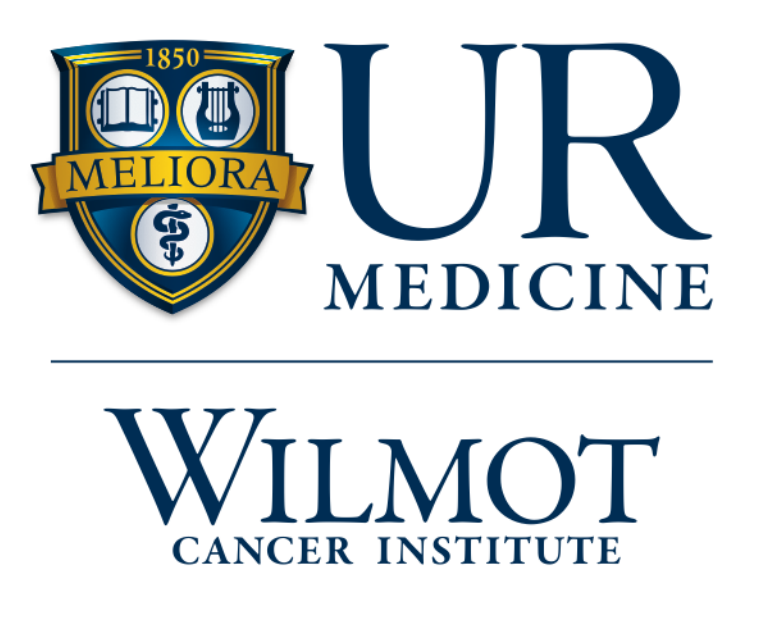


Visualizing clinic routines from multiple points of view using *ThreadNet*



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Background

Healthcare routines are a series of events and interdependent elements needed for patient care. Understanding clinic visit processes requires knowledge of all the roles involved and the work done during the visit. In business, knowing how routines support work activities is key to efficiency. Each individual involved in a clinic visit has detailed knowledge of their own actions, but also has knowledge of the larger whole process.

Processes, routines, and other patterns of action are hard to see. Our narrow window of perception is framed in time and space, so at best, we see one action at a time. Aggregating fragments into patterns is a central problem in empirical research understanding routines. The problem is exacerbated when participants (or observers) have different understandings of an organizational routine. They are familiar with their own work, but the work of others may be less visible and less well understood. When different participants see and understand a routine differently, it contributes to the *multiplicity* of the routine.

Objective

How does the understanding or perception of clinic visit processes differ by role?

Methods

- We interviewed individuals in each clinical role (office staff, technician, licensed practical nurse, registered nurse, resident, physician) in University of Rochester Dermatology clinics in each clinic.
- The interviews provided structured narratives of a typical clinic visit from check-in to checkout as a sequence of actions and who performed those actions (i.e., Actor). The variations of these sequences for different clinic scenarios were noted (i.e., follow-up, new, surgery, biopsy).
- We used *ThreadNet*, a novel, R-coded, graph-theoretic methodology to convert the narrative threads of interview data into event networks summarizing the clinic visit routine from the point of view (POV) of each participant.

Snapshot of Narrative Interview Data for *ThreadNet*

Visit ID	Sequence ID	Actor	Action	POV
1	1	OAS	Checks-in patient at front desk	Physician
1	2	OAS	Checks insurance, DOB, address, phone	Physician
1	3	OAS	Paperwork & iPad returned	Physician
1	4	OAS	Prints Encounter Form	Physician
1	5	Clinical Tech	Picks up Encounter Form from printer	Physician
1	6	Clinical Tech	Calls patient from waiting room for rooming	Physician
1	7	Clinical Tech	Puts patient in exam room	Physician
1	8	Clinical Tech	Takes BP, height, weight in exam room	Physician
1	9	Clinical Tech	Asks chief complaint & pain score	Physician
1	10	Clinical Tech	Asks mandatory screening questions	Physician
1	11	Clinical Tech	Enters information into EMR	Physician
1	12	Clinical Tech	Exits exam room	Physician
1	13	Clinical Tech	Places Encounter Form in rack in Residents' Room	Physician
1	14	Resident	Removes Encounter Form from rack	Physician
1	15	Resident	Enters exam room	Physician

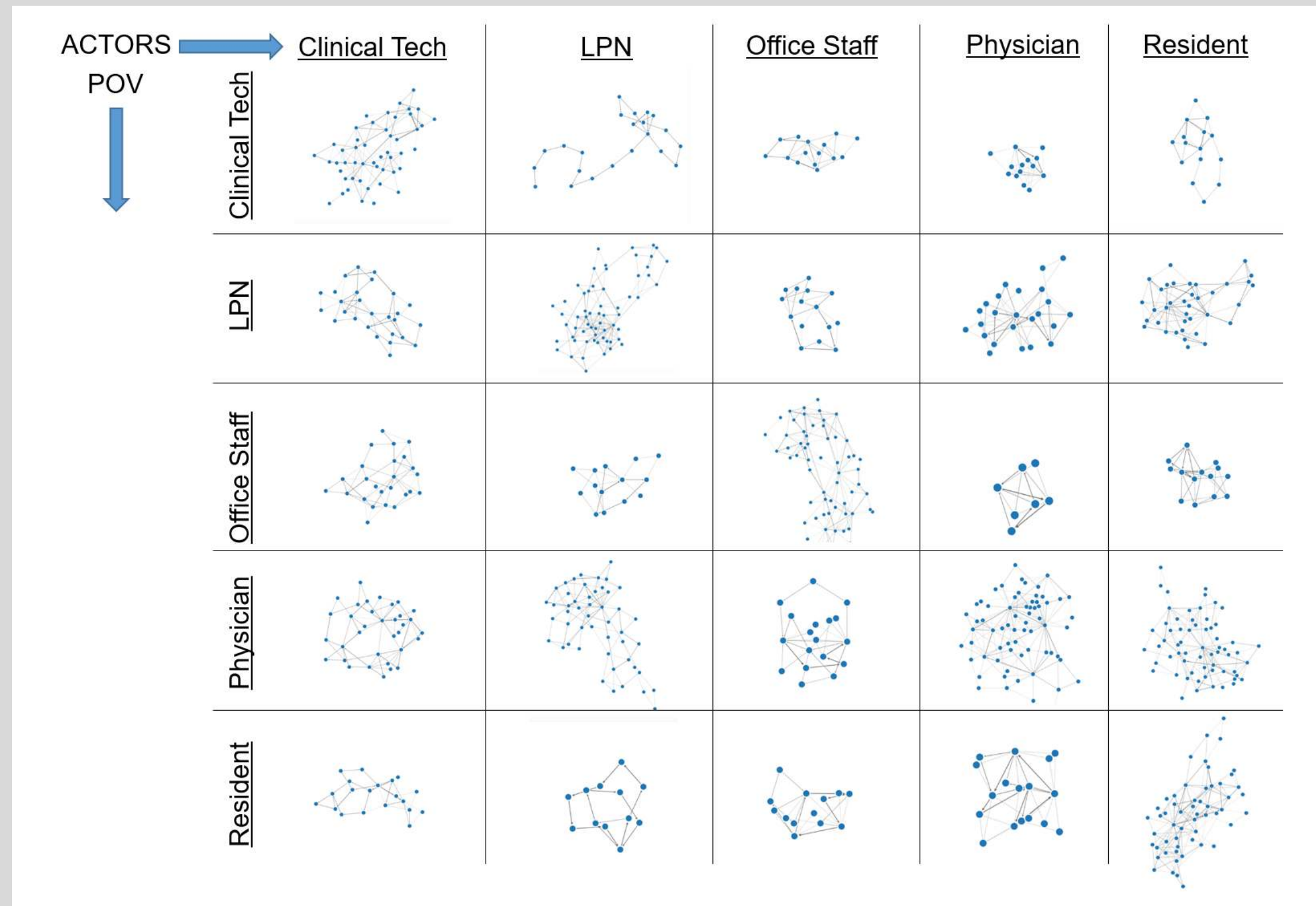
ThreadNet (free R package):

<http://routines.broad.msu.edu/ThreadNet>

Results

Narrative networks shown below are each constructed from a different point of view using *ThreadNet*. These networks represent portions of work practices in the same clinics. (NOTE: When using the software, these images are interactive; action names appear when the mouse hovers over the node.)

Figure 1: Different roles have different perspectives on each other's work.



Each role typically sees the greatest detail in its own work

Figure 2: Office Staff (OAS) and Residents perceptions of each other's work.

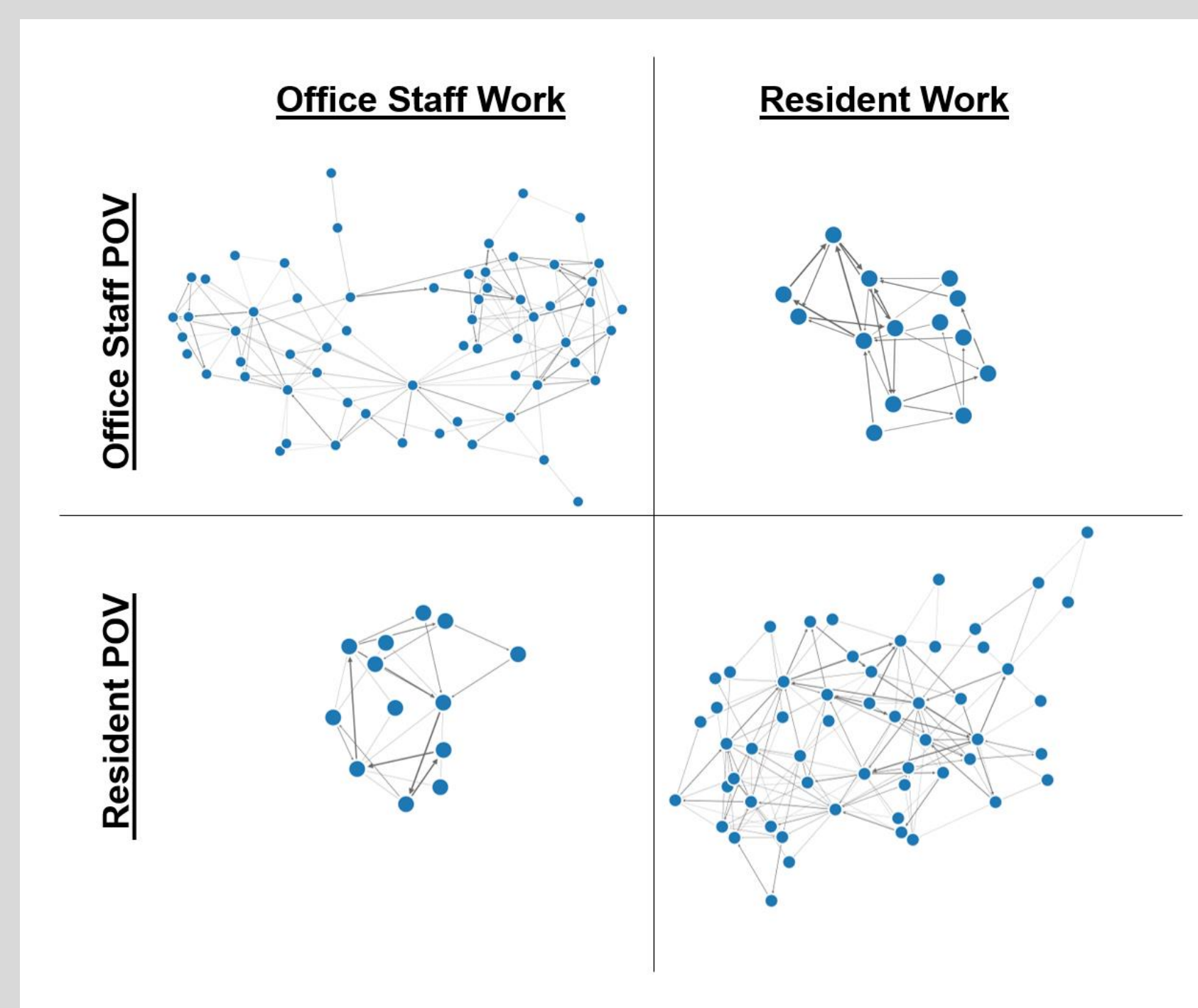


Figure 3: LPNs and Residents perceptions of each other's work.

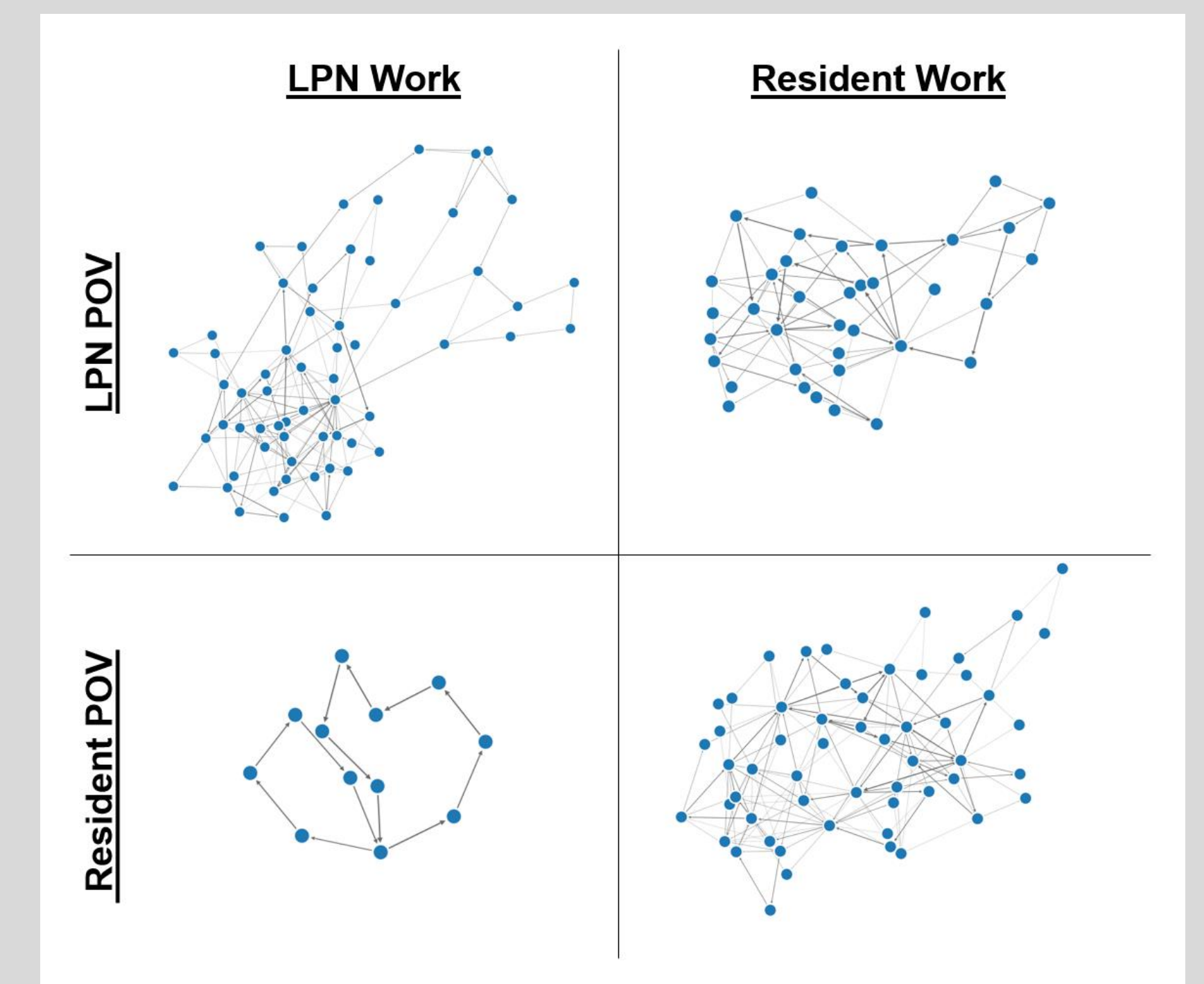
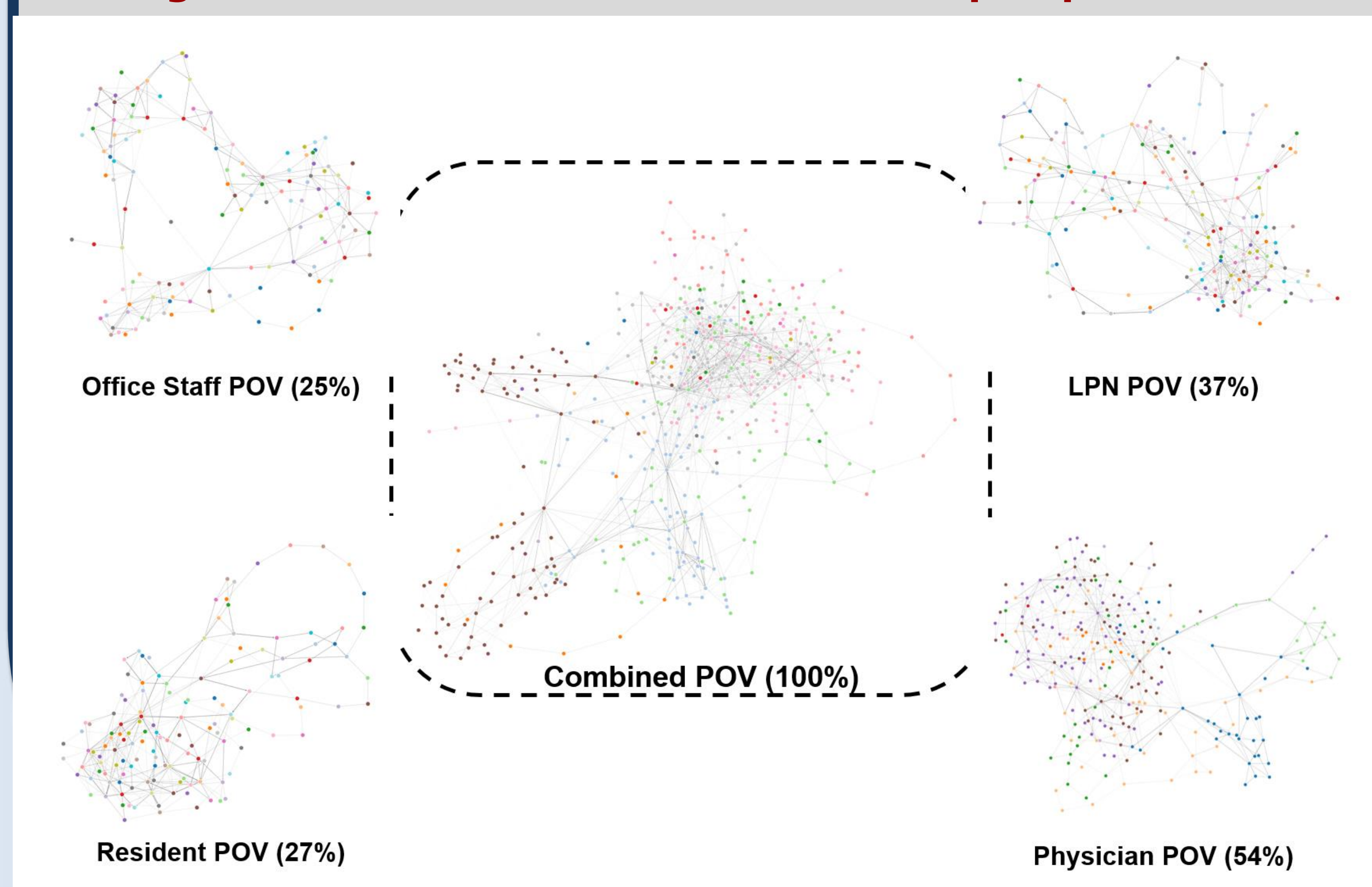


Figure 4: Different roles have different perspectives of the whole clinic visit process.



Conclusions

- A complete picture of clinic visit process required aggregation of the multiple points of view.
- Clinic staff are primarily aware of their own work instead of the overall process.
- Education interventions portraying clinic process as aggregated networks of interdependent roles and actions may improve comprehension of clinic process, clinic efficiency, and quality of care.

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