



October 2013

# Preliminary Findings from an Interventional Study using Network Analysis to Support Management in Local Health Departments in Florida

Chin S. Park

*Columbia University, New York, NY, [csp2135@columbia.edu](mailto:csp2135@columbia.edu)*

Hado Byon

*Columbia University, New York, NY, [hbyon0633@gmail.com](mailto:hbyon0633@gmail.com)*

Jonathan W. Keeling

*Columbia University, New York, NY, [jonathan.keeling@boehringer-ingelheim.com](mailto:jonathan.keeling@boehringer-ingelheim.com)*


Leslie M. Beitsch

*Florida State University College of Medicine, [les.beitsch@med.fsu.edu](mailto:les.beitsch@med.fsu.edu)*

Jacqueline A. Merrill

*Columbia University, New York, NY, [jam119@columbia.edu](mailto:jam119@columbia.edu)*

Follow this and additional works at: <https://uknowledge.uky.edu/frontiersinphssr>

 Part of the [Health and Medical Administration Commons](#), [Health Policy Commons](#), [Health Services Administration Commons](#), and the [Health Services Research Commons](#)

### Recommended Citation

Park CS, Byon H, Keeling JW, Beitsch LM, Merrill JA. Preliminary Findings from an Interventional Study using Network Analysis to Support Management in Local Health Departments in Florida. *Front Public Health Serv Syst Res* 2013; 2(6).  
DOI: 10.13023/FPHSSR.0206.06

This Article is brought to you for free and open access by the Center for Public Health Systems and Services Research at UKnowledge. It has been accepted for inclusion in *Frontiers in Public Health Services and Systems Research* by an authorized administrator of UKnowledge. For more information, please contact [UKnowledge@lsv.uky.edu](mailto:UKnowledge@lsv.uky.edu).

---

# Preliminary Findings from an Interventional Study using Network Analysis to Support Management in Local Health Departments in Florida

## ABSTRACT

Management is the core service that integrates and coordinates essential public health services. Managers of local health departments (LHDs) are experts in practice but may not have expertise in organizational management. We conducted an evidence-based training intervention in 10 LHDs in Florida to support managers' decision-making on organizational integration and coordination. We deployed a standard survey to collect organizational network measurements pre and post intervention. We presented results as evidence-based performance feedback and interviewed managers to document how they used the results in the context of each organization. Post intervention we found unexpected, significantly higher network centralization in daily work. We attributed this increase in hierarchical communication to preparations for a statewide accreditation initiative. When QI initiatives are undertaken globally within a state, managers and leaders need to be alert for possible impact on autonomous decision-making of professionals at the point of service which could affect service delivery.

### Cover Page Footnote

Acknowledgement This study was supported by Florida State Department of Health Contract # A5530C and # A5F4B5.

Management is the core service that integrates and coordinates essential public health services. Managers of local health departments (LHDs) are experts in practice but may not have expertise in organizational management. We conducted an evidence-based training intervention in 10 LHDs in Florida to support managers' decision-making on organizational integration and coordination. We deployed a standard survey to collect organizational network measurements pre and post intervention. We presented results as evidence-based performance feedback and interviewed managers to document how they used the results in the context of each organization. Post intervention we found unexpected, significantly higher network centralization in daily work. We attributed this increase in hierarchical communication to preparations for a statewide accreditation initiative. When QI initiatives are undertaken globally within a state, managers and leaders need to be alert for possible impact on autonomous decision-making of professionals at the point of service which could affect service delivery.

## METHODS

We conducted an interventional field study using network analysis and management training in 10 LHDs that were recruited with the assistance of the Florida State Department of Health. LHD sizes ranged from 48-564 employees serving counties distributed throughout the state. Data on work-related communication between employees in each LHD were collected with a standard online survey that measured routine and frequent (daily/weekly) communication.<sup>1</sup> Following Time 1 measurement, we delivered a standard training via webinar to the management team in each LHD to translate network analysis results with visualizations and interpretation of measurements. We presented five evidence-based management strategies to address integration and coordination: cross functional teams, cross training, communication improvement, knowledge transfer, and transactive knowledge building. After Time 2 measurements, we presented study results to each LHD and conducted interviews with managers to collect qualitative data on how they applied the evidence from the intervention to decision-making.

## RESULTS

Network surveys were conducted in April 2012 and repeated in January 2013. Three LHDs were not included in our analysis due to response rates <80%, which are insufficient for reliable network analysis.<sup>2</sup> The response rates for 7 LHDs were 84-92% (mean= 88%, n= 1047) for Time 1 and 82-99% (mean= 89%, n= 1021) for Time 2. We calculated four network measurements: organizational density (representing communication across the organization); complexity (representing integration of tasks knowledge and resources); centralization (representing distributed versus hierarchical communication); and clustering coefficient (representing local information flow among small groups of employees).<sup>3</sup> These measurements were standardized between 0-1. We tested the difference in Time 1 and Time 2 measurements with paired-sample t-tests and compared the results with pre-intervention network measurements from a national sample of 23 LHDs. There was no significant difference in complexity and clustering coefficient. There were, however, significant increases in density and centralization at p-values,  $p=0.021$  and  $p=0.014$  respectively. These results are displayed in Table 1.

During our post-survey interviews with decision makers and managers, we learned that a statewide accreditation effort was implemented after our Time 1 intervention. We also learned that during this period, new PH leadership had been installed at the state level, and this was accompanied by an overall increase in attention to quality improvement.

**Table 1.** Standardized network measurements (range 0 .0 – 1.0) for 7 LHDs pre and post intervention and p values for paired T-tests, compared with a pooled national sample mean

LHD	Employees	Complexity		Clustering Coef.		Density		Centralization	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	48	0.36	0.36	0.52	0.48	0.18	0.19	0.27	0.31
2	94	0.32	0.35	0.48	0.52	0.15	0.18	0.30	0.42
3	92	0.27	0.29	0.47	0.51	0.12	0.14	0.25	0.30
4	103	0.28	0.32	0.40	0.43	0.09	0.13	0.23	0.29
5	80	0.32	0.38	0.48	0.52	0.10	0.14	0.18	0.22
6	564	0.11	0.11	0.43	0.43	0.04	0.04	0.21	0.46
7	66	0.36	0.34	0.52	0.48	0.21	0.21	0.27	0.45
Mean (SD)		0.29 (0.09)	0.31 (0.09)	0.47 (0.05)	0.48 (0.04)	0.13 (0.06)	0.15 (0.06)	0.24 (0.04)	0.35 (0.09)
Paired T-test		p = 0.10		p = 0.44		p = 0.021		p=0.014	
*National Sample Mean (SD)		0.28 (0.07)		0.51 (0.07)		0.13 (0.06)		0.26 (0.11)	

\*Pooled mean of standardized network measurements collected between 2006 and 2012 from a national sample of 23 LHDs

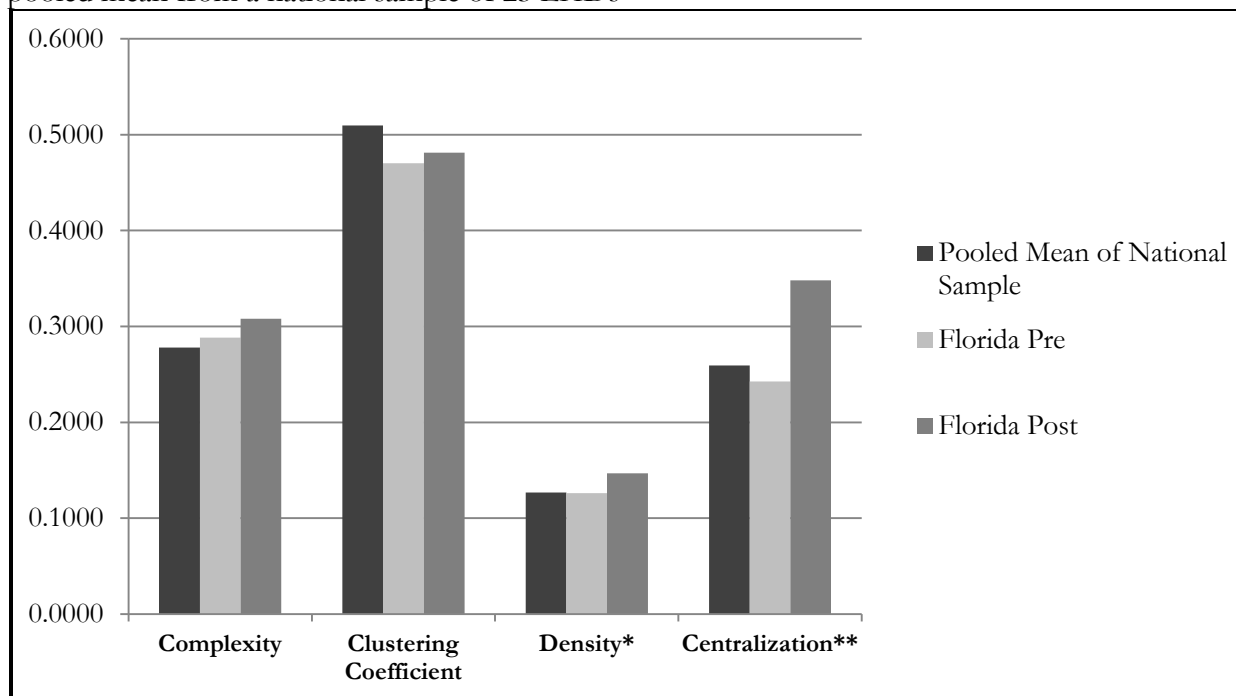
## DISCUSSION

Our analysis found that organizational centralization in daily work for all 7 local health departments increased despite our intervention. Centralization reflects the extent to which communication ties are directed to and from a core group, such as a leadership team. Measurements that approach 0.5 represent a more authoritative or “command and control” pattern of information flow, whereas measurements closer to a value of zero signify more decentralized information flow, suggesting more autonomous communication with decisions made closer to the point of services.<sup>4</sup> We suspect that our results were influenced by a concurrent statewide accreditation initiative, preparation for which required centralized efforts to identify and gather necessary documentation. A statistically significant increase in communication ties between employees (density) is consistent with this conclusion.

These findings suggest that when QI initiatives such as accreditation are undertaken globally in a state, there may be a tendency for LHDs to adopt a more hierarchical “top down” communication

in day-to-day operations. Indeed, any time-critical statewide management imperative, such as reporting requirements, budget deadlines, or a PH response, might have this effect. We have documented this phenomenon in a prior study.<sup>5</sup> Such organizational adaptation makes sense for LHD staff to meet the needs of a given situation. At the same time, centralized communication may risk distributed decision-making by skilled professionals at the point of service. Local managers and state leaders need to consider the impact of hierarchical communication on day-to-day operations to ensure quality in local public services. This may be the case particularly in states where a centralized governance model drives local activities. This study illustrates the critical importance of interpreting research results in context. It also shows how multiple interventions implemented concurrently can confound results, contaminate findings, and lead to potentially erroneous conclusions.

**Figure 1:** Means of network measurements from 7 LHDs pre and post intervention compared to pooled mean from a national sample of 23 LHDs



\*Pre/post intervention difference is significant at p-value,  $p = .021$

\*\* Pre/post intervention difference is significant at p-value,  $p = .014$

### SUMMARY BOX

**What is Already Known about This Topic?** Management integrates and coordinates essential public health services. Managers of local health departments are typically practice experts. They may benefit from interventions designed to build expertise in organizational management.

**What is Added by this Report?** In an interventional field study using network analysis to support management decision making in 10 LHDs, we found unexpected, significantly higher network centralization in daily work post intervention. We attributed this increase in hierarchical-style communication as an adaptation to the requirements of a concurrent statewide accreditation effort.

**What are the Implications for Public Health Practice, Policy, and Research?** While centralized communication serves a purpose, to maintain quality in local public services, LHD managers and state leaders may need to consider the impact of broadly implemented QI initiatives on the distributed decision-making that skilled public health professionals employ during day to day operations.

## REFERENCES

1. Merrill, J, Keeling, J, Gebbie, KM. (2009). Toward standardized, comparable public health systems data: a taxonomic description of essential public health work. *Health Services Research, 44 (5) Part II*: 1818-41
2. Borgatti, S.P., Carley, K., and Krackhardt, D. (2006). On the robustness of centrality measures under conditions of imperfect data. *Social Networks, 28*: 124–136.
3. Wasserman S, Faust K. *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press; 1994.
4. Walker, RM, Ioyne, GA, Brewer, GA (eds) *Public Management and Performance: Research Directions*. Cambridge: Cambridge University Press; 2010, p. 92
5. Keeling, JW, Pryde, J, Merrill, JA. 2013. The influence of management and environment on local health department organizational structure and adaptation: a longitudinal study using network analysis. *Journal of Public Health Management and Practice, 19(6)*: 598-605.