

PHSSR Research-In-Progress Series:

Predoctoral and Postdoctoral Research Awards

Wednesday, October 8, 2014 12noon -1pm EDT

Variations in the Costs of Delivering Public Health Services: *An Analysis of Local Health Departments in Florida*

Conference Phone: 877-394-0659

Conference Code: 775 483 8037#

Please remember to mute your computer speakers during the presentation

PHSSR NATIONAL COORDINATING CENTER AT THE UNIVERSITY OF KENTUCKY COLLEGE OF PUBLIC HEALTH

PHSSR Research-In-Progress Series

Agenda

- **Welcome: CB Mamaril, PhD**, National Coordinating Center PHSSR
- **Presenter:** *“Variations in the Costs of Delivering Public Health Services: An Analysis of Local Health Departments in Florida”*
Simone R. Singh, PhD, Assistant Professor, University of Michigan School of Public Health
- **Commentary:**
Patrick Bernet, PhD, Louisiana State University School of Public Health
Robert C. Vitto, MHA, MBA, Florida Dep’t. Health-Brevard County
- **Questions and Discussion**
- **Future Webinars and Closing**

2013-2014 Pre and Post Doctoral Research Awards (10)

One-year mentored research awards presentations

See: <http://www.uky.edu/publichealthsystems/phsr-research-progress-webinars>

- **May 14: Local Health Department–Hospital Collaborations in New York State: A Natural Experiment** -- Chris Maylahn, MPH, NYS Dept. of Health
- **June 18: Health Care Reform: Colorectal Cancer Screening Expansion and Health Disparities** -- Michael Preston, PhD, U. of Arkansas for Medical Sciences
- **Aug 13: Quantifying the Value of Public Health Intervention** -- Theresa Green, PhD, U. of Rochester Medical Center
- **Aug 27: Priorities in Rural Health: Cost-effectiveness Analysis of Fungal Meningitis Outbreak in New River Health District** -- Kaja Abbas, PhD, Virginia Tech
- **Sept 10: Improving HIV/STD Partner Services in New York State: A Performance Management Approach** -- Britney Johnson, MPH, AIDS Institute of the NYS Dep't. of Health & NY Public Health PBRN
- **Sept 24: State Health Department and National Food Safety Surveillance Concordance: A Pilot Study** -- Fanta Purayidathil, PhD, Manager, Boehringer Ingelheim
- **Oct 8: Variations in the costs of delivering public health services: An analysis of local health departments in Florida** -- Simone Singh PhD, U. of Michigan School of Public Health



***Variations in the Costs of Delivering
Public Health Services:
An Analysis of Local Health
Departments in Florida***

Simone R. Singh, PhD
Assistant Professor
University of Michigan School of Public Health

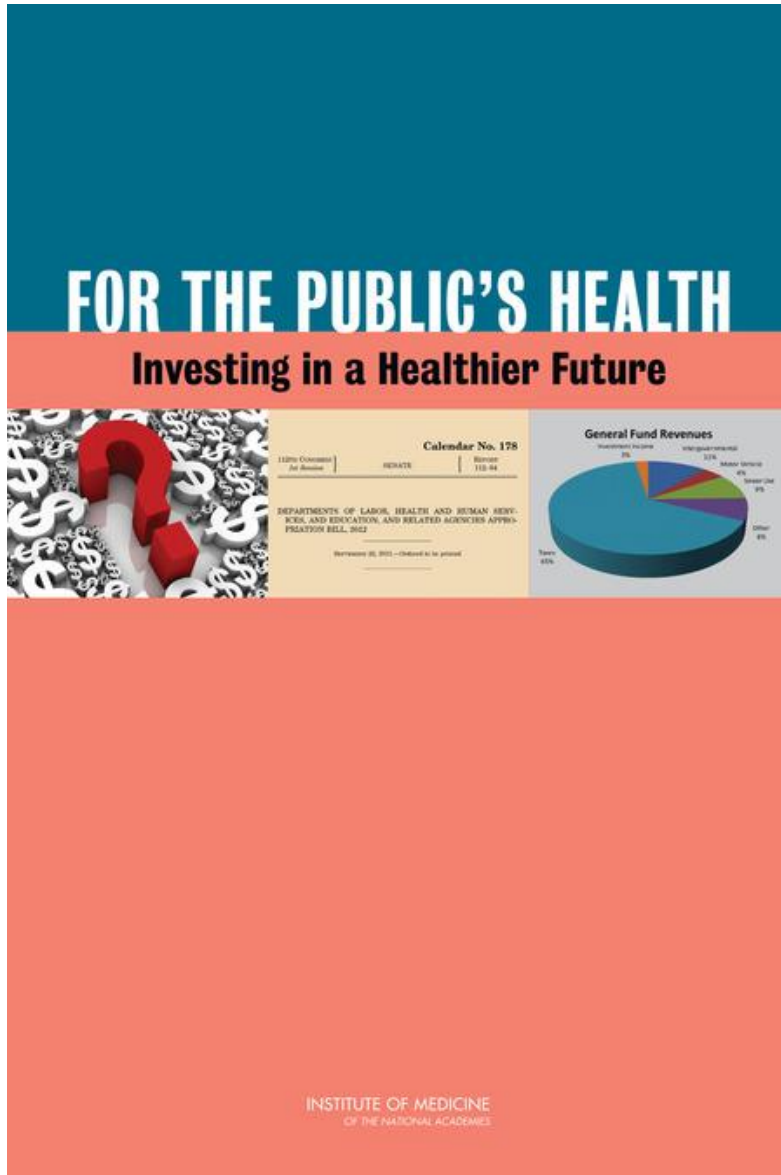


Acknowledgements



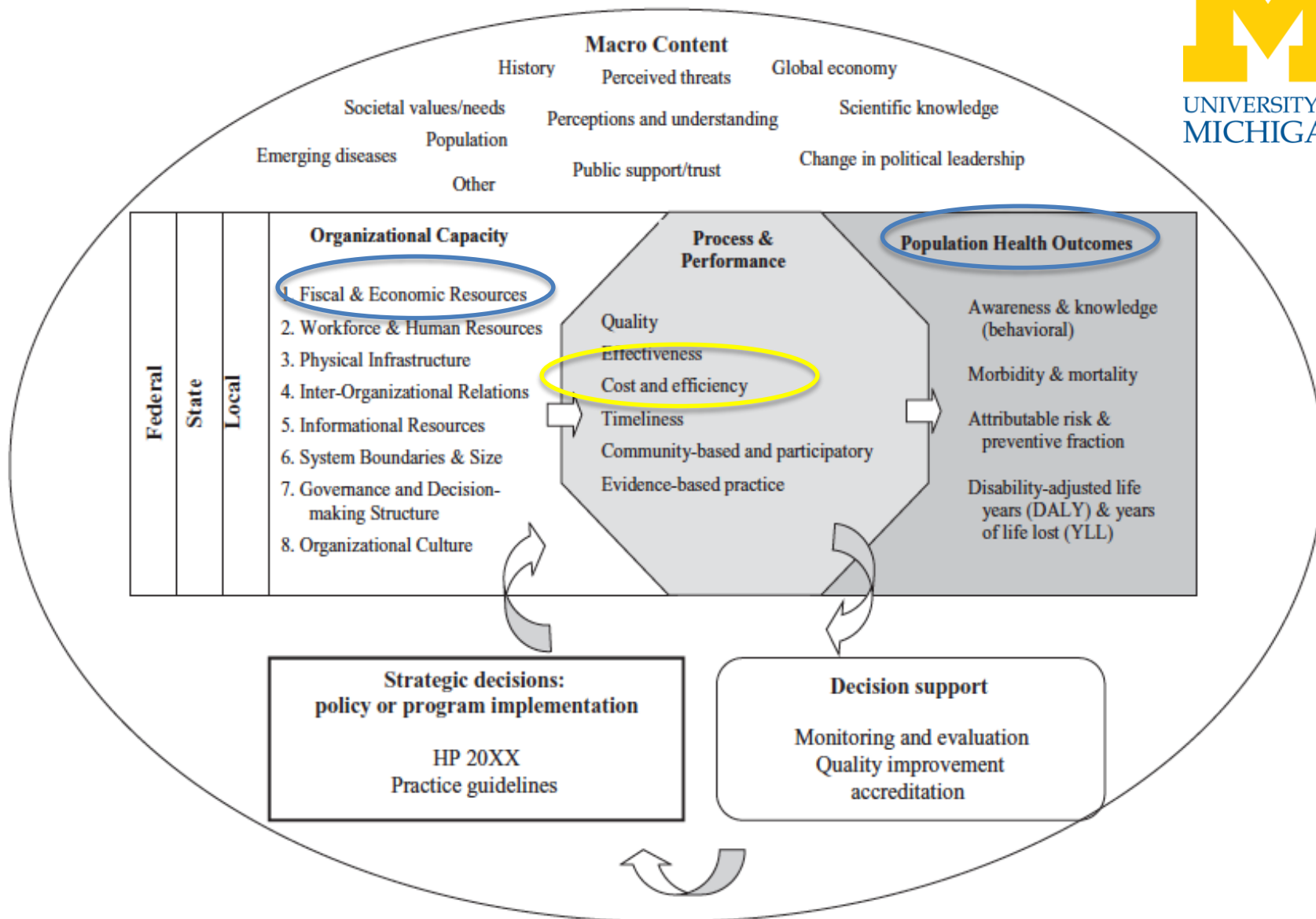
- Data for this study was made available by Dr. Patrick Bernet and the Florida Public Health Data Collaborative.
- Funding for this research was provided by Grant Number N016299 from the Robert Wood Johnson Foundation.

Context



Recommendation:

Increase federal funding for public health to ensure that public health agencies have the resources to invest in healthier communities.



Costing Public Health Services



- Surprisingly little is known about the costs that LHDs incur in providing public health services
 - Limited capacity/expertise to collect cost information
 - Lack of a standard chart of accounts
- Without understanding costs
 - Policymakers lack information about resources needed and used by LHDs
 - Practitioners fly blind when deciding how to use resources

Research Questions



1. How much does it cost LHDs to provide select core public health services? How do costs vary across LHDS?
2. What factors drive LHDs' costs of service provision focusing on the importance of economies of scale and scope?

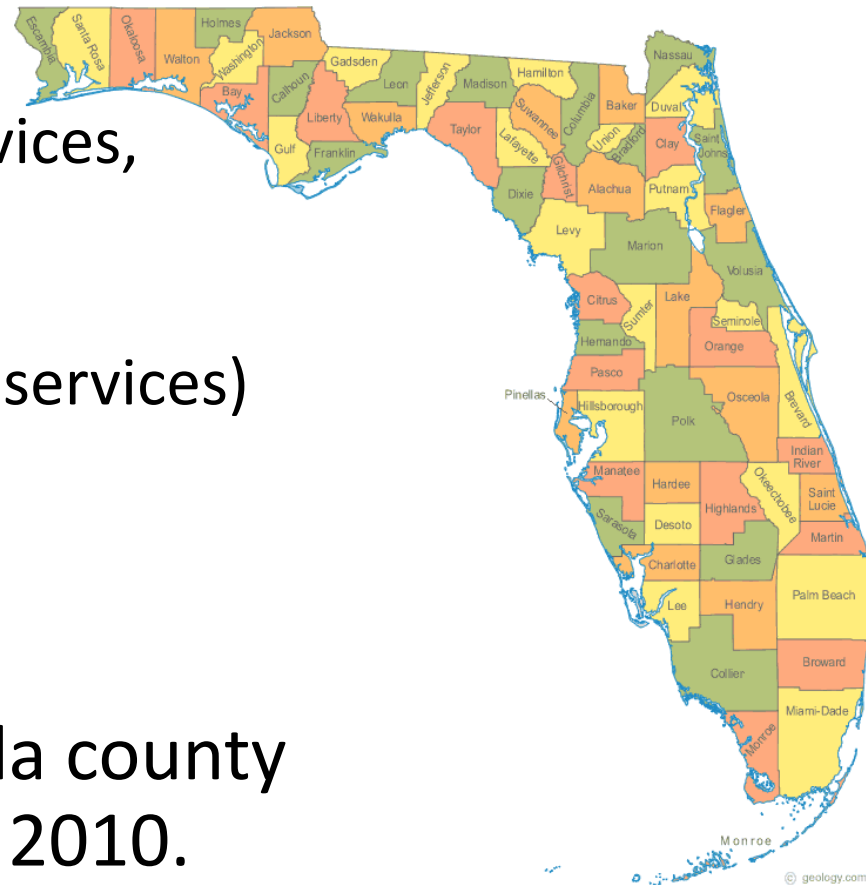
Core public health services analyzed:

- Communicable disease surveillance and investigation
- Chronic disease prevention
- Food hygiene services
- Onsite sewage treatment and disposal services
- Vital records services

Data and Sample



- Data came from three sources:
 - Florida Department of Health (Expenditures, number of services, number of clients served)
 - NACCHO Profile Studies (LHD characteristics, scope of services)
 - Area Resource File (Community characteristics)
- Sample included all 67 Florida county LHDs for the years 2008 and 2010.



Measures of Costs



- Total cost
= Total cost of providing services in a given service line including direct and indirect components.
- Cost per service
= Total cost / Number of services provided
- Cost per capita
= Total cost / Number of clients served

Table 2. Total cost and cost per service for five select public health services, 2010

Public health activity	Total cost	Cost per service			
	Mean (SD)	Median	25 th percentile	75 th percentile	75 th /25 th percentile ratio
Communicable disease surveillance and investigation	\$177,640 (\$296,456)	\$128	\$74	\$503	5.8
Chronic disease prevention	\$187,911 (\$295,105)	\$470	\$290	\$1,446	4.0
Food hygiene	\$107,910 (\$151,103)	\$104	\$74	\$133	0.8
Onsite sewage treatment and disposal	\$329,423 (\$291,648)	\$141	\$101	\$209	1.1
Vital records	\$181,276 (\$274,017)	\$6.37	\$5.18	\$9.73	0.9

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Economies of Scale

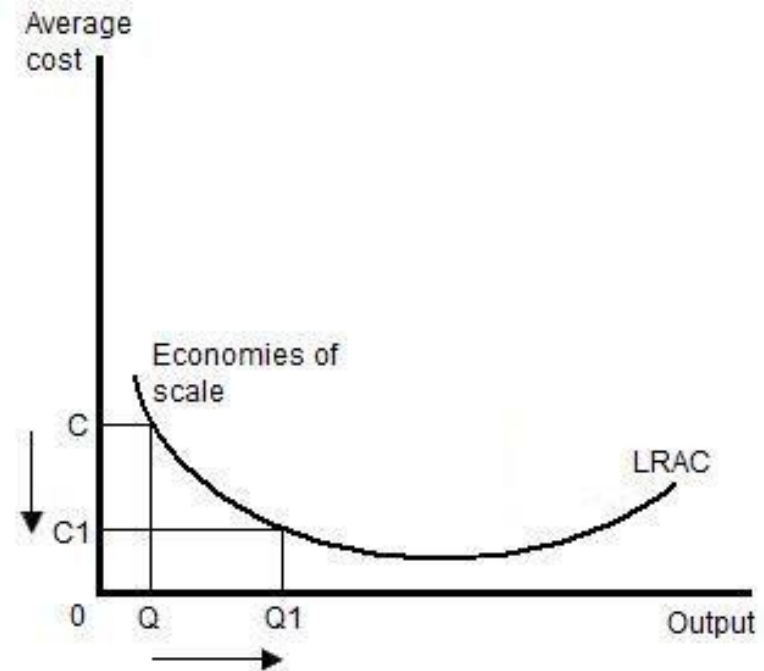


- Theories of economies of scale suggest that cost per unit decreases as more units are produced.

✓ Fixed costs can be spread over more units, reducing per unit costs.

✓ Higher volumes permit specialization of staff, allowing each staff member to work at the top of their license.

✓ Scale diseconomies can result from an organization becoming too large such that communication flows break down, bureaucratic inertia sets in, and principal/agent problems develop.

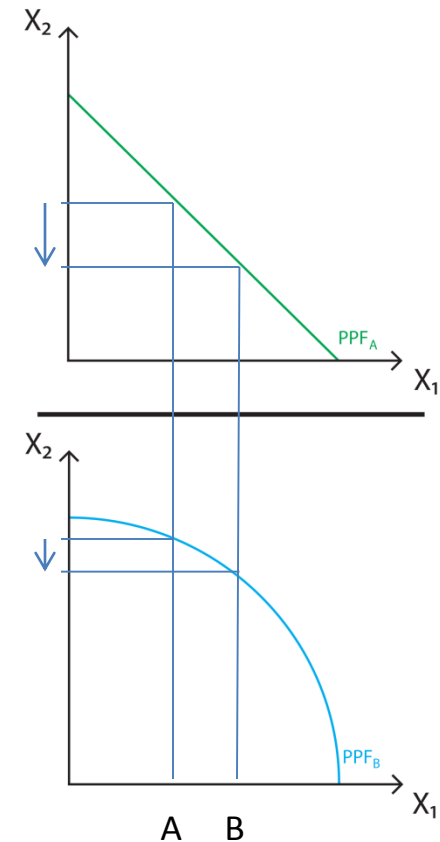


Economies of Scope

- Theories of economies of scope propose that cost per unit decreases as more different services are produced.

✓ Scope economies exist if larger LHDs, for instance, consolidate a variety of services and thereby reap the benefits of lower costs from joint production.

✓ Scope diseconomies may be the result of small LHDs being required to provide a wide variety of services.

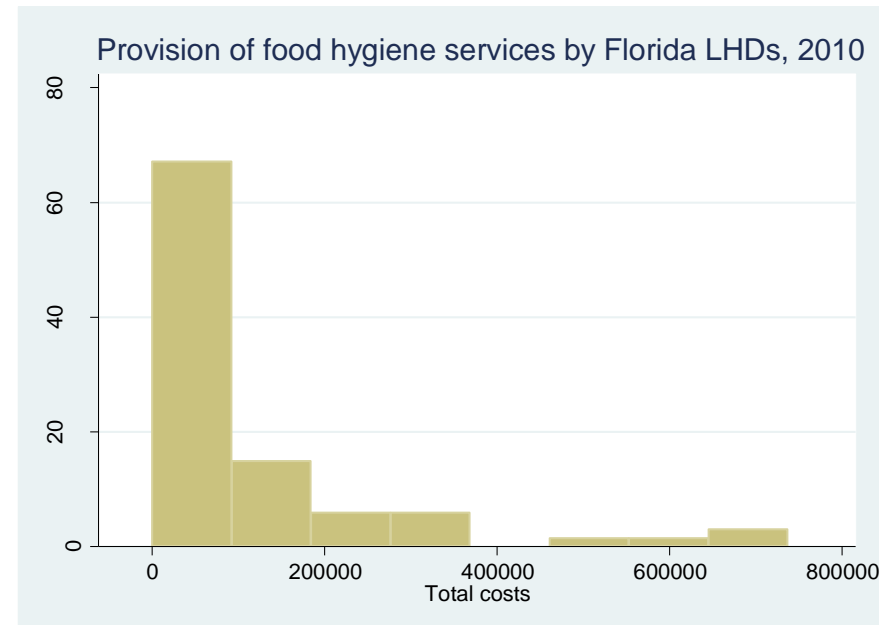


Multivariate Model



$\text{Log}(\text{Cost}) = f(\text{Economies of scale, economies of scope, agency, population, community characteristics})$

- Cross-sectional analysis using OLS regressions
- Separate models for each public health service
- Dependent variable logged as costs were highly skewed



Measures of Economies of Scale and Scope

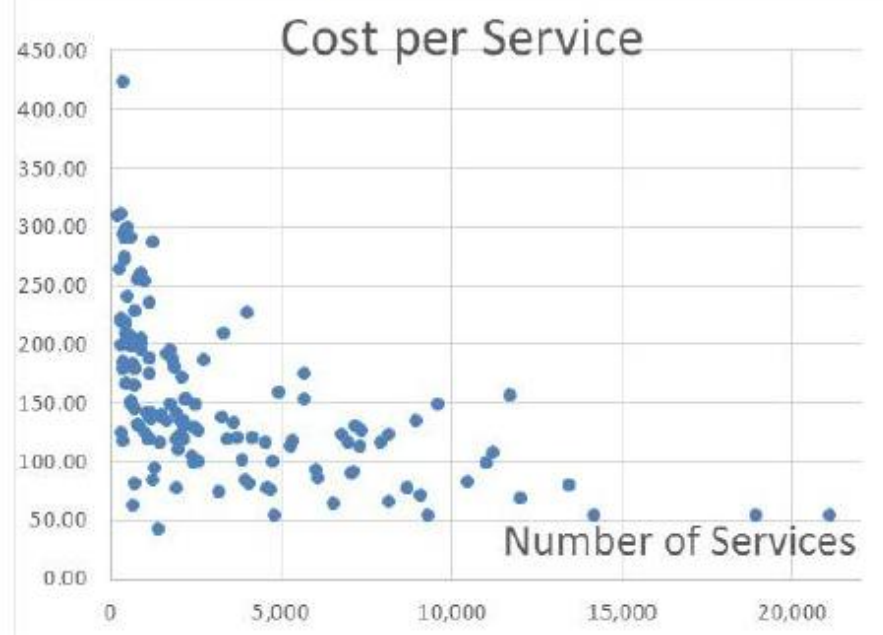
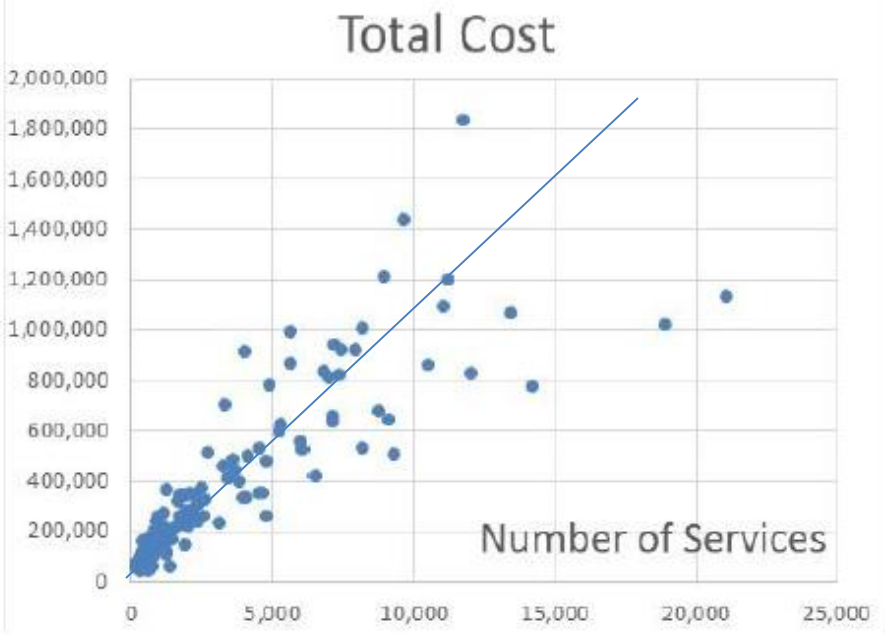


- Economies of scale are measured as
 - Number of services provided
 - Squared number of services provided
- Economies of scope are measured as six categories of services indicating the proportion of services in each category provided by the LHD itself
 - Clinical preventive services
 - Medical care services
 - Specialty services
 - Population-based services
 - Regulatory and licensing services
 - Environmental health services

Cost and Volume of Services



Onsite sewage treatment and disposal



Multivariate Findings

Dep. Variable: Log (Cost)



	Commun disease	Chronic disease	Food hygiene	Onsite sewage	Vital records
Scale of services					
Services (1,000)	0.48**	0.23	1.95**	3.50**	0.074**
Services ² (1,000,000)	-0.19**	-0.09	-0.31**	-0.013**	-0.00034**
Scope of services					
Clinical preventive	-0.76	0.95	0.59	-0.07	-1.35
Medical care	-0.67	0.32	-0.35	-0.15	0.12
Specialty	0.13	-0.30	-0.22	0.22	-0.25
Population-based	1.46	1.53*	0.14	-0.31	-0.78
Reg and licencing	0.87	0.34	0.52	0.10	0.67
Environ health	0.04	-0.82	-0.31	-0.10	0.46
Adjusted R-squared	0.68	0.56	0.84	0.86	0.71

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Multivariate Findings

Example: Food hygiene services



	Log (Cost)	Cost per service	Cost per capita
Scale of services			
Services (1,000)	1.95**	-35.49*	-0.17*
Services ² (1,000,000)	-0.31**	9.66*	0.045*
Scope of services			
Clinical preventive	0.59	67.14	0.16
Medical care	-0.35	48.60	-0.26
Specialty services	-0.22	-43.36*	-0.14
Population	0.14	7.18	0.12
Reg and licencing	0.52	10.24	0.034
Environ health	-0.31	-44.76	-0.16
Adjusted R-squared	0.84	0.32	0.27

Key Findings



- **Evidence of economies of scale:**

Although larger numbers of services were generally associated with higher total costs, the negative coefficient on services squared indicates that costs increased less than proportionally.

- **No evidence of economies of scope:**

Producing a greater range of services was generally not associated with lower costs.

Discussion



- Findings of economies of scale hardly surprising, yet have implications for organization of public health at the local level.
- Findings of scale economies also pose challenges, esp. for smaller LHDs which may need to rely on contracted services or partnerships more than larger LHDs.
- Breadth of service provision was not associated with variations in costs; finding is encouraging in public health settings where many LHDs are expected to provide a minimum package of core services.

Limitations



- Data from only one state (Florida) and two years (2008 and 2010)
 - Limited generalizability to other states and time frames
- Study only looked at five services.
- Variation in costs may be due to factors not controlled for in analysis including variation in types and quality of services provided

Implications for Policy and Practice



An in-depth understanding of their cost structure presents an opportunity for LHDs

- to communicate to policymakers information about the resources needed to provide essential public health services
- to engage in activities aimed at increasing the efficiency of service provision
- to make better decisions about partnerships or shared services, which may help lower costs and increase efficiency

Publications



- Singh, S.R. 2013. “Efficiency in public health service delivery: An analysis of clinical health services provided by local health departments in Florida.” *Frontiers in Public Health Services and Systems Research* 2 (7): Article 3.
- Singh, S.R. and Bernet, P.M. 2014. “Economies of scale and scope in public health: An analysis of food hygiene services provided by local health departments in Florida.” *Frontiers in Public Health Services and Systems Research*: 3 (3): Article 5.
- Bernet, P.M. and Singh, S.R. “Economies of scale in the production of public health services: An analysis of local health districts in Florida.” (forthcoming in *American Journal of Public Health*)
- Singh, S.R. “Public health spending and population health: A systematic review.” (forthcoming in *American Journal of Preventive Medicine* in Nov 2014)



Thank You

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Additional Multivariate Results



	Communicable disease surveillance and investigation	Chronic disease prevention	Food hygiene	Onsite sewage treatment and disposal	Vital records
Public health agency characteristics					
Revenue from local sources (%)	-3.47	-1.56	2.39	-0.20	-0.15
Revenue from state sources (%)	-3.23	2.10	-0.47	-0.79	-2.70
Revenue from federal sources (%)	-3.16	2.88	1.55	-1.37*	-4.91
Revenue from clinical services (%)	-3.90*	1.12	-0.46	-0.79	-0.74
Population and community characteristics					
Population per square mile (1,000)	-0.02	0.88**	0.26	0.08	-0.05
Percent population nonwhite (%)	-0.01	0.01	0.020*	0.00	-0.01
Percent with college education (%)	11.31*	2.27	4.79	1.78	8.34*
Percent 65+ years old (%)	0.85	-0.24	2.39	-1.02	-0.96
Income per capita (log)	1.26	1.20	0.30	0.10	-0.68
Percent uninsured (%)	0.00	0.02	0.02	-0.02	0.04
Year 2008 (reference = 2010)	0.22	0.72**	0.14	0.16	-0.04
Model					
Constant	-2.14	-5.62	3.39	11.71**	18.10*
Adjusted R2	0.68	0.56	0.84	0.86	0.71
N	111	115	115	115	115

Commentary



Patrick M. Bernet, PhD, MBA

Associate Professor

Louisiana State University School of Public Health



Robert C. Vitto, MHA, MBA

Financial Administrator

Florida Department of Health-Brevard County

Questions and Discussion

Future Webinars – PHSSR Research in Progress

All webinars from 12-1 pm, ET

Oct 29 – Response Willingness Among the Public Health Workforce and Emergency Preparedness Laws

Daniel Barnett, MD, MPH, Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health

Nov 12 – Trends and Characteristics of the State and Local Public Health Workforce

Angela J. Beck, PhD, MPH, Associate Director, Center of Excellence in Public Health Workforce Studies, University of Michigan

Future Webinars – PHSSR Research in Progress

All webinars from 12-1 pm, ET

Dec 3 – Relationship Between Public Health Workforce Competency, Provision of Services, and Health Outcomes in Tennessee

Robin Pendley, DrPH, *formerly* Health Services Management and Policy, College of Public Health, East Tennessee State University

Dec 10 – Integrating Public Health and Healthcare: Lessons from One Urban County

Erik L. Carlton, DrPH, Health Systems Management and Policy, School of Public Health, University of Memphis

Commentary: Paul Erwin, MD, DrPH, Dept. of Public Health, University of Tennessee

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