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Integrating Knowledge in Paediatric Care

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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

The point of view of organization theory...

- 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: 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 .

The context of the research

- 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 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 knowledge (among them or with other physicians) more than non-members?
- RQ 2: Other than formal membership to an association, what other explanations of knowledge exchange may occur?
- RQ 3: is there a correlation between the knowledge network and the clinical guideline adoption?

Theoretical background on Knowledge Exchange

(based 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
- ...

Methodology

- Online survey targeted to family paediatricians in 4 Regions
- 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 out of 26 completed surveys (88%)
- Case 2: 75 out of 116 (65%)

Case study: Paediatricians in a Local Health Agency of the Veneto Region

The territory

- About 200,000 resident people;
- Most live in flat lands, a few part on mountains and hills (less accessible)
- Industrialized (SMEs), rich, and internationalized (immigrants)

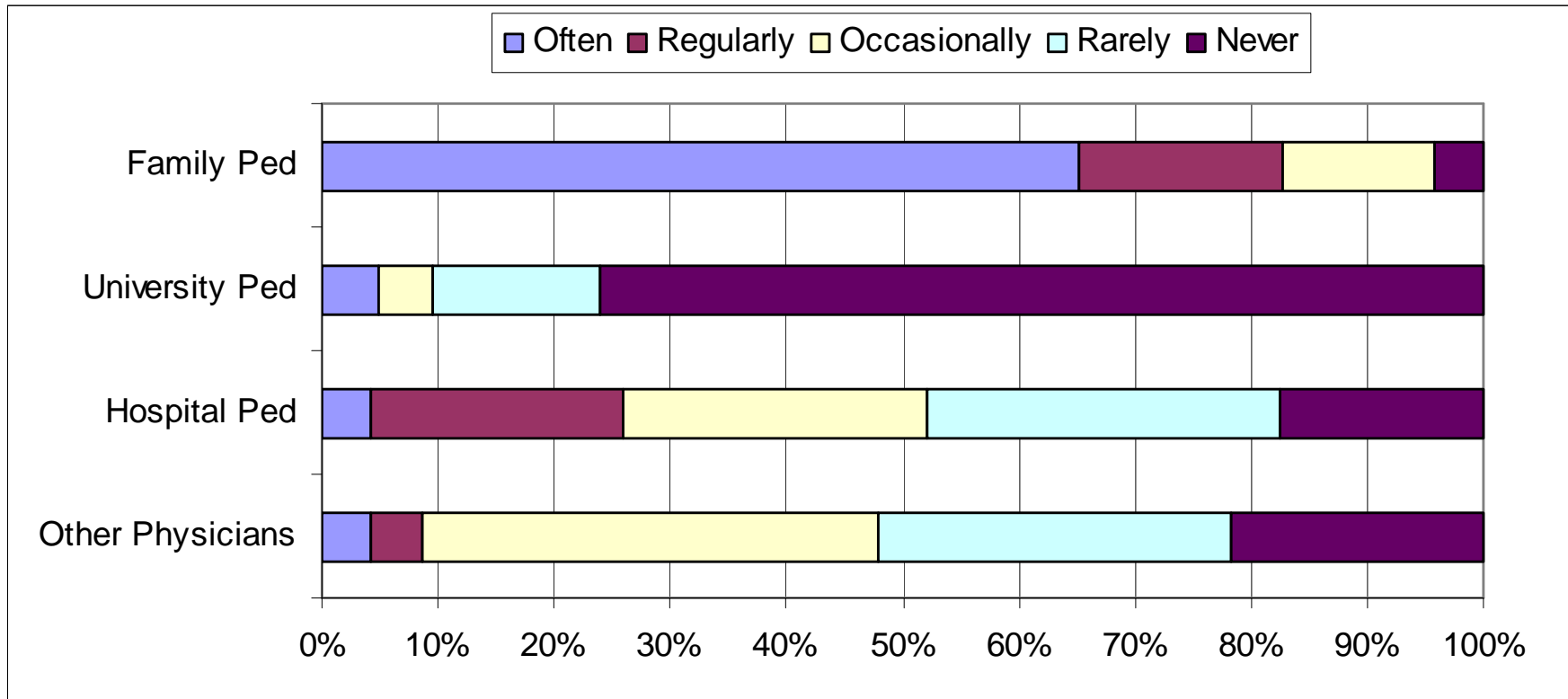
The study:

- 23 respondents out of 25 (plus 1: former paediatrician)
- Distributed across 2 health districts (North and South)
- 19 out of 23 belongs to 6 paediatric associations
- about 20,000 children served

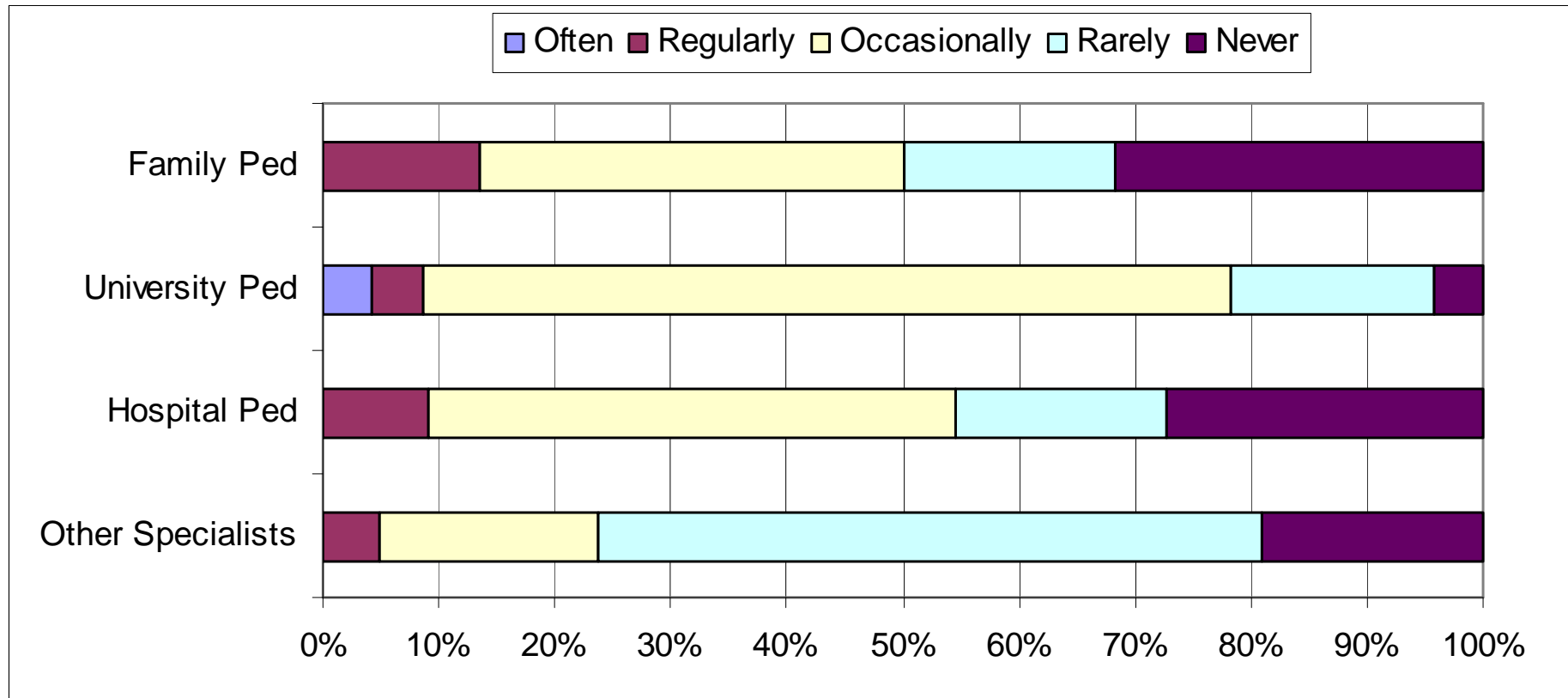
Problems with information / knowledge sources (%)

	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
Mean	39	14	8	6	3

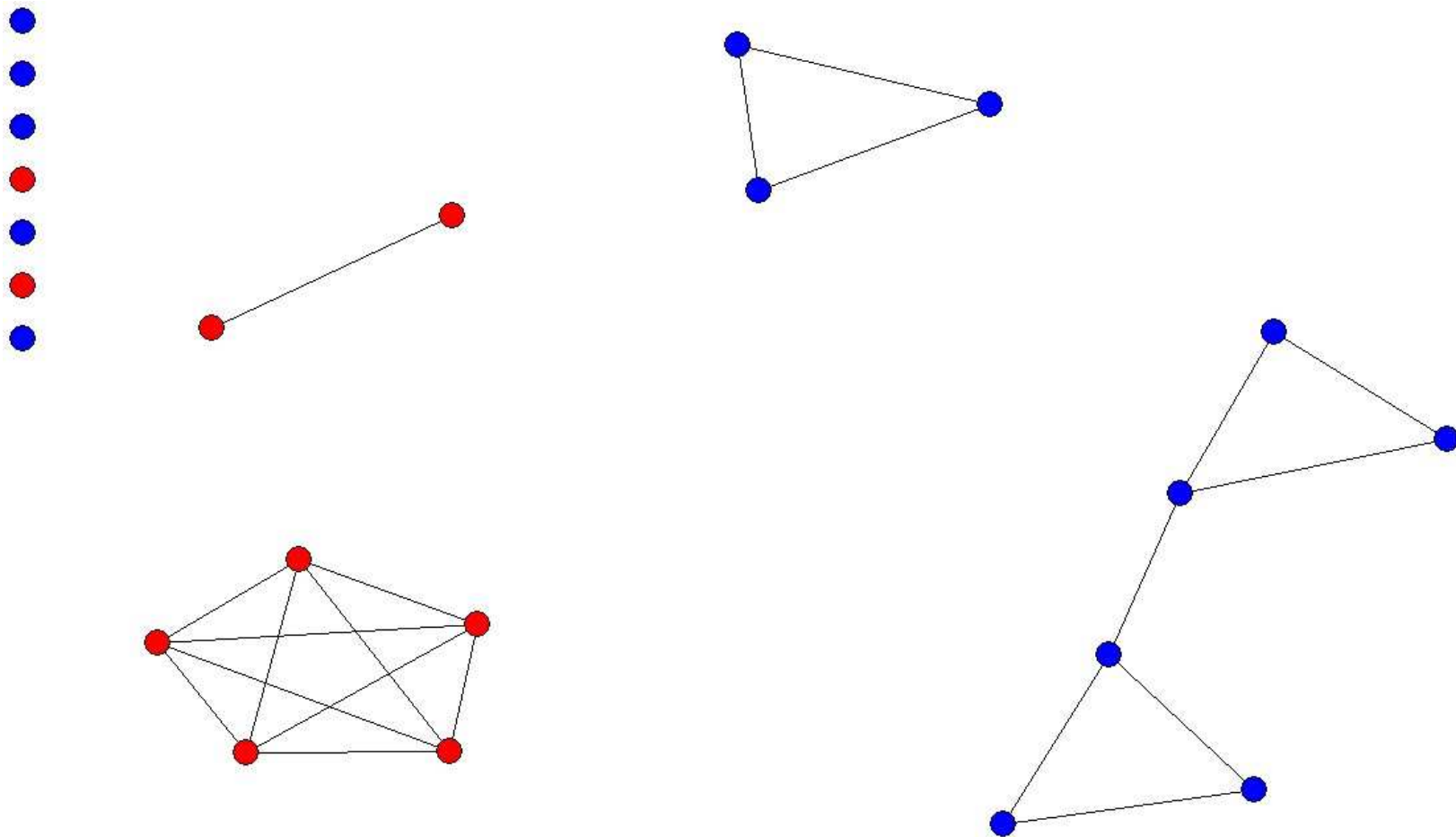
Advice exchange with colleagues in the Local Health Agency



Advice exchange with colleagues outside the Local Health Agency



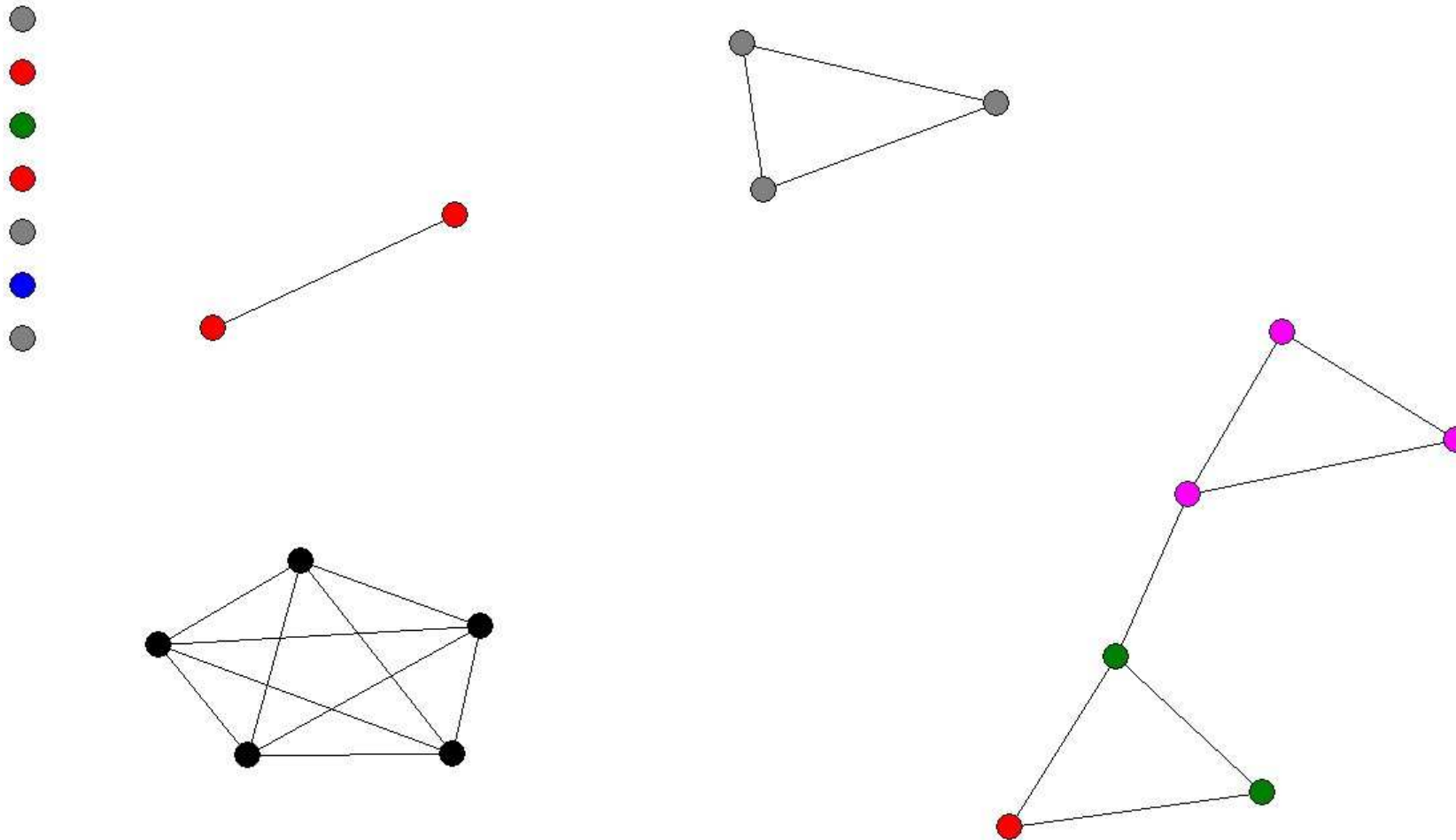
Asthma: Paediatrician advice network **by District** (only confirmed relationships)



BLUE= South district (14 nodes)

RED= North district (9 nodes)

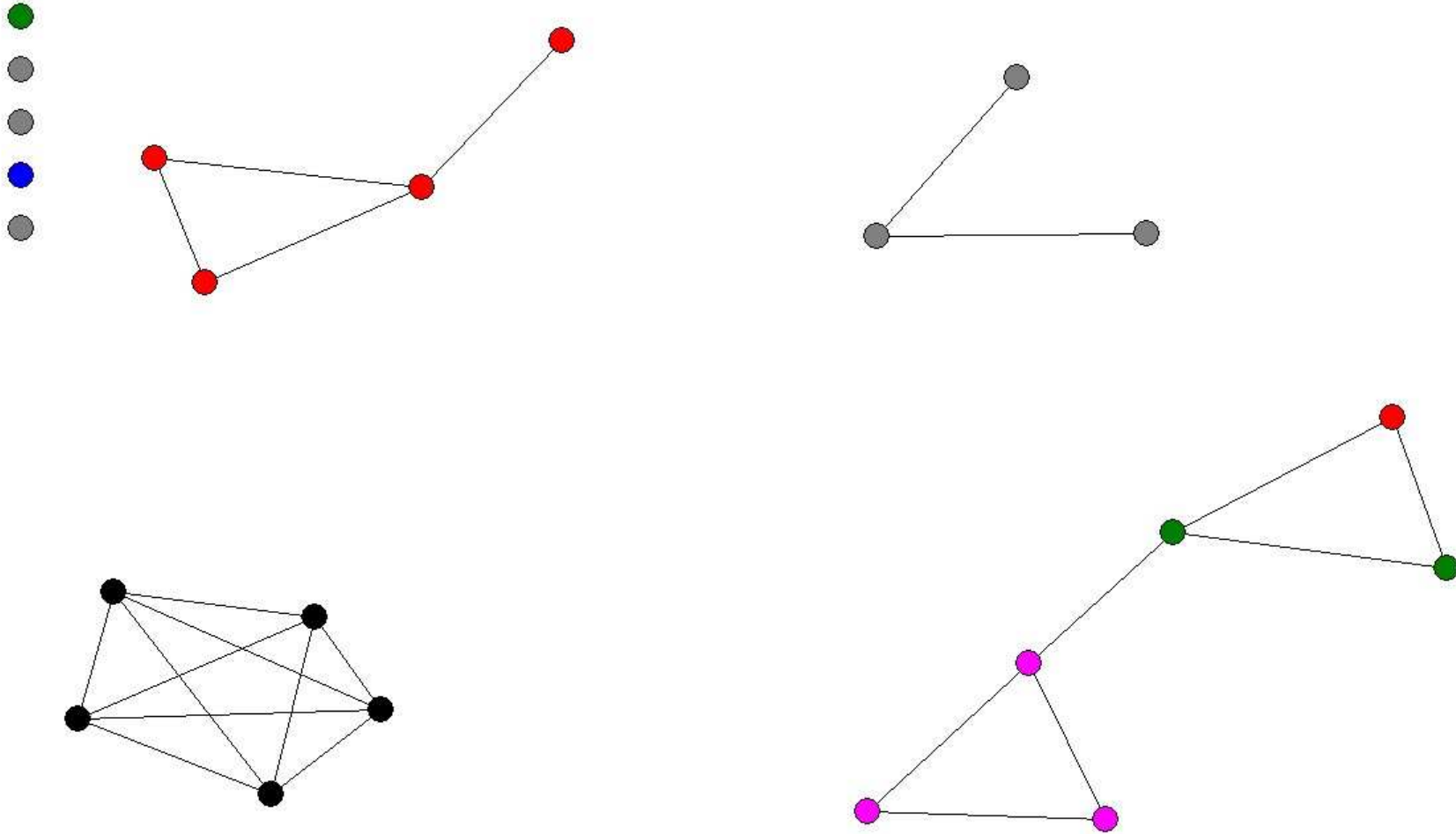
Asthma: Paediatrician advice network **by association** (only confirmed relationships)



RED = not formally grouped

OTHER COLOURS = each colour an Association

Gastro: Paediatrician advice network **by association** (only confirmed relationships)

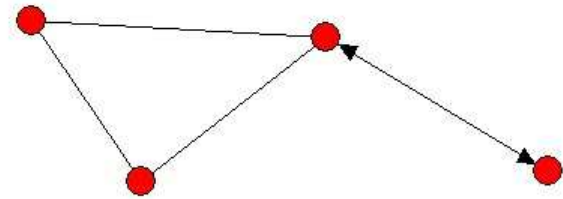
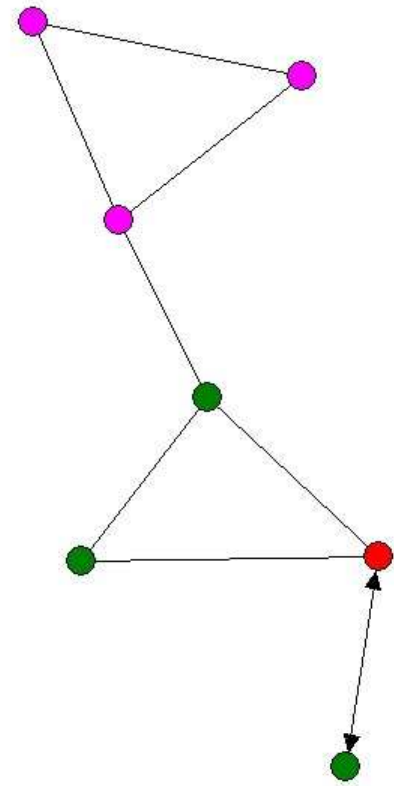
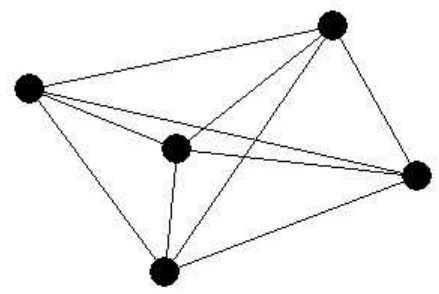


RED = not formally grouped

OTHER COLOURS = each colour an Association

Urinary tract infections: Paediatrician advice network by association (only confirmed relationships)

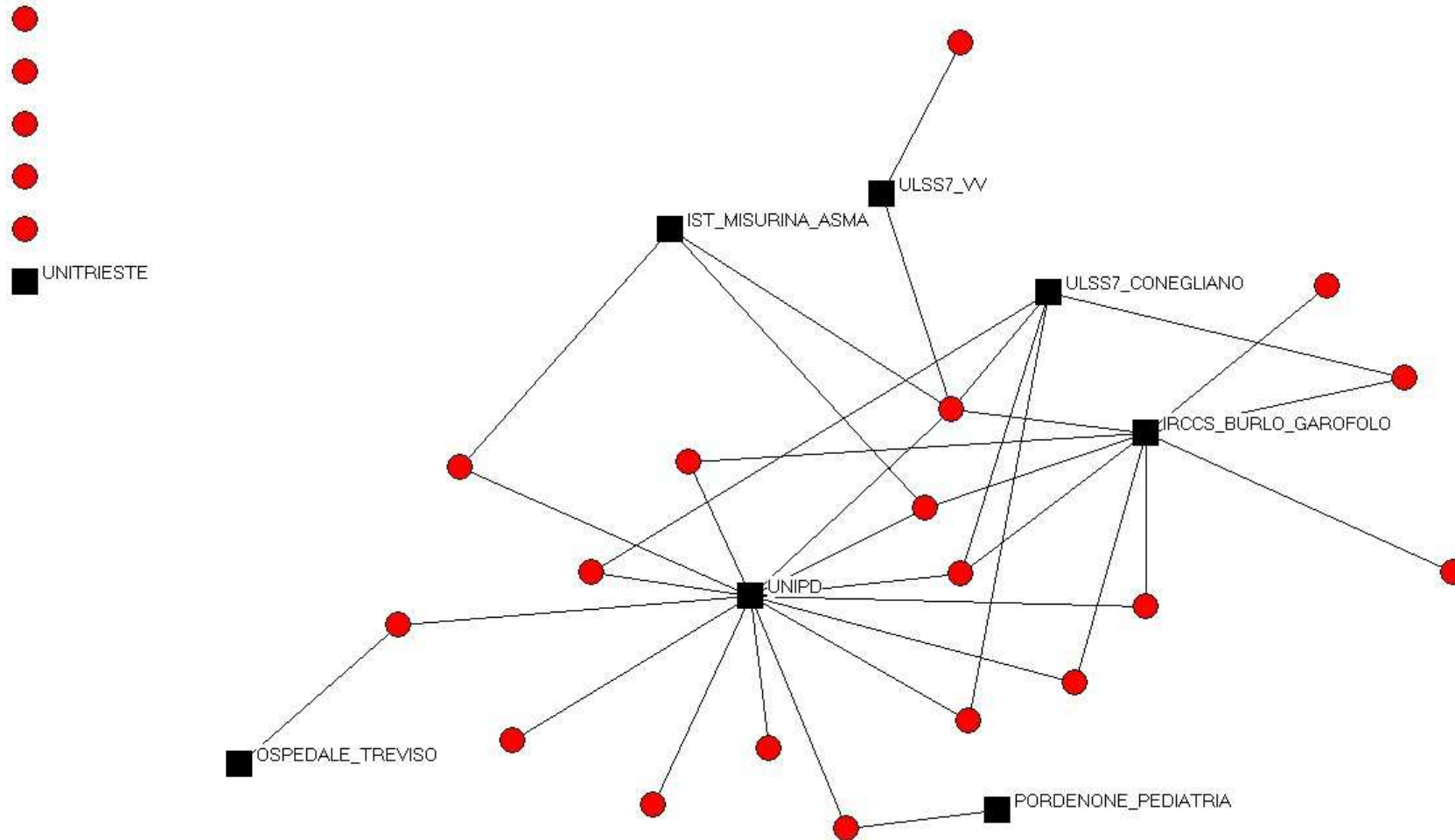
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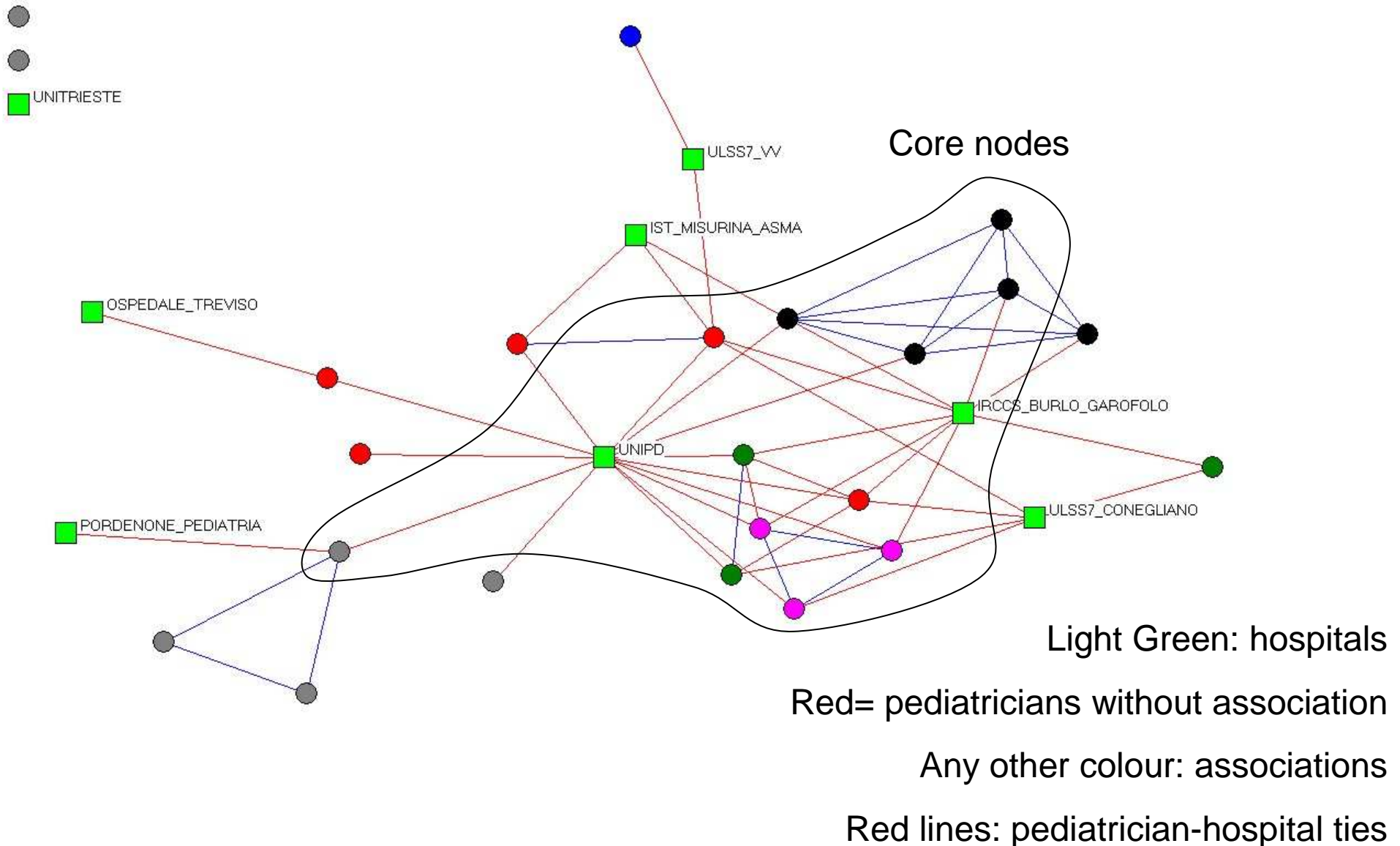
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Paediatrician hospital advice relations - asthma


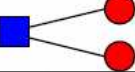
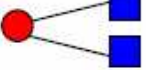
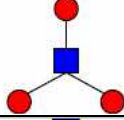
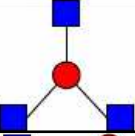

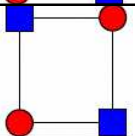
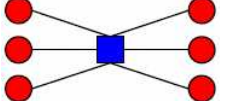


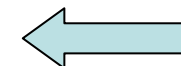
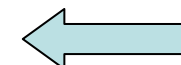
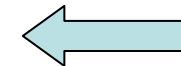
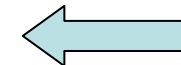
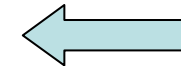
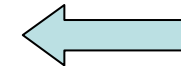
Asthma: Pediatrician-pediatrician & pediatrician-hospital advice relationships



ERGM: preliminary results on pediatrician-hospital relations (blue square=hospital)


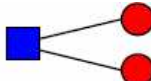
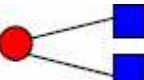
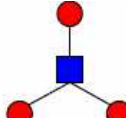
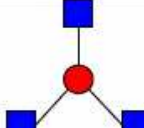
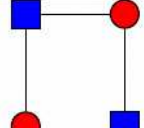
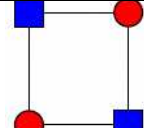
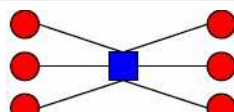
Asthma

			Network Motifs
L (Density)		-4.2424* (2.000)	
Sa2-Star		6.7755* (0.979)	
Sp2-Star		1.2452 (1.403)	
Sa3-Star		-1.1315* (0.228)	
Sp3-Star		-0.6660 (0.994)	
L3		-0.2459* (0.122)	
C4		0.7019* (0.229)	
Ksa(K=4)		-7.6693* (1.094)	



ERGM (preliminary results)


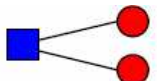
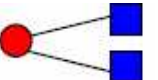
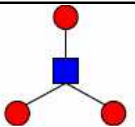
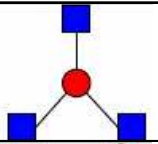
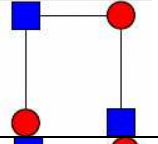
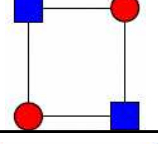
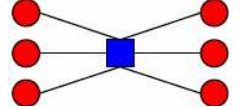
Gastrointestinal pathologies

			Network Motifs
L (Density)		-0.0777 (1.951)	
Sa2-Star		19.9082* (0.804)	
Sp2-Star		-1.2853 (1.526)	
Sa3-Star		-3.3262* (0.278)	
Sp3-Star		-0.1722 (0.737)	
L3		0.0379 (0.156)	
C4		0.4393* (0.194)	
Ksa (K=4)		-22.4305* (0.788)	



ERGM (preliminary results)

Urinary trait infections

			Network Motifs
L (Density)		-2.7600 (2.140)	
Sa2-Star		3.8088* (1.041)	
Sp2-Star		0.8354 (1.484)	
Sa3-Star		-0.6270* (0.236)	
Sp3-Star		-0.2309 (0.723)	
L3		-0.1158 (0.147)	
C4		-0.3115* (0.578)	
Ksa (K=4)		-4.5546* (0.580)	



Findings: Pediatrician-hospital relations

- **Within-LHA 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)
- **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.
- According to ERGM, few attributes impact on the probability of linking to a hospital : (i) **university of specialization (Padua)** is a predictor of advice seeking about urinary tract infections from hospitals; (ii) **tenure** is associated to advice seeking towards hospitals about gastrointestinal pathologies

Results: RQ1 & 2

- ✓ Homophily: Similarities based on years of expertise, university of graduation, gender, number of patients are not significantly related to advice exchange among family paediatricians. However, **same district** and **same association** have positive correlation with advice exchange. Also, paediatricians exchange advice mostly with **same discipline colleagues** (paediatricians), rather than with other specialists. Homophily partially confirmed.
- ✓ Social Embeddedness: advice relations for asthma, gastro, infection are highly correlated; advice relations correlated with **past co-membership** in guideline development teams. Confirmed.
- ✓ Proximity is confirmed: QAP (distance, KE) = - 0.321***

Results: RQ3

- Adoption 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.**
- Frequent users of guidelines exchange knowledge mostly with other frequent users (**social contagion?**)
- No significant correlation between adoption of guidelines and association membership

Management implications

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