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# Primary Care Integration: the Case of Advice Networks among Pediatricians

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# The problem: integrating knowledge in healthcare

- 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)
- “(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)

# Mindlines vs. Guidelines

- Gabbay and Le May (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”).

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

# Integrating knowledge in primary care

- In Italy there are about 9,000 community-based (or family) paediatricians taking care of about 8 million children aged 0-14
- They are specialized on children but are generalist on pathologies
- Community-based paediatricians mostly work in isolation, organizationally and physically

## Paediatric associations

- In 2000, the National Collective Agreement (DPR 272, art. 52) established that community paediatricians are free to join **paediatric “associations”** in order to:
  - Take care of patient of other group members in case of their absence
  - Have a representative for the coordination with the Local Health Authority
  - **Share clinical guidelines** on prevalent pathologies
  - **Periodically meet**
  - Share an office
  - Adopt a common information system

# Research questions

- RQ 1: Are members of paediatric associations exchanging more knowledge (among them or with other hospital paediatricians) than non-members?
- RQ 2: Other than formal membership to an association, what are other mechanisms to explain knowledge exchange among paediatricians?
- RQ 3: Is there a correlation between the knowledge network and the clinical guideline use?

# Theoretical Background on Knowledge Exchange

(based mostly on Monge & Contractor, 2003)

Many theoretical mechanisms explaining knowledge exchange:

- **Homophily:** birds of a feather flock together
- **Social Embeddedness:** trust relationships matter
- **Proximity:** physical proximity still matters, even online
- **Transactive Memory Systems:** who's the expert?
- **Social contagion:** I'll get what she is getting!
- **Reciprocity:** do ut des, qui pro quo, tit for tat
- ...

# Methodology

- Online survey targeted to family paediatricians in 2 Regions: **Veneto** and **Emilia Romagna**
- Focus on 3 pathologies: **asthma**, **gastrointestinal pathologies**, **urinary tract infections**
- Relationships: questions on **advice** exchange with **fellow paediatricians** and **hospital paediatricians**
- Attributes: questions on demographics, information sources
- Case 1: 23 respondents out of 25 (92%)
- Case 2: 75 respondents out of 116 (65%)



# Case 1: Public Health Agency in the Veneto Region

## **The area:**

- About 200,000 inhabitants;
- Rural territory and mountains
- Industrialized (SMEs), rich, and internationalized (immigrants)
- 3 rural hospitals

## **The respondents:**

- 23 respondents out of 25
- Distributed across 2 health districts (North and South)
- 19 out of 23 belongs to 6 pediatric associations
- about 20,000 children served

# Case 2: Public Health Agency in the Emilia Romagna Region

## **The area:**

- About 850,000 inhabitants;
- Urbanized and industrialized territory
- 9 city hospitals
- 1 university hospital
- 1 research hospital
- 1 Unit devoted to integrating hospitals with community physicians

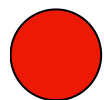
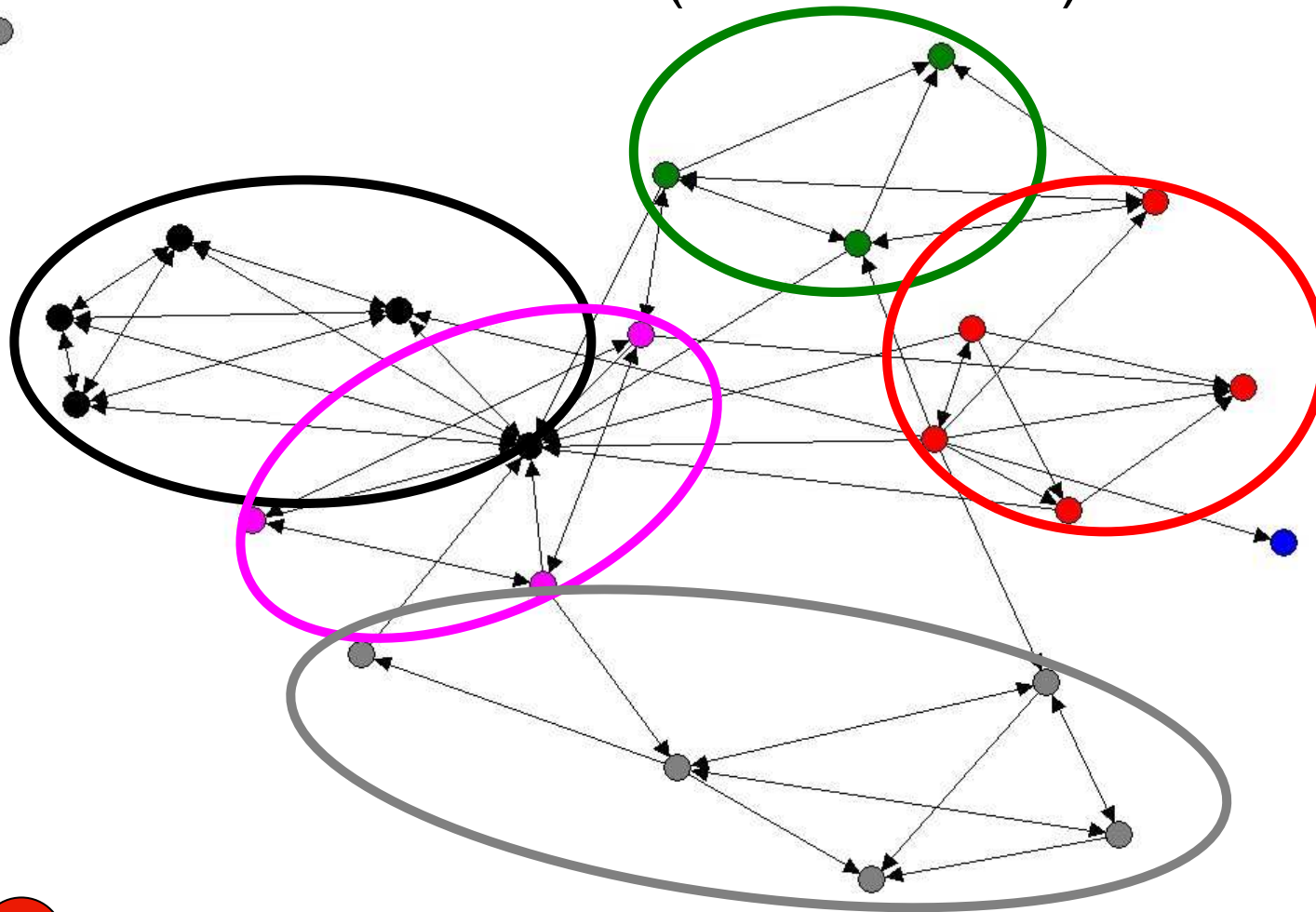
## **The respondents:**

- 75 respondents out of 116
- Distributed across 6 health districts
- 63 out of 75 belong to 20 paediatric associations
- about 60,000 children served

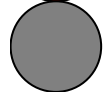
# Problems with information / knowledge sources (%)

	Contextuali- zing info	Lack of Time	Selecting info	Accessing info	Computer literacy
Clinical Guidelines / EBM	67	10	5	5	0
Scientific publications	48	29	24	10	10
Voluntary training (seminars/workshops)	48	24	5	0	0
Specialized web sites	43	14	24	0	14
LHA, Public Health documents	43	5	10	5	0
Mandatory training	38	0	0	10	0
Handbooks	33	29	14	0	0
Specialists of the pathology	33	10	5	24	0
LHA intranet / association's IS	29	14	0	10	10
Fellow pediatricians	29	19	0	0	0
Othe physicians	24	5	0	10	0
<b>Mean</b>	39	14	8	6	3

# CASE 1 Asthma: Paediatrician advice network **by association** (directed ties)

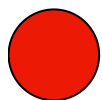
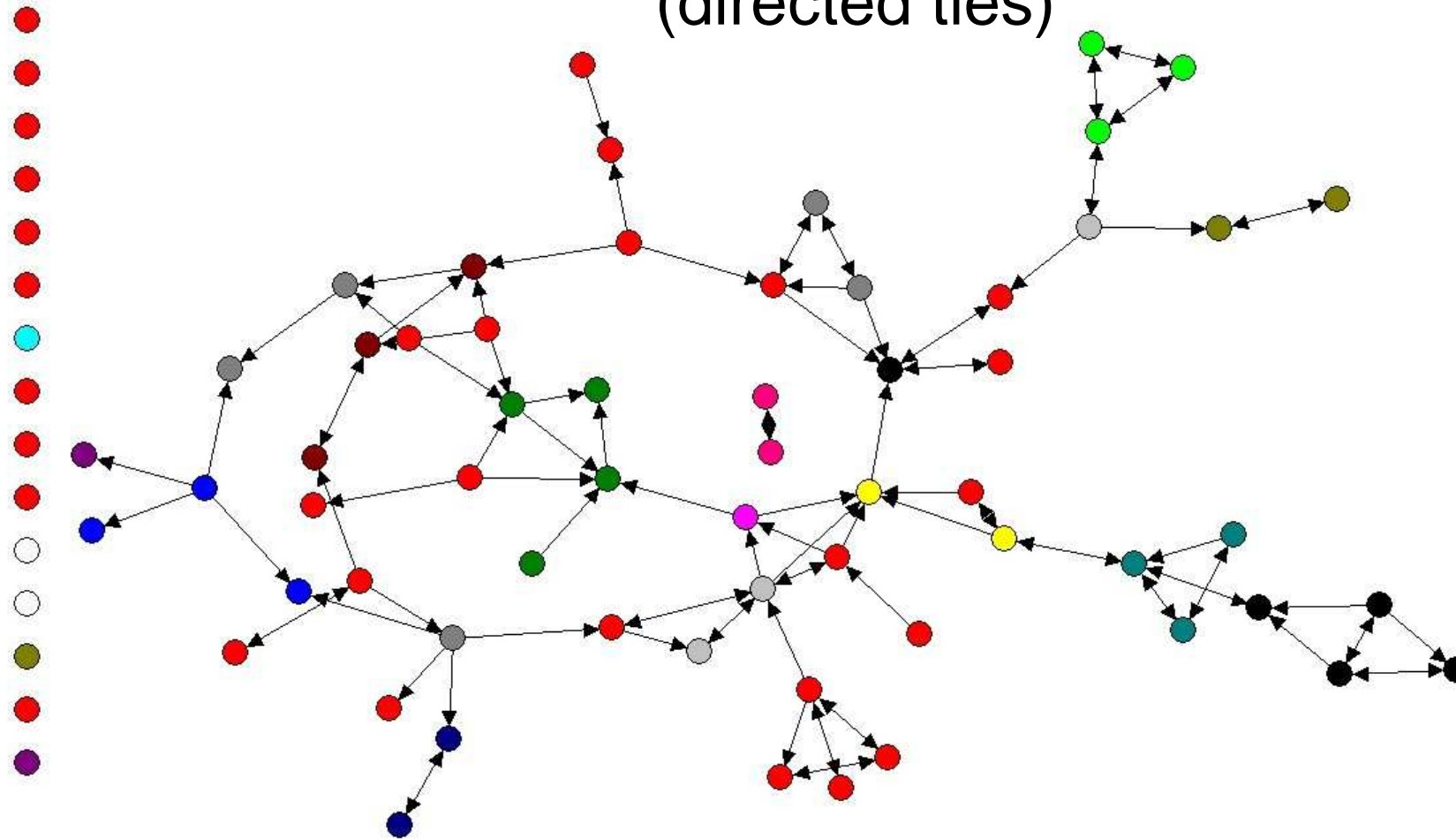


= not formally grouped in associations

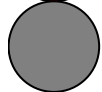


ALL OTHER COLOURS = each colour an Association

# CASE 2 Asthma: Paediatrician advice network **by association** (directed ties)

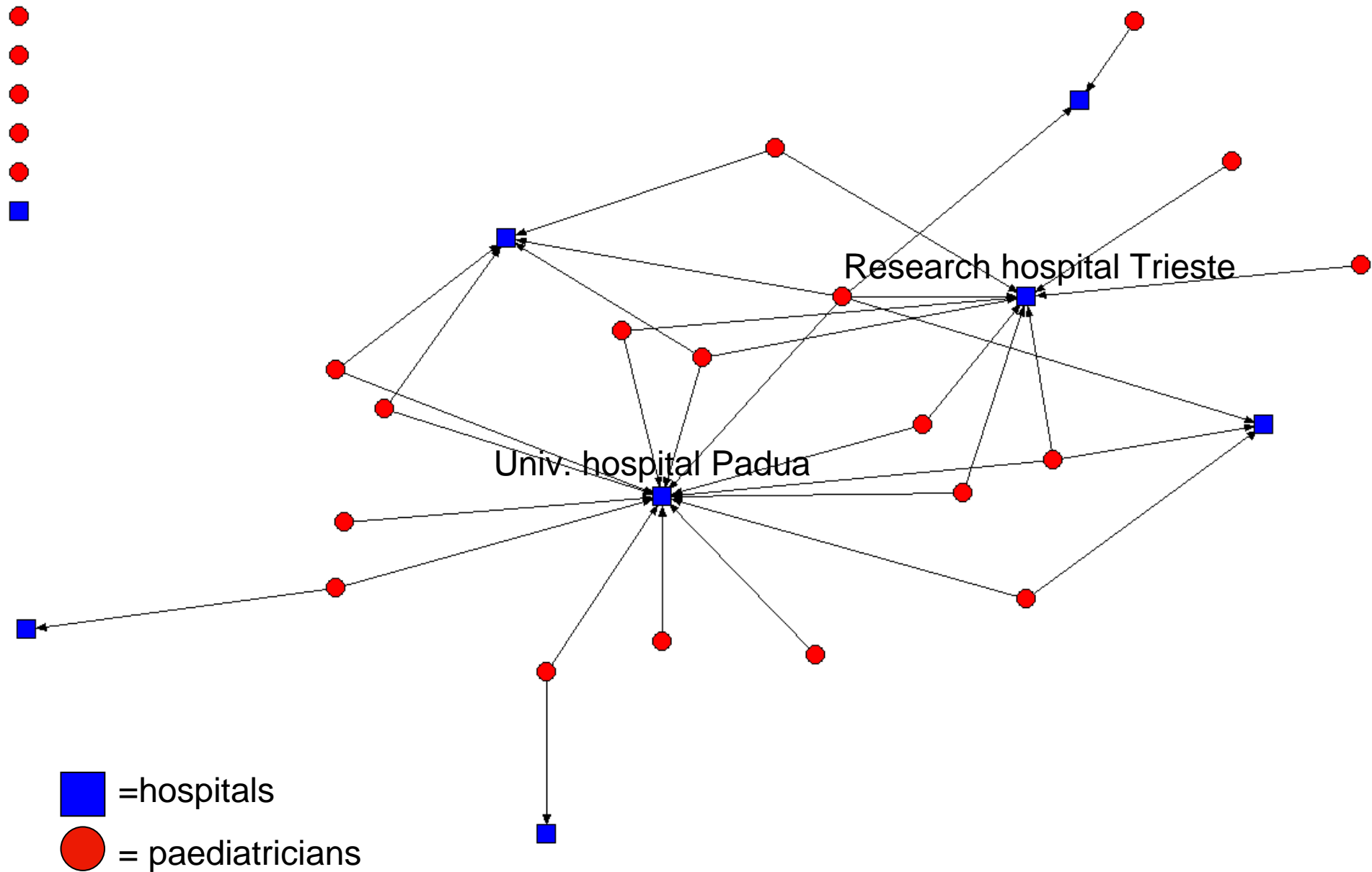


= not formally grouped in associations

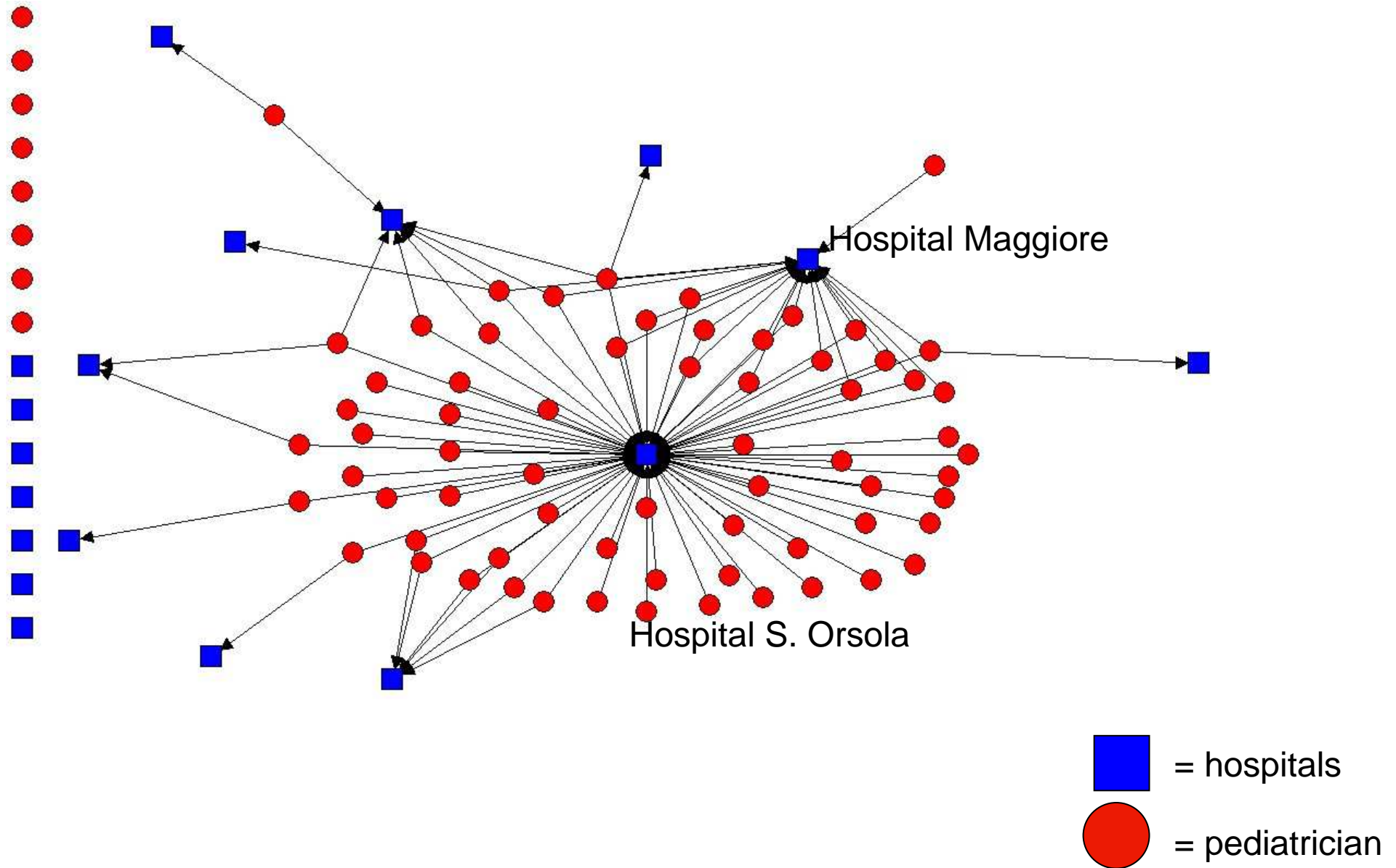


ALL OTHER COLOURS = each colour an association

# CASE 1: Paediatrician-hospital advice relations asthma



# CASE 2: Paediatrician-hospital advice relations asthma



# Social Embeddedness

	Veneto	Emilia Romagna
Asthma – gastro	0.837***	0.811***
Asthma – urinary t.	0.820***	0.805***
Gastro- urinary t.	0.927***	0.867***

Pediatricians **rely on the same pediatricians** for advice on the 3 pathologies

	Veneto	Emilia Romagna
Asthma – gastro	0.609***	0.617***
Asthma – urinary t.	0.570***	0.733***
Gastro- urinary t.	0.492***	0.724***

Pediatricians **rely on the same hospitals** for advice on the 3 pathologies

\*=p>0.05; \*\*=p>0.01; \*\*\*= p>0.001



# Homophily

	Veneto	Emilia Romagna
Asthma advices – same tenure class	0.085	0.041**
Gastrointestinal advices – same tenure class	0.057	0.038**
Urinary tract infections – same tenure class	0.057	0.031*

	Veneto
Asthma advices – same gender	0.078
Gastrointestinal advices – same gender	0.148*
Urinary tract infections – same gender	0.174*

Pediatricians do not rely much on other pediatricians who are similar in gender or in tenure

\*=p>0.05; \*\*=p>0.01; \*\*\*= p>0.001

# Proximity

Veneto

Asthma advices – distance less than 5 km	0.426***
Gastrointestinal advices – same health district	0.483***
Urinary tract infections – same health district	0.504***

Pediatricians **rely on pediatricians who are less than 5 kms away** for advice

In case 1, pediatricians **do not rely on proximate hospitals** for advice

\*=p>0.05; \*\*=p>0.01; \*\*\*= p>0.001

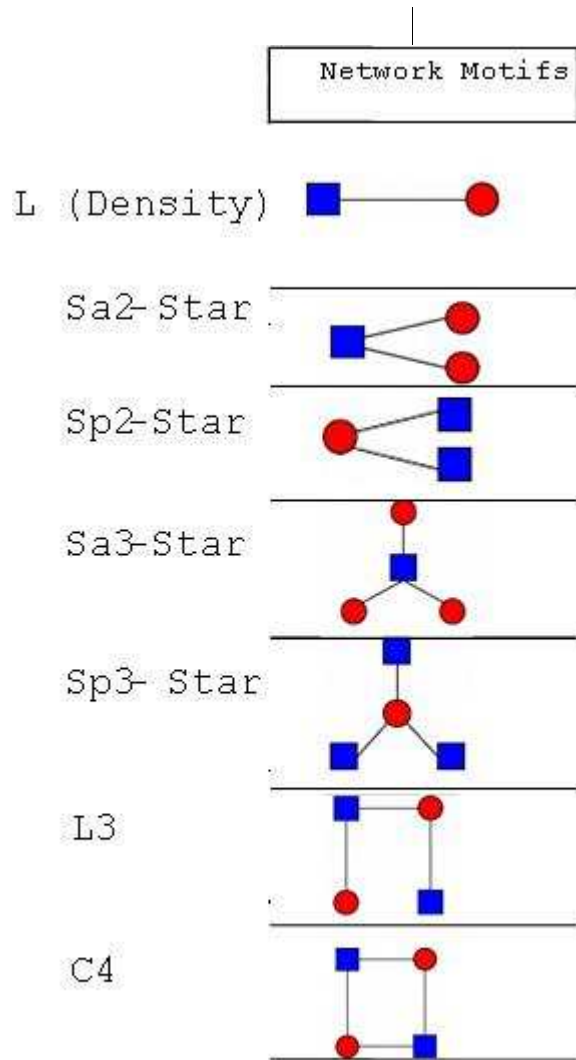
# MR QAP model in Ucinet paediatrician-paediatrician advice exchanges

	Asthma		Gastro		Urinary tract	
	Veneto	Em. R.	Veneto	Em R.	Veneto	Em. R.
Past collaboration	<b>0.168***</b>	0.052**	<b>0.138*</b>	0.054**	<b>0.151*</b>	<b>0.236**</b>
Same association	<b>0.558***</b>	-0.024**	<b>0.581***</b>	-.030***	<b>0.570***</b>	-.034***
Same district	0.038	<b>0.171***</b>	0.018	<b>0.144***</b>	0.029	<b>0.141***</b>
Same gender	0.056		<b>0.123*</b>		<b>0.150*</b>	
Same tenure	0.077	-0.034*	0.047*	0.032*	0.045	-0.005
Proximity	<b>0.246***</b>		<b>0.305**</b>		<b>0.325***</b>	
Adj. R squared	<b>0.522***</b>	0.032***	<b>0.595***</b>	0.004**	<b>0.620***</b>	0.027***

The low R squared for Emilia Romagna probably depends on the low response rate (65%) and on the lack of info on proximity (we could not gather that for technical problems) .

# ERGM with BPnet

## Paediatrician-hospital advice exchange



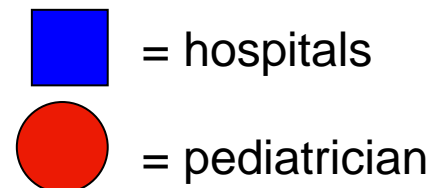
### Attributes

#### Hospital attributes:

- average length of stay
- location within or outside the public health agency

#### Pediatrician attributes:

- tenure
- number of patient for pathology
- frequency of continuing education
- frequency of use of scientific publications for knowledge update
- difficulties in relating to other physicians
- University hospital where degree was obtained

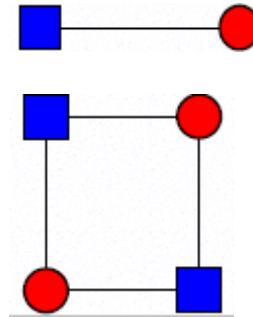


# ERGM: results for asthma

(only significant and convergent results)

## Veneto

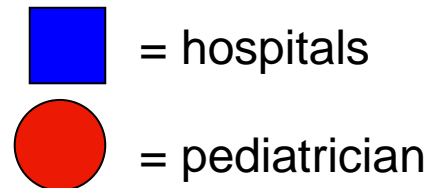
	Estimates	stderr	t-ratio
L	-4.522427	1.973	0.031*
C4	0.430848	0.205	0.014*



Likely: 2  
paediatricians asking  
for advice to 2 same  
hospitals

## Emilia Romagna


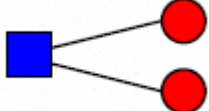
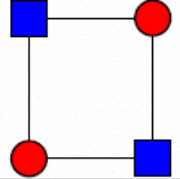
No results



# ERGM on pediatrician-hospital advices: : results for gastrointestinal path.


(only significant and convergent results)

## VENETO

effects	estimates	stderr	t-ratio	
L	-2.870166	1.121	-0.102*	
Sa2-Star	1.130174	0.556	-0.118*	
C4	0.404803	0.191	0.102*	

Unlikely: 2  
paediatricians asking  
for advice to the same  
hospital

Likely: 2  
paediatricians asking  
for advice to 2 same  
hospitals

 = hospitals

 = pediatrician

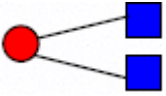
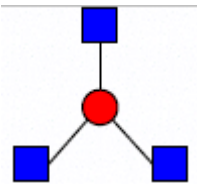
# ERGM on pediatrician-hospital advices: results for urinary tract infections (only significant and convergent results)

Veneto:

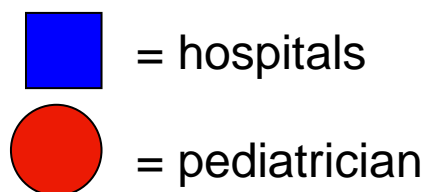
	estimates	stderr	t-ratio	
- Degree obtained at U Padua:	1.375040	0.697	0.004	*

Likely: paediatricians from U Padua asking for advice to hospitals

## Emilia Romagna:

Sp2-Star		1.622201	0.571	-0.169	*
Sp3-Star		-2.678043	0.878	0.042	*

Likely: paediatricians connecting with 2 hospitals. Unlikely: with 3 hospitals



## Results: RQ1 & 2

- ✓ Homophily: Similarities based on years of tenure and gender are not significantly or highly related to advice exchange among family paediatricians. However, **same district** and **same association** have positive correlation with advice exchange. Homophily partially confirmed.
- ✓ Social Embeddedness: advice relations for asthma, gastro, urinary infections are highly correlated; advice relations correlated with **past co-membership** in guideline development teams. Confirmed.
- ✓ Proximity is confirmed in Veneto for pediatrician-pediatrician relationships only



# Findings: Pediatrician-hospital relations

- **In case 1, local hospitals are not** being used much for advices on pediatric pathologies. **Proximity not a real issue** here (most pediatricians seek advice from hospitals far from home)
- **In both cases, high centralization towards 2 hubs** in all pathologies. According to the ERGM, if there is a link to one hospital, chances are that another link is created. However, finding more than 2 links from each paediatrician to hospitals is significantly unlikely.

## Results: RQ3

- To be developed...

Use of guidelines about a pathology is positively related with degree centrality in the knowledge exchange network on that pathology (asthma: 0.227\*\* ; gastro: 0.188\*\* ; urinary tract: 0.327\*\*\*):  
**no substitution between guidelines and colleagues; rather, reinforcement.**

## Management implications

- In Case 1, association membership results correlated with advice exchange. Advice exchanges are positively related to guideline adoption in each pathology. Local health managers may **incentive non-members to join** an association
- Access to a colleague (in the community or in the hospitals) is exploited for advice on all pathologies (regardless of expertise). Local managers may better **promote expert recognition and access** on each topic
- Local hospital pediatric dpts are not chosen for advice, Padua is. Formalizing a **partnership?**

Thanks!