30 (p < .001)			

Organizational Centrality

Adolescent Health		Senior Health		Preparedness	
Non-Core	Micro	Non-Core	Micro	Non-Core	Micro
Schools	Youth Orgs	AA Aging	AA Aging	**LHD**	Fire
LHD	Schools	Sen Ctr	**LHD**	City	Police
Youth Orgs	County	Hospital	Hospital	Fire	EMS
Reg HD	Reg HD	Hum Svs	County	County	Sheriff
Police	**LHD**	**LHD**	Schools	EMS	**LHD**

Conclusion

- The role of the local health department
  - Does the role differ by community size?
  - Surge capacity? Involving peripheral actors.
- Context and collaboration
  - The effect of governance, community size, and, and regionalization
  - The best of both worlds? Core funding for non-core, delegation to encourage enterpreneuship
- Funding Collaboration
  - Regional networks: Micropolitan and non-core

Research Implications

- When are we really studying public health systems?
  - "The *structural capacity* of the public health system is the cumulative resources and relationships necessary to carry out the important processes of public health" (Handler, Issel, and Turnock ,2001)
  - Minimizing omitted variable bias / spurious effects
- Do we need domain specific theories rather than generic theories?
- Collaboration and health status: A complicated relationship

Limitations and Implications

- Limitations
  - Eight communities in two states
  - Higher response rate by people active in LHDs
    - But no difference in type of responders across communities

- Implications
  - Public health systems involve communities – focusing solely on LHDs can result in biased results
  - Problem domains differ and researchers may find it useful to take those differences into account

Thank you to all the people in eight great communities who taught us about their public health systems and made us optimistic for the future of public health in rural communities!