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# Regional Differences in Pediatric Care Networks

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# The problem: the effect of professional networks on the use of clinical guidelines in healthcare

- Several empirical studies have documented that the **diffusion of scientific knowledge into clinical practice is slow** and partial (Bero et al., 1998; Cabana et al., 1999).
- “(Healthcare) professional boundaries and the fragmented nature of medical knowledge results in a **gap between academic research evidence and everyday practice** in healthcare settings” (Nicolini et al. 2008)
- Modern **healthcare professionals** have to resolve an ‘information paradox’; they **are overwhelmed with information** but cannot find particular information when and where they need it (Gray and de Lusignan, 1999)

The problem:  
the effect of professional networks on the use  
of clinical guidelines in healthcare

- Mintzberg (1979) defined health organizations as “professional bureaucracies” (main coordination mechanism: **standardization of knowledge**)
- Later (Mintzberg and Glouberman, 2001: 75) he added that medical practice can not be restricted only to a matter of ***pigeonholing*** – placing the case in a category defined **in a clinical guideline (DE-PROFESSIONALIZATION)**
- When unpredictable problems arise they can be solved in the best way only through the mechanism of **mutual adaptation**, that implies peer collaboration, informal communication, teamworking and integration of different capabilities

# Research Question

The interplay between codified knowledge (clinical guidelines) and tacit knowledge (medical experience) influences the adoption and use of clinical guidelines.

Use of clinical guidelines therefore depends on the professional network influence

**RQ: HOW?**

# First answer: the professional network **increases** the use of clinical guidelines

- **Social contagion**: information and opinions regarding new medical technologies and innovative behaviours spread more rapidly in high cohesion network settings (Coleman et al., 1966).
- **Social “persuasion”**: highly central physicians (“opinion leaders”) promote or not the adoption and use of an innovation (Valente 1995; Valente and Rogers, 1995; Valente and Davis, 1999).

Cohesive groups are likely to be conducive to mechanisms of social influence and contagion, thus influencing the adoption and use of clinical guidelines

## Second answer: the professional network **reduces** the use of clinical guidelines

- Gabbay and LeMay (2004) found that general practitioners rarely access and use explicit evidence from research or other sources directly, but rely instead on what the authors termed **mind lines** (“collectively reinforced, internalized, tacit guidelines”).
- Mascia and Cicchetti (2011) found that groupthink in professional networks hinders EBM adoption

Mindlines are based mainly on physicians' own or **colleagues' experiences** and are developed through interaction

# Institutional Setting

- The Italian NHS is a publicly funded health system that provides universal coverage through a single player. 21 regions (similar to states in the US) allocate resources to approximately 249 Local Health Authorities (LHAs)
- LHAs are administrative bodies responsible for the provision of community health care services to a target population
- The organization of pediatric care in Italy is peculiar:
  - community-based (or family) pediatricians (# 9,000) taking care of children aged 0-14 (~8 million). They are specialized on children but are generalist on pathologies
  - hospital pediatricians treating acute cases
- Community-based pediatricians mostly work in isolation, organizationally and physically

# Data

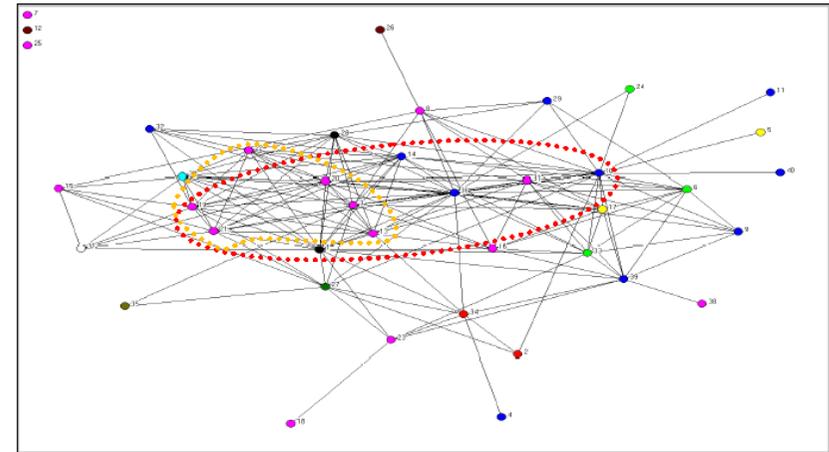
- Survey instrument
  - Online questionnaire: i) attributive data; ii) frequency of EBM adoption; iii) network data
- Network data
  - Inter-physician communication for three pathologies: i) asthmatic; ii) gastrointestinal; iii) urinary
  - Horizontal and Vertical integration
- Three LHAs
  - 2 located in the North Italy
  - 1 located in the Central Italy
- Sample
  - After 6 months, 112 complete and usable questionnaires (89% LHA1, 25% LHA2, 65% LHA3)

# Analysis

- **Social Network analysis**

... “network analysis corrects a tendency in organizational theory to focus on the trees rather than the forest, on the action of individual organizations rather than on the organization of their action”

Gerald Salancick (ASQ, 1995: 345)



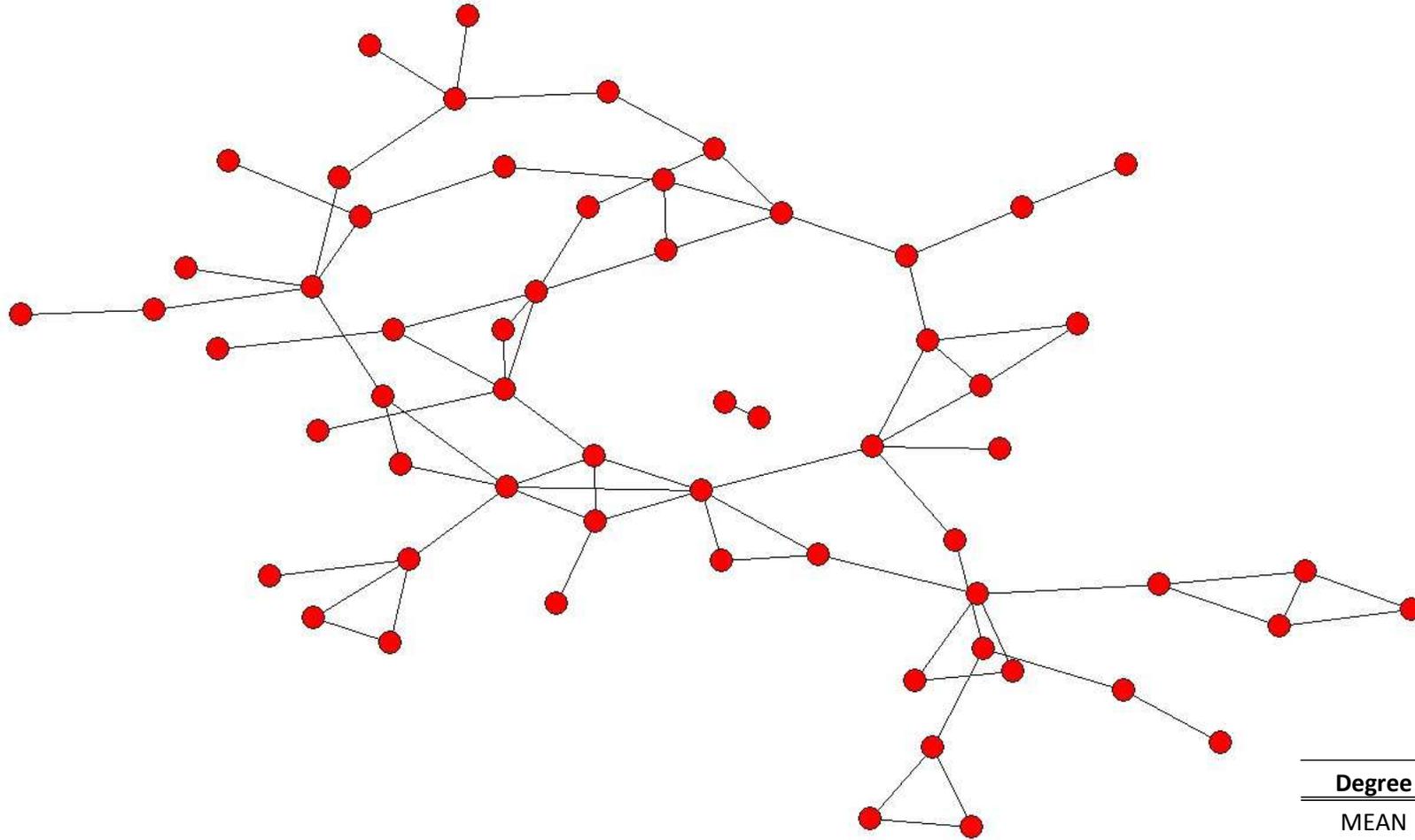
- Behaviors, actions, decisions and a wide stream of other outcomes are the result of both actors' attributes and their relationships
- A social network is given by a set of actors called "nodes", which are tied by one or more specific types of interdependency called “edges” (Wasserman and Faust, 1994)

- **Regressionanalysis**

- **Software**

- 2.089NetDraw + 6.232UCINET
- 10STATA

# Results – network analysis (1/2)

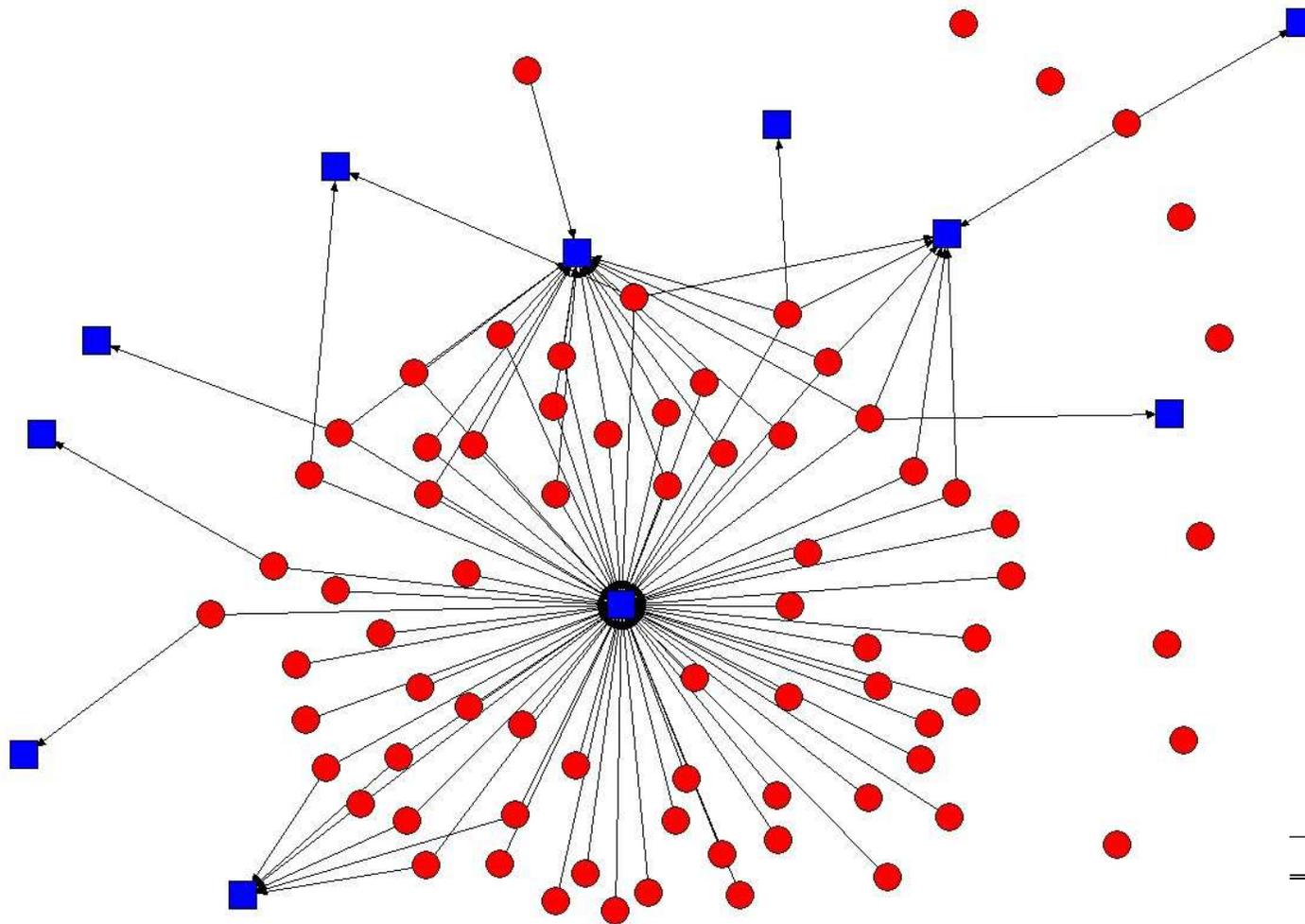


Degree	Value
MEAN	2.053
MAX	6
MIN	0
ST DEV	1.565

LHA 1  
ASTHMA  
horizontal integration  
Pediatricians (# 75)

NetDraw software package (version 2.089)  
Spring embedding layout

# Results – network analysis (2/2)



Degree	Value
MEAN	1.4
MAX	4
MIN	0
ST DEV	0.84

LHA 1  
ASTHMA  
vertical integration  
Blue = Hospitals (# 11), Red = Pediatricians (# 75)

NetDraw software package (version 2.089)  
Spring embedding layout

# Variables and regression technique

- Dependent variable:
    - Self-reported frequency of guidelines adoption (likert scale)
  - Network variables
    - Horizontal integration: professional ties between family pediatriicians (in-degree and out-degree)
    - Vertical integration: professional ties with pediatricians working in hospitals (out-degree)
  - Control variables
    - Tenurship, difficulty in using guidelines, number of journal subscriptions
- ➔ Ordinal logistic regression (Scott-Long & Freese, 2006)

# Results – regression analysis

	LHA1			LHA2			LHA3		
	Asthma	Gastroint estinal diseases	Urinary Tract Infections	Asthma	Gastroint estinal diseases	Urinary Tract Infections	Asthma	Gastroint estinal diseases	Urinary Tract Infections
<b>Model 1 (no relational variables)</b>									
Prob > Chi squared	0.344	0.819	0.619	0.127	0.127	<b>0.013</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
Pseudo R squared	0.074	0.016	0.027	<b>0.150</b>	<b>0.150</b>	<b>0.213</b>	0.023	0.014	0.014
Tenure (10-19 years)	-0.806	-0.762	-1.132	<b>1,657*</b>	<b>1,657*</b>	1.446	-0.184	-0.865	-0.983
Tenure (>20)	0.015	-0.758	-0.836	-0.467	-0.467	-1.022	0.433	-0.044	-0.283
Difficulties in using clinical guidelines	1.473	0.565	0.967	-0.261	-0.261	0.496	<b>-0,794**</b>	-0.013	-0.053
Number of scientific journal subscriptions	0.154	-0.101	-0.038	-0.265	-0.265	-0.538	-0.017	-0.151	-0.215
<b>Modello 2 (with relational variables)</b>									
Prob > Chi squared	<b>0.039</b>	<b>0.018</b>	<b>0.034</b>	<b>0.034</b>	0.060	0.233	<b>0.000</b>	<b>0.000</b>	<b>0.052</b>
Pseudo R squared	<b>0.344</b>	<b>0.250</b>	<b>0.220</b>	<b>0.425</b>	<b>0.726</b>	<b>0.264</b>	0.039	0.057	0.044
Tenure (10-19 years)	-0.037	-0.345	-0.654	-1.175	<b>-4,121**</b>	0.068	-0.250	-1.055	-1.271
Tenure (>20)	0.269	-2.019	-0.751	<b>-3,511**</b>	<b>-8,449**</b>	-1.616	0.622	0.044	-0.254
Difficulties in using clinical guidelines	1.610	1.831	0.536	-0.851	<b>4,238*</b>	0.508	<b>-0,880*</b>	-0.087	-0.397
<del>Number of scientific journal subscriptions</del>	<del>0.061</del>	<del>-0.542</del>	<del>-0.287</del>	<del>-0.695</del>	<del>-2,948*</del>	<del>-0.744</del>	<del>-0.056</del>	<del>-0.191</del>	<del>-0.125</del>
indegree paediatrician-paediatrician	0.261	<b>0,344*</b>	<b>0,268**</b>	<b>0,555**</b>	<b>2,240***</b>	0.214	<b>-0,161*</b>	-0.136	-0.266
outdegree paediatrician-paediatrician	0.092	0.003	0.035	<b>0,377*</b>	<b>0,904*</b>	0.041	0.022	-0.009	0.057
outdegree paediatrician-hospitals	0.125	-0.389	0.089	0.030	<b>0,404*</b>	0.033	0.500	<b>0,648***</b>	0.707

- Horizontal integration is positively associated with guidelines adoption (In-degree and Out-degree pediatrician-pediatrician ties)
- Vertical integration is positively associated with guidelines adoption (Out-degree pediatrician-hospital ties)

# Take away

- Our findings have implications:
  - for LHA administrators: invest more and support team working in order to increase the adoption of guidelines within organizations
  - for Physicians: higher propensity to collaborate likely fosters the utilization of guidelines into routine practice
  - for Patients (and their families): selection of the family pediatrician

# Limitations and future research

- Cross-sectional study (no possibility to determine causality, e.g. “centrality → use of guidelines” or vice versa?)
- Professional networks are fluid and multiplex
- Frequency of adoption is self-reported
- Non-independence of observations
- Endogenous network mechanisms (“motifs”) are not taken into account
- Low rate of respondents (25% for LHA2)
- Generalizability