



# Assessment of PACT Structure using Social Network Analysis

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# Poll Question

- What is your primary role in the VA?
  - A. PACT Physician
  - B. PACT Nurse
  - C. Other Primary Care Role (e.g., Dietician, Pharmacist)
  - D. Investigator or Research Staff
  - E. Other

# Poll Question

- How familiar are you with social network analysis?
  - A. Not at all.
  - B. I have read/heard about it.
  - C. I understand the basic principles.
  - D. I understand it well.
  - E. Duh. I use Facebook all the time!

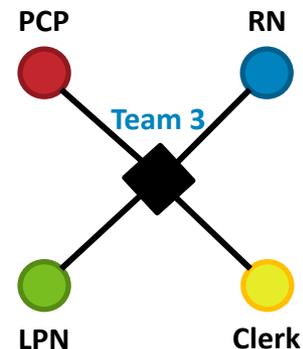
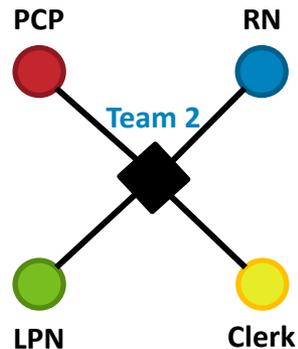
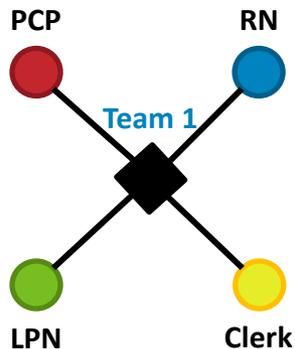
# Basic Question

- Who is on what team?
- Should we just read the PCMM almanac?

	A	B	C	D	E	F
1	Sta3n	Sta6a	Team	StaffName	StandardPosition	TeamPosition
2	555	555	STC 555 TEAM#1 *WH* NP2	CRONKITE, WALTER V	NURSE (LPN)	TEAM#1 NP2 WH LPN
3	555	555	STC 555 TEAM#1 *WH* NP2	RICHARDS, KEITH L	MAS CLERK	TEAM#1 NP2 WH ADMIN
4	555	555	STC 555 TEAM#1 *WH* NP2	LOPEZ, JENNIFER B	NURSE (LPN)	TEAM#1 NP2 WH LPN SISTER
5	555	555	STC 555 TEAM#1 *WH* NP2	CRAWFORD, EEAN R	CLINICAL PHARMACIST	TEAM#1 NP2 CLIN PHARM 2
6	555	555	STC 555 TEAM#1 *WH* NP2	STEWART, GREG L	CARE MANAGER	TEAM#1 NP2 WH CARE MANAGER
7	555	555	STC 555 TEAM#1 *WH* NP2	REEVES, CODY J	NURSE PRACTITIONER	TEAM#1 NP2 WH
8	555	555	STC 555 TEAM#1 *WH* NP2	LULKUS, STACY E	SOCIAL WORKER	TEAM#1 NP2 SWS
9	555	555	STC 555 TEAM#1 *WH* NP2	STEWART, MARTHA M	CLINICAL PHARMACIST	TEAM#1 NP2 CLIN PHAR 1
10	555	555	STC 555 TEAM#1 *WH* NP2	QUIJOTE, DON J	NURSE (RN)	TEAM#1 NP2 WH RN
11	555	555	STC 555 TEAM#1 NP2	CRONKITE, WALTER V	NURSE (LPN)	TEAM#1 NP2 LPN SISTER
12	555	555	STC 555 TEAM#1 NP2	RICHARDS, KEITH L	MAS CLERK	TEAM#1 NP2 ADMIN
13	555	555	STC 555 TEAM#1 NP2	LOPEZ, JENNIFER B	NURSE PRACTITIONER	TEAM#1 NP2
14	555	555	STC 555 TEAM#1 NP2	CRAWFORD, EEAN R	NURSE (LPN)	TEAM#1 NP2 LPN
15	555	555	STC 555 TEAM#1 NP2	STEWART, GREG L	CLINICAL PHARMACIST	TEAM#1 NP2 CLIN PHARMACIST 2
16	555	555	STC 555 TEAM#1 NP2	REEVES, CODY J	SOCIAL WORKER	TEAM#1 NP2 SW
17	555	555	STC 555 TEAM#1 NP2	LULKUS, STACY E	CARE MANAGER	TEAM#1 NP2 CARE MANAGER
18	555	555	STC 555 TEAM#1 NP2	STEWART, MARTHA M	CLINICAL PHARMACIST	TEAM#1 NP2 CLIN PHARMACIST 1
19	555	555	STC 555 TEAM#1 NP2	QUIJOTE, DON J	NURSE (RN)	TEAM#1 NP2 RN
20	555	555	STC 555 TEAM#1 PHY3	CRONKITE, WALTER V	CARE MANAGER	TEAM#1 PHY3 CARE MANAGER

# Easier Way

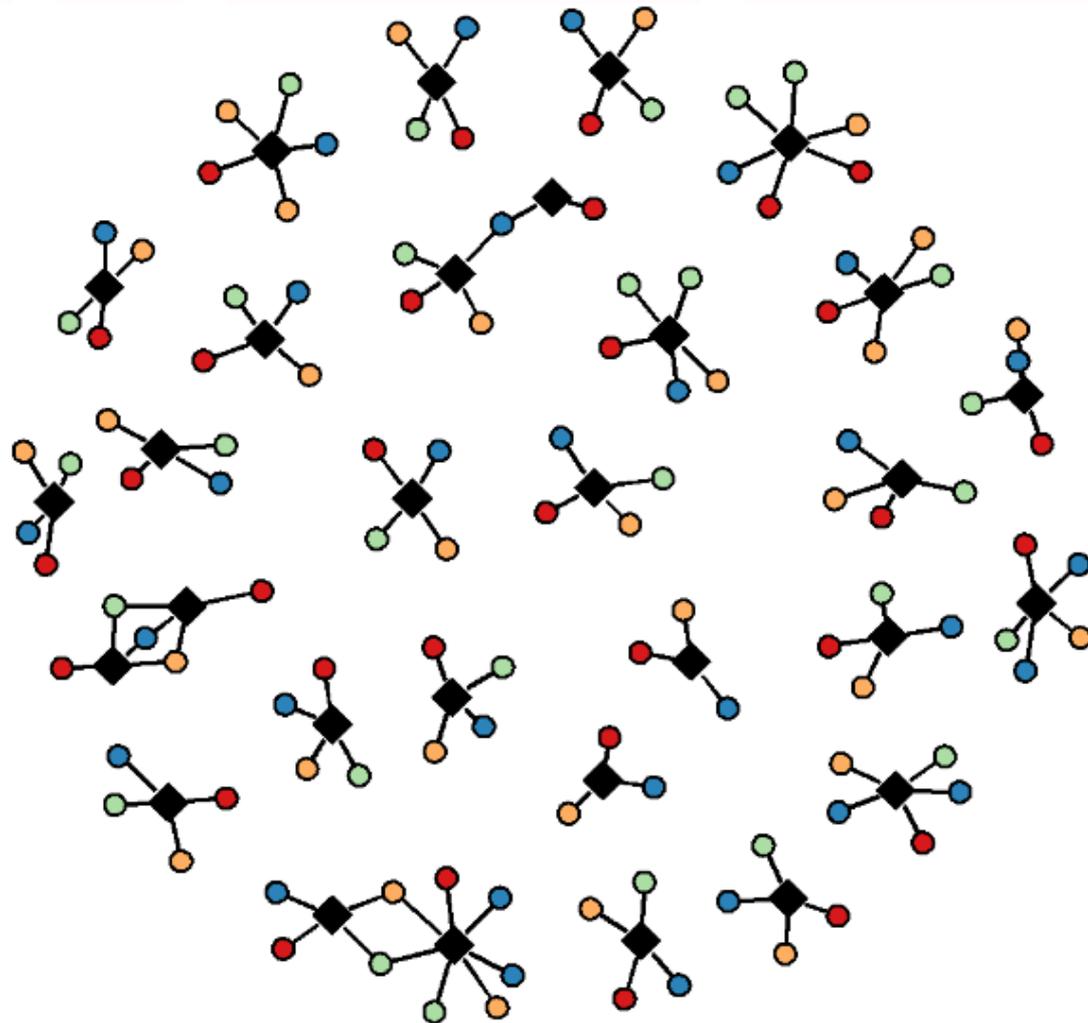
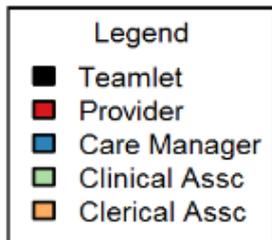
- Use social network analysis to visualize



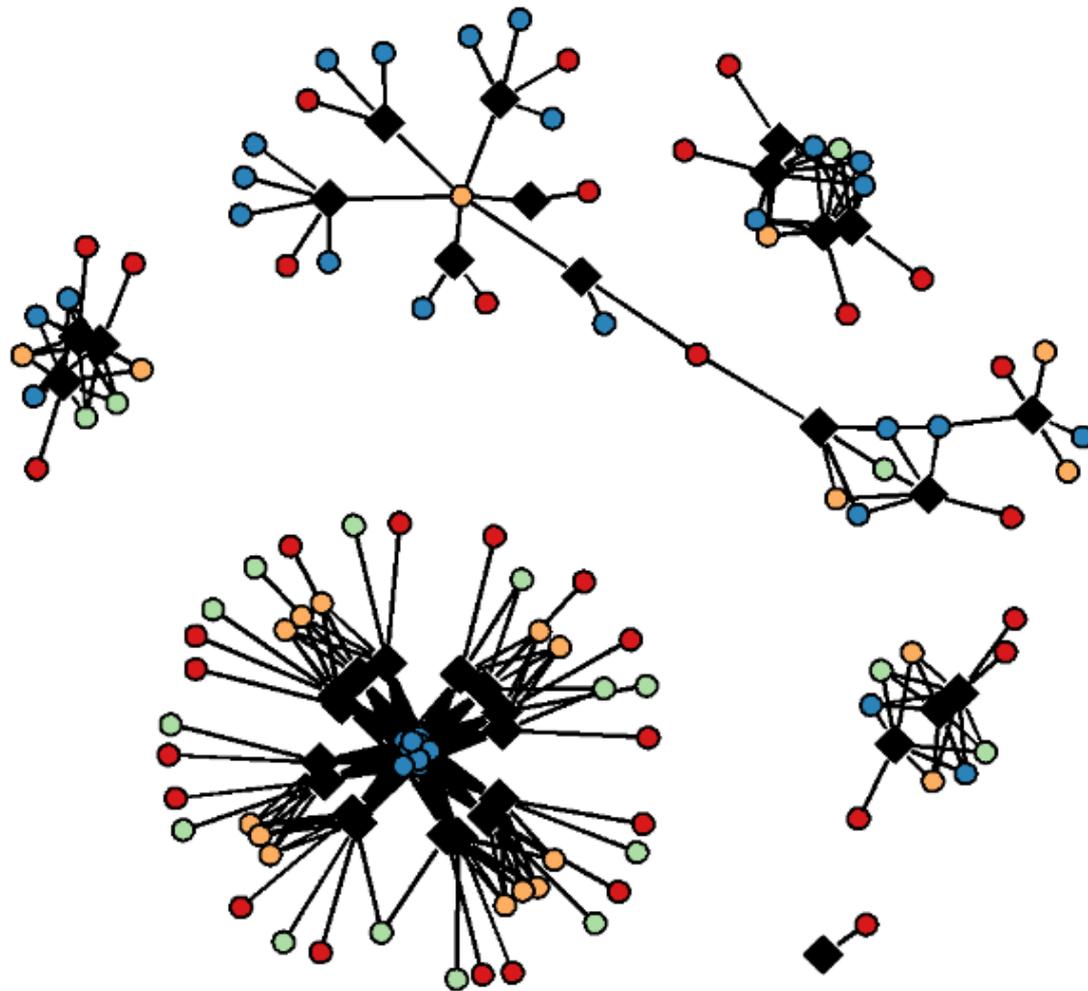
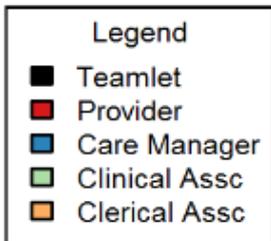
Suggested characteristics of PACT theoretical model:

- One primary care provider, RN care manager, clinical associate, clerical associate per teamlet  
*(visually: each black diamond is connected to one red, blue, green, and yellow circle)*
- Each assigned to a unique teamlet and patient panel  
*(visually: each circle is linked to only one black diamond)*

# Actual VHA System 1



# Actual VHA System 2



# Observations

- Substantial variation in PACT structure
- Can quantify the differences in structure
- Relate the differences to outcomes
  - Access
  - Continuity
  - Coordination

# Poll Question

- What percentage of teamlets are structured following the suggested characteristics of the ideal PACT theoretical model?
  - A. 91%
  - B. 72%
  - C. 54%
  - D. 36%
  - E. 19%

# How do teams deviate from PACT ideals?

	Percentage of Teamlets Missing This Role	Percentage of This Role Shared Across Multiple Teamlets
Nurse Care Manager	5.6%	32.2%
Clinical Associate	20.1%	25.8%
Clerical Associate	11.4%	35.9%

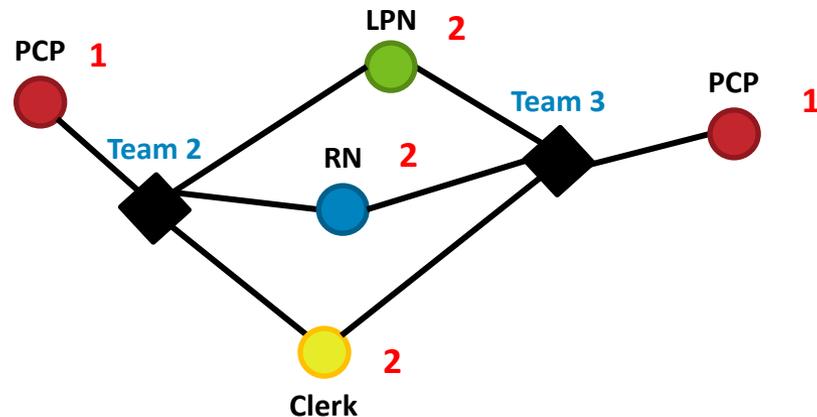
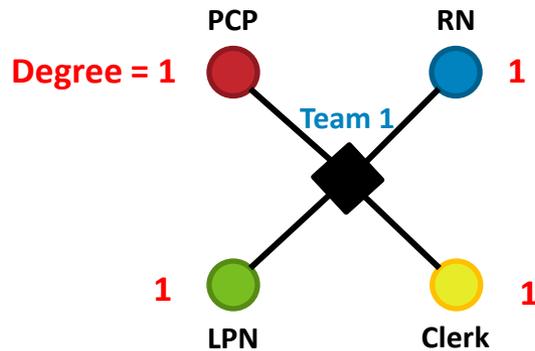
NOTE: 4,988 teamlets (teaching facilities are excluded)

# Method

- Calculate network measures based on Sept FY13 PCMM Team Assignments Report
- Outcomes pulled from Sept FY13 Compass
- Visualizations provided at HCS level (Sta3n)
- Analysis performed at the Division level (Sta6a)
- R software

# Structural Measures

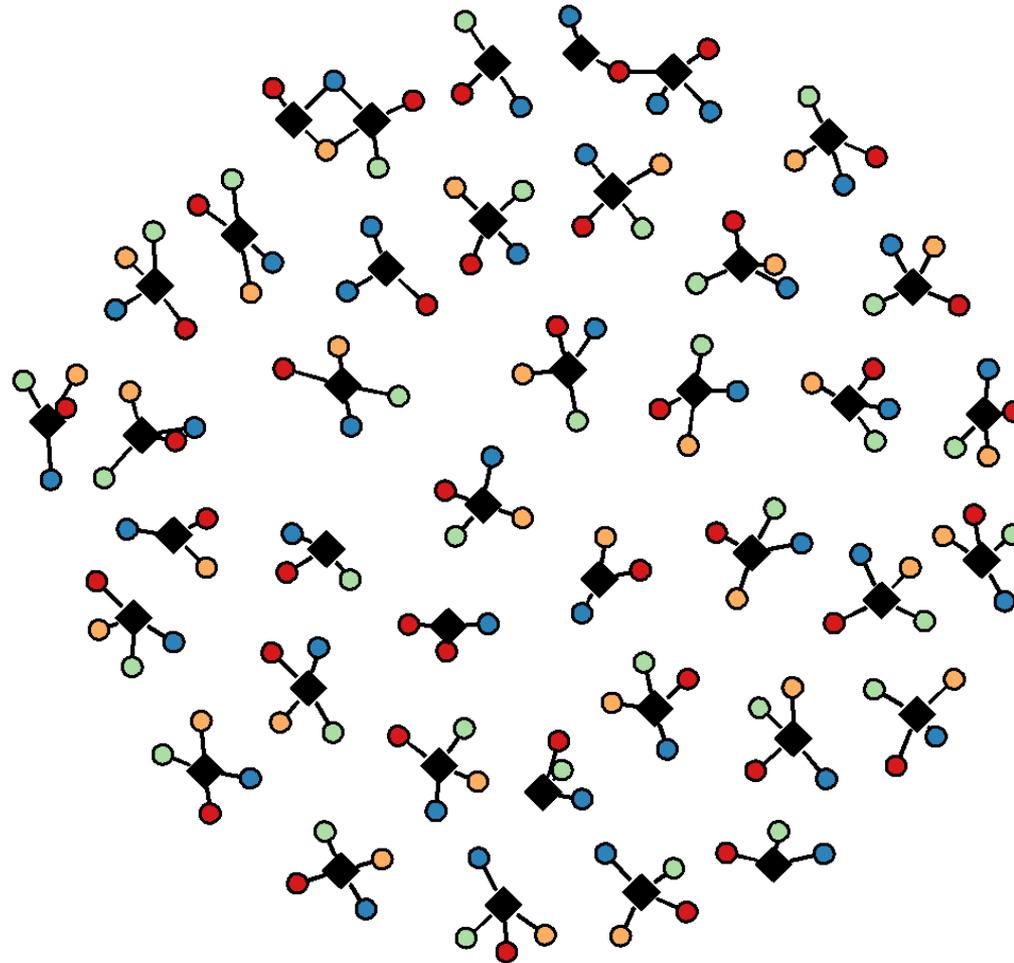
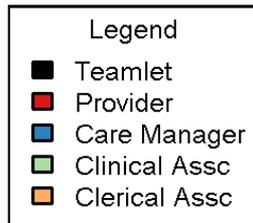
- Degree – number of teamlets individual assigned to



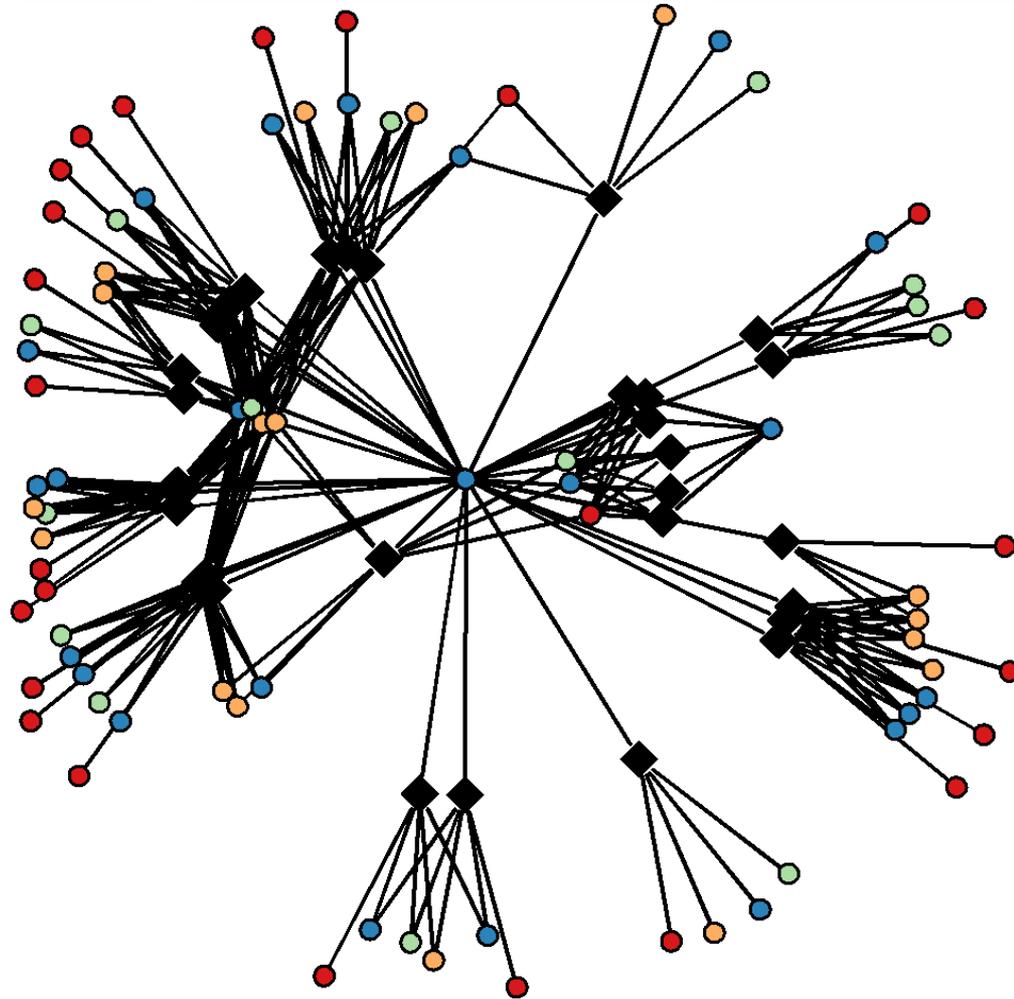
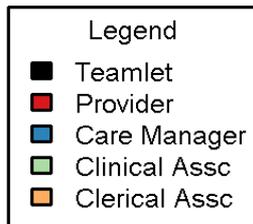
Averaged to the division level

- *How does the average number of teams to which individuals are assigned within a division relate to the division's access, continuity, and coordination of care?*
- Lowest Division Degree: 1.00
- Highest Division Degree: 11.80
- Average Division Degree: 1.44

# Actual VHA System with Lowest Degree

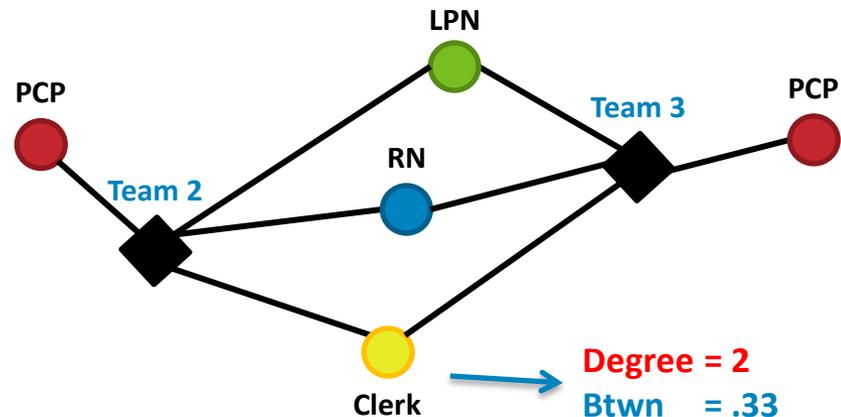
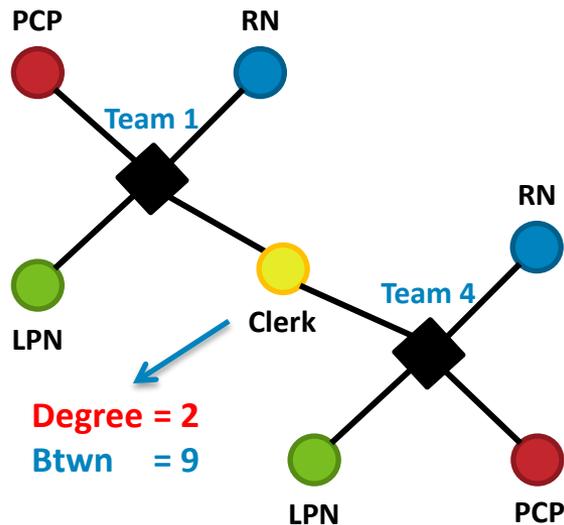


# Actual VHA System with Highest Degree



# Structural Measures

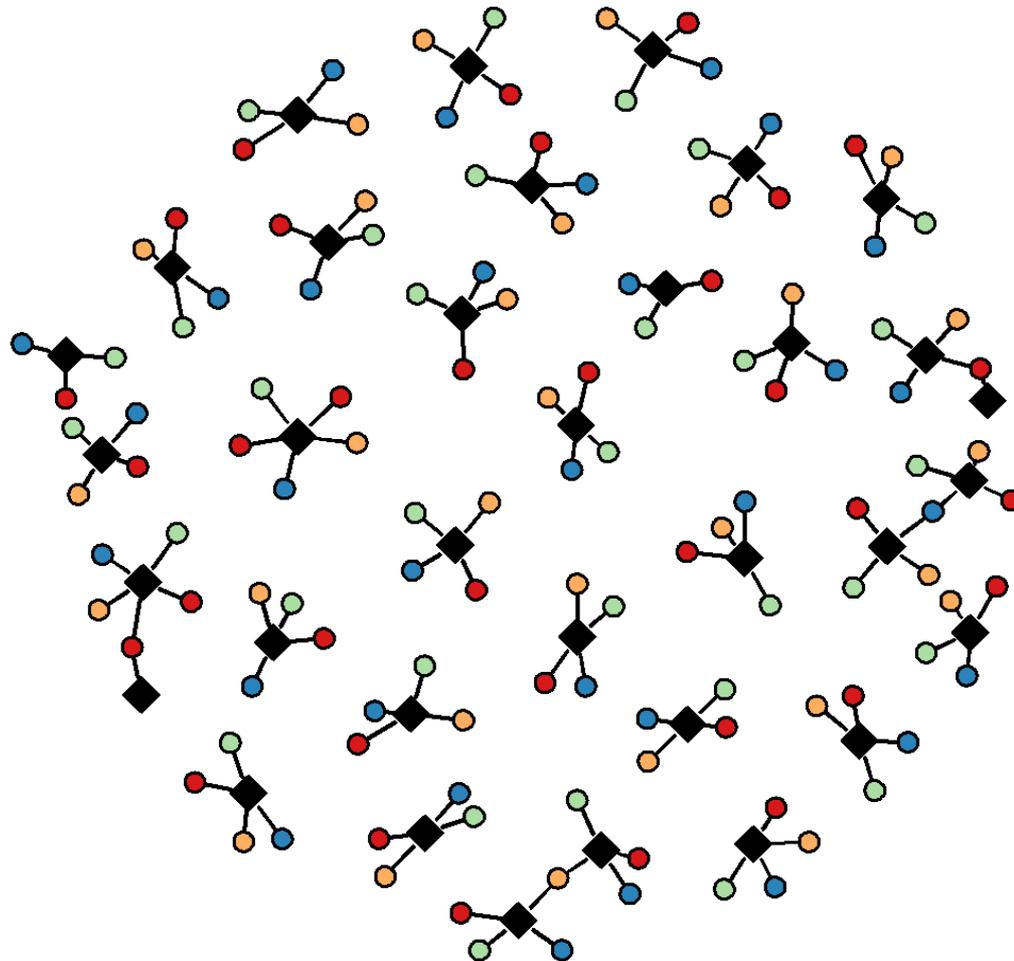
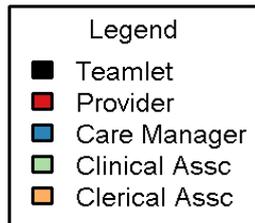
- Betweenness – number of people you uniquely “bridge”



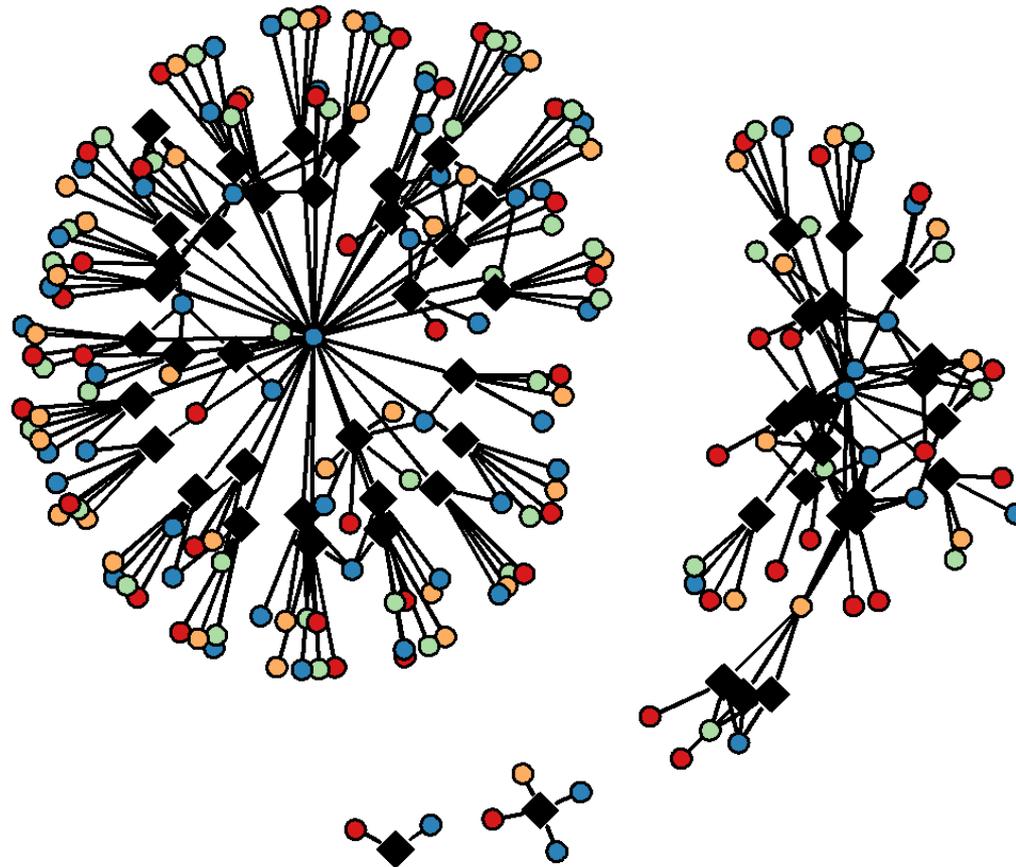
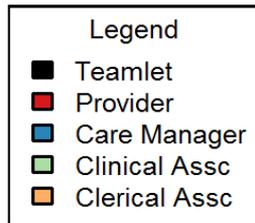
Averaged to the division level

- *How does the extent to which individuals act as lone “bridges” between division teamlets relate to the division’s access, continuity, and coordination of care?*
- Lowest Division Betweenness: 0.00
- Highest Division Betweenness: 908.91
- Average Division Betweenness: 23.68

# Actual VHA System with Lowest Betweenness

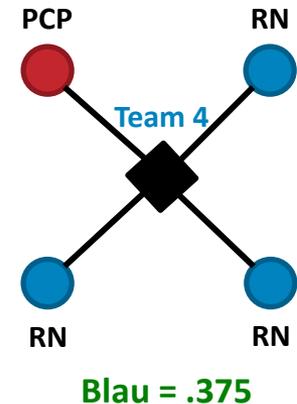
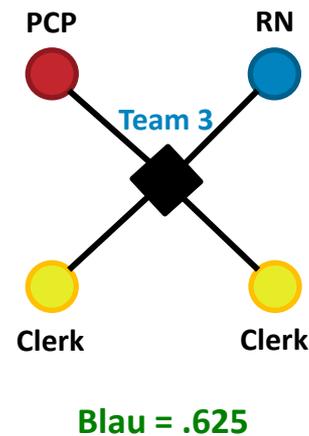
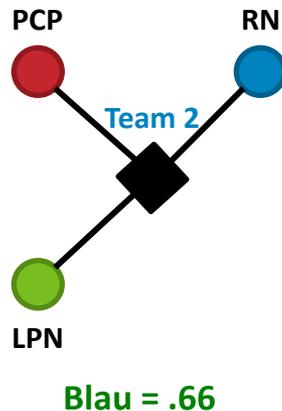
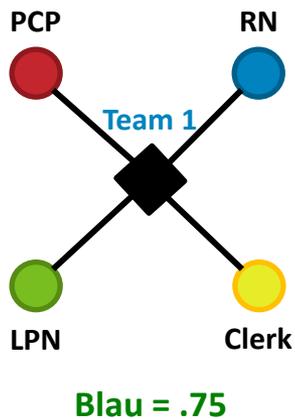


# Actual VHA System with Highest Betweenness



# Structural Measures

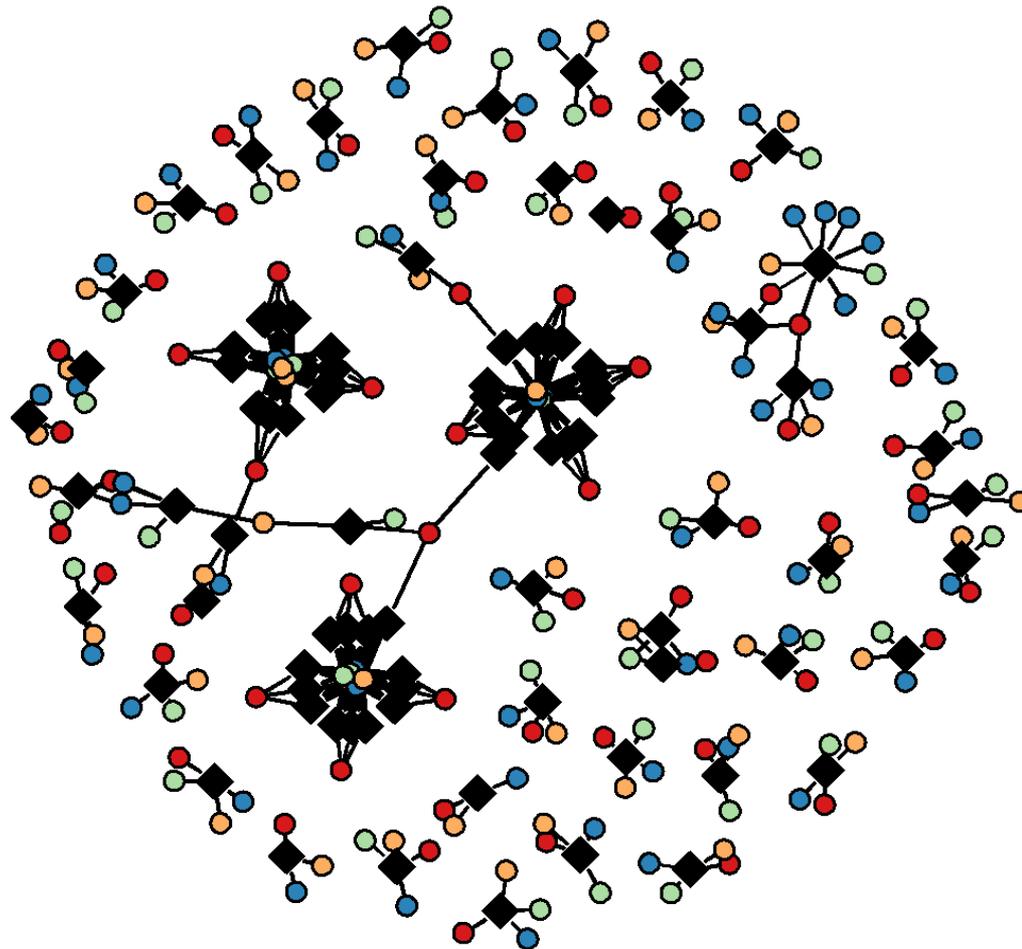
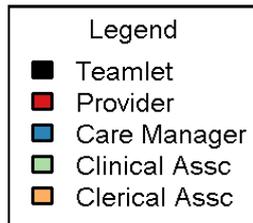
- Blau Index – balance in presence of all four core roles



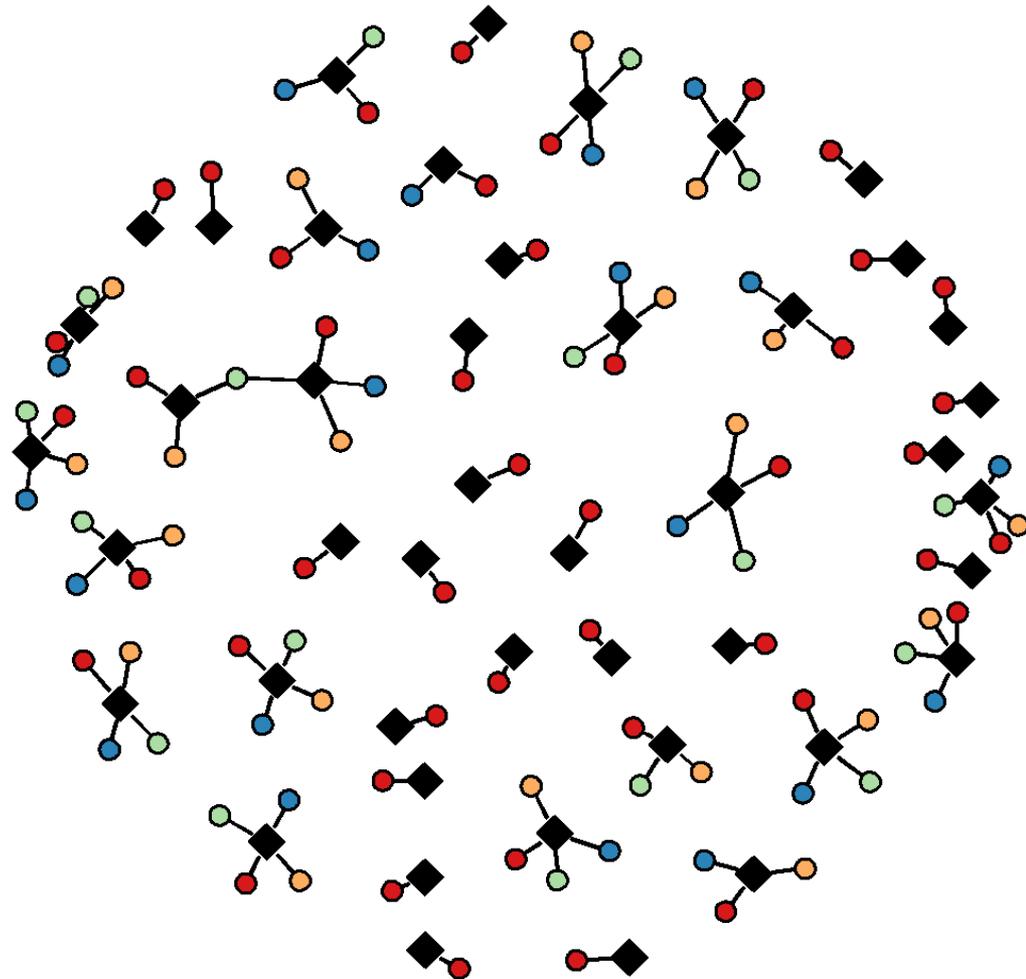
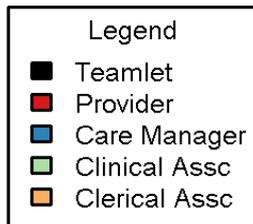
Averaged to the division level

- *How does the extent to which a division's teamlets have balanced representation of the four core roles relate to the division's access, continuity, and coordination of care?*
- Lowest Division Blau Index: 0.00
- Highest Division Blau Index: 0.75
- Average Division Blau Index: 0.66

# Actual VHA System with Highest Blau Index

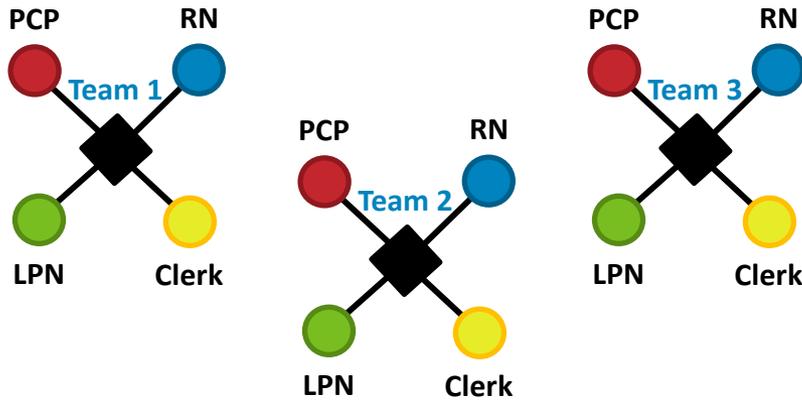


# Actual VHA System with Lowest Blau Index

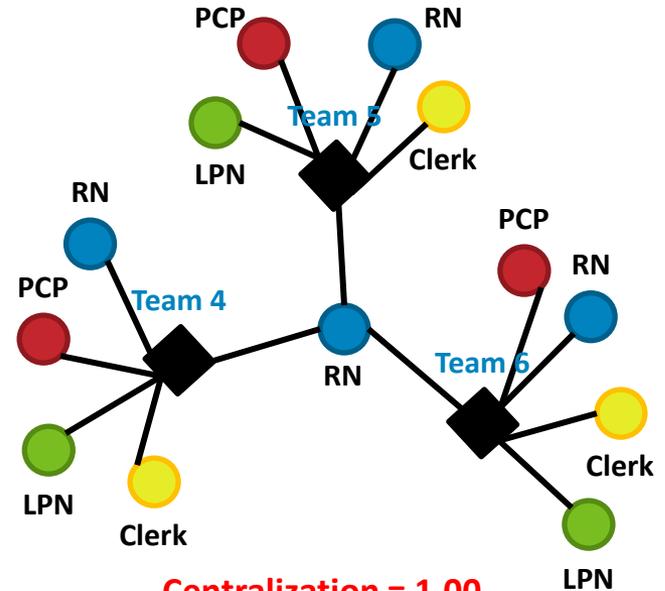


# Structural Measures

- Centralization – how central is one relative to others



Centralization = 0.00

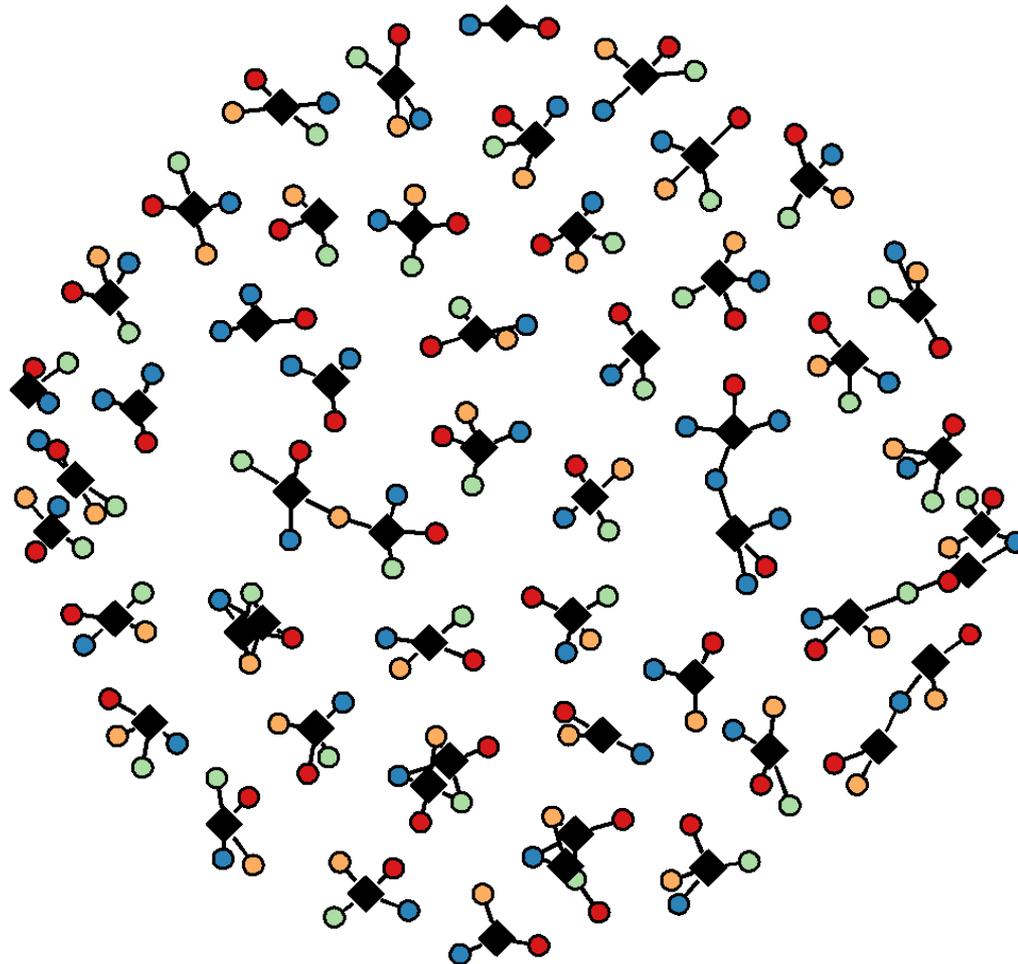
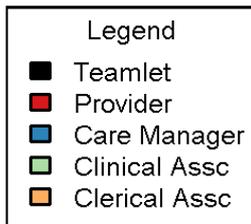


Centralization = 1.00

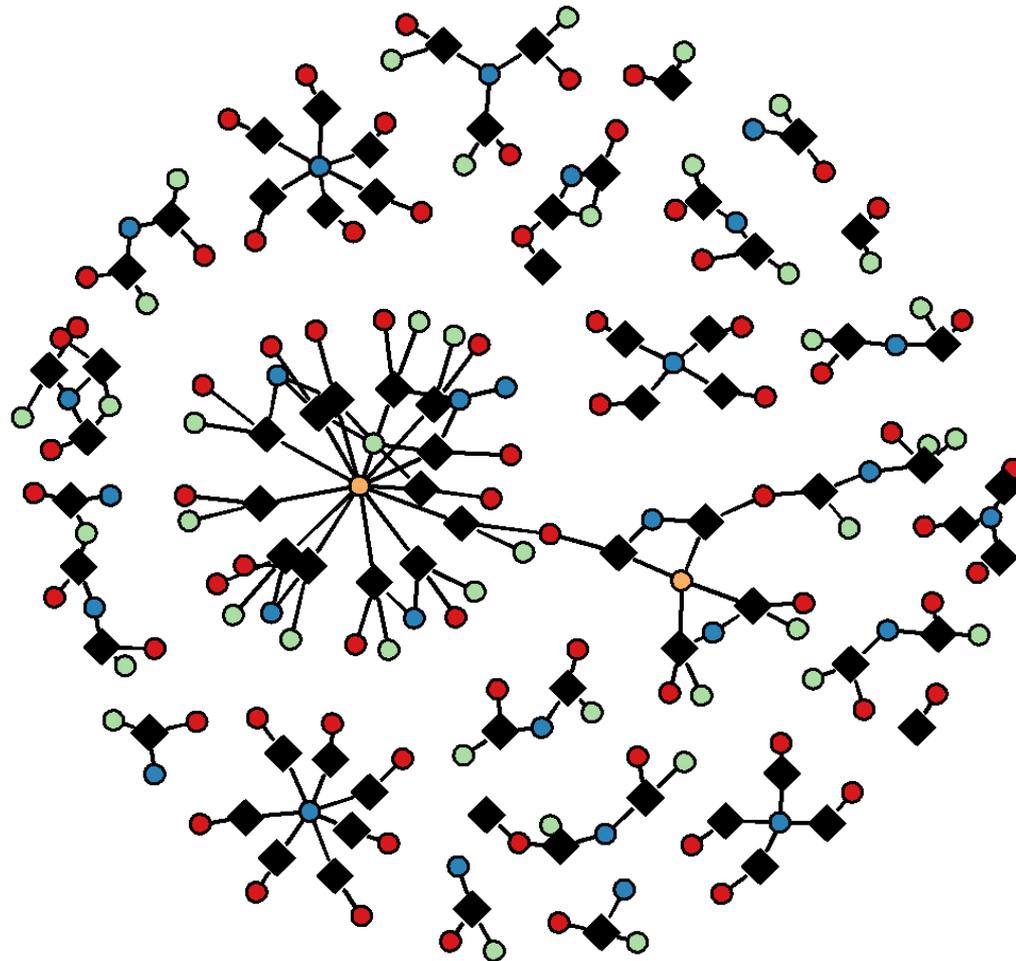
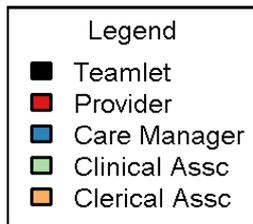
Averaged to the division level

- *How does the extent to which a division has one person very central to all teamlet assignments relate to the division's access, continuity, and coordination of care?*
- Lowest Division Centralization: 0.00
- Highest Division Centralization: 1.00
- Average Division Centralization: 0.29

# Actual VHA System with Lowest Centralization



# Actual VHA System with Highest Centralization



# Results for Access

	% Telephone Encounters		% Seen w/in 1-Day of DD	
Intercept	-1.79***	-2.30***	1.86***	1.63***
Panel Assignments	.00	.00	-.00	-.00
DCG Average	-.19	-.22	-.52**	-.52***
PCP FTE Adjusted	.01	.01	.03	.02
PC Staffing Ratio	.11***	.08***	-.02	-.03
Teamlet Size	.09***	.03	-.01	-.02
Degree		-.04		.07
Betweenness		.00***		-.00***
Blau Index		1.32***		.29
Centralization		.09		.03
<i>Pseudo R</i> <sup>2</sup>	.108	.171	.016	.032

N = 864; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

# Results for Continuity

	% Encounters with PCP	
Intercept	2.72***	2.72***
Panel Assignments	-.00**	-.00**
DCG Average	-1.54***	-1.54***
PCP FTE Adjusted	.03	.03
PC Staffing Ratio	-.03	-.04
Teamlet Size	.00	.00
Degree		-.07
Betweenness		.00
Blau Index		.15
Centralization		.07
<i>Pseudo R</i> <sup>2</sup>	.167	.170

N = 864; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

# Results for Coordination

	ER/Urgent Care Util.		2-Day Post Discharge	
Intercept	-3.68***	-3.63***	-.06	-.60*
Panel Assignments	.00	.00	-.00	-.00
DCG Average	4.42***	4.43***	-.33	-.25
PCP FTE Adjusted	.02	.02	.01	.02
PC Staffing Ratio	.07**	.09***	.09*	.04
Teamlet Size	-.04	-.04	.17***	.09*
Degree		.13**		-.17*
Betweenness		-.00		.00
Blau Index		-.45*		1.72***
Centralization		-.07		.37**
<i>Pseudo R</i> <sup>2</sup>	.396	.402	.032	.072

N = 864; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

# Benefits of conforming to PACT Principles

Degree	Top 10%	Bottom 10%
ER/Urgent Care Utilization	.25	.27
2-Day Post Discharge	.79	.73

Blau Index	Top 10%	Bottom 10%
% Telephone Encounters	27%	19%
ER/Urgent Care Utilization	.25	.30
2-Day Post Discharge	.76	.56

Betweenness	Top 10%	Bottom 10%
% Seen w/in 1-Day of DD	82%	79%

# Unexpected Benefits of **deviating** from PACT Principles

Betweenness	Top 10%	Bottom 10%
% Telephone Encounters	24%	30%

Centralization	Top 10%	Bottom 10%
2-Day Post Discharge	.69	.77

# Insights

- Substantial variation in PACT structure
- Can quantify the differences in structure
- Relate the differences to outcomes
  - Being assigned to a unique teamlet and having balanced coverage of the four roles related to better access and coordination
  - No relationships with continuity
- Some trade-offs in results with outcomes
  - Bridging beneficial for telephone encounters, but detrimental to being seen within one day of desired date.
  - Centralization beneficial for 2-day post-discharge contact

# Limitations

- **Cross-sectional data from one month – Sept. FY 13**
  - Snapshot of one moment in time; changes may have occurred
  - Can't conclude structure causes outcomes, only association
- **Didn't account for provider FTE**
  - FTE appears in PCMM early 2014
- **Extent of PCMM data inaccuracies unknown**
- **Unable to examine finer-grained interactions**

# Future Directions

- Feedback Visualizations and Metrics
- Follow-up Discussions regarding Varying Structures
- Incorporate Provider FTE in Calculations
- Longitudinal Tracking of Team Assignments
- Unobtrusive Observations of Interactions

# Thank You!

- Questions/Comments?

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