

**UTILIZING PHUND\$ AND COST-BENEFIT ANALYSIS
TO EVALUATE FINANCIAL EFFICIENCY
AT THE LOCAL PUBLIC HEALTH UNIT**

Submitted to: *Center for Sharing Public Health Services*

Authors:

Mark A. Strand, PhD,^a
Justice Witt^b
Kelly Nagel, MS, LRD^c
Tami Dillman, MBA^d and
Robin Iszler, RN^e

October 2015

^a Corresponding author: Mark A Strand, Professor, Pharmacy Practice, Master of Public Health Program, North Dakota State University, P.O. Box 6050, Fargo, ND, 58108. Phone 701-231-7497. Email: Mark.Strand@ndsu.edu

^b Student, Pharmacy Practice, University of Minnesota Duluth, Duluth, MN. Email: wittx086@d.umn.edu

^c Public Health Liaison, North Dakota Department of Health, Bismarck, ND. Email: kjnagel@nd.gov

^d Finance Director, Central Valley Health District, Jamestown, ND. Email: tdillman@nd.gov

^e Administrator, Central Valley Health District, Jamestown, ND. Email: riszler@nd.gov

ABSTRACT

Local public health units around the country are under significant financial constraints. Seven counties in the Southeast Central Region of North Dakota established a cross-jurisdictional collaborative to increase financial efficiency through shared delivery of public health services. This paper reports on the cost-benefit analysis instrument designed by the collaborative and the ways it was used to analyze current financial efficiency with regard to service delivery. The instrument allowed for the cost-per-beneficiary to be calculated, as well as the portion of the cost of delivering the service that was dependent on public subsidization. Emergency preparedness and tobacco prevention were determined to be the lowest cost per beneficiary, while the Ryan White program and chronic disease management were determined to be the highest cost per beneficiary. These results were used by the collaborative to do strategic planning with regard to service delivery and opportunities for collaboration.

KEYWORDS

local health department, cost-benefit, public health services

CONFLICTS OF INTEREST AND SOURCE OF FUNDING

Strand received reimbursement for his role as consultant on this grant. Nagel is employed by the North Dakota State Department of Health, who provided funding for this grant. For the remaining authors none were declared. Funding for this research was provided by North Dakota Department of Health, grant number 13.419.

BACKGROUND

There is growing pressure on local public health units (LPHU) to increase their financial efficiency (1, 2). Seven LPHUs in the Southeast Central Region of North Dakota formed a collaboration to increase work performance and financial efficiency. The region has a population of 53,943 predominantly rural people with an agriculture-based economy. The Southeast Central Region had a total public health budget of \$4.36 million in 2012. All of the LPHUs were small according to the National Association of County and City Health Officials (NACCHO) membership categories (3) and had a combination of 35 full- and part-time public health staff, 50 percent of whom were trained in nursing. This paper reports on their work to determine overall financial efficiency in the region, with the long-term goal of cross-jurisdictional collaboration in order to increase efficiency and service quality.

METHODS

PHUND\$

As part of the gap analysis process, financial analysis was conducted for the year 2012. The method of analysis used was Ratio and Trend analysis through the use of the Public Health Uniform National Data System (PHUND\$). PHUND\$ is a national web-based data collection hosted by NACCHO. Data collected in PHUND\$ generates reports for use by LPHUs to measure the financial health of their agencies. Analysis was conducted on each of the seven health agencies in the Southeast Central Region of North Dakota collaboration and compared all U.S. agencies that have been assessed by PHUND\$ (n=400).

Definitions used in PHUND\$: ***Revenue per capita*** quantifies funds (monies) acquired by the LPHU per person in the jurisdiction (city, county, region) for public health services. ***Total margin*** is a ratio—the difference between revenues and expenditures divided by revenues—that measures the amount of surplus or deficit generated by each dollar of revenue and which indicates the agency's ability to control expenses and/or generate surplus revenue to fund operations or program activities. ***Administrative expenditures*** as a proportion of total

expenditures shows the costs associated with the administrative staff and functions as a percent of total costs for the entire budget for the LPHU.

Cost-Benefit Analysis Instrument Design

Cost-benefit analysis of services provided was calculated using an instrument created by the authors (which is provided in the appendix and available from the authors upon request). This instrument relied on data as entered by the administrator or an assigned person from each LPHU. The data collected on each service provided was: full-time equivalents (FTEs) devoted to that project, overall cost of the project, income generated by the project from third-party payers or out-of-pocket payments (excluding grants, and state or federal allocations), and the number of individual beneficiaries of that project. Beneficiary used individual persons as the unit of measure, without consideration for the variable level of benefit that would be received from different services. From this data, researchers calculated the cost per person served, service-generated income, public subsidy necessary to run the project, and portion of the cost dependent on public subsidization. These results were then averaged over all participating LPHUs, so that the services could be ranked by cost per beneficiary and by public subsidy as portion of the total cost. This allowed for project-by-project and inter-county comparison of the services delivered in order to determine which were the most cost efficient.

RESULTS

Revenue per capita (*Table 1* on page 3) in the Southeast Central Region of North Dakota (\$48.23) is comparable to the mean revenue for all agencies (\$50.33) included in the PHUND\$ database. Local county/city revenue per capita was even stronger in the Southeast Central Region of North Dakota (\$21.83) when compared to all assessed counties (\$15.38).

The seven counties in the Southeast Central Region collaboration had a mean total margin of 0.02 in 2012 (*Table 1*). This means that that their total revenue exceeded expenditures by an average of 2 percent. These results confirm the fiscal responsibility of the seven LPHUs in the present study compared to others around the country.

Table 1. Comparative results of PHUND\$ analysis of the Southeast Central Region of North Dakota and other Local Public Health Units

Unit	Total Revenue per Capita	Local County/City Revenue per Capita	Total Margin	Administrative Expenditures as Percentage of Total Expenditures
Southeast Central Region of North Dakota Network (n=7)	\$48.23	\$21.83	2%	13.78%
All Assessed U.S. Counties (n=400)	\$50.33	\$15.38	-3%	20.44%

Another way to consider overall fiscal efficiency is to consider the portion of expenses going toward administrative expenses. The Southeast Central Region of North Dakota appears to have great operating efficiencies with administrative expenditures (*Table 1*). The mean for the Southeast Central Region of North Dakota was 13.78 percent, compared to 20.44 percent for all assessed U.S. counties. Such operating efficiencies allows for a greater proportion of the operating revenues to be targeted to public health program services. Frequently a target benchmark is set of less than 15 percent going to administrative expenses, which includes promotion and fundraising. So these counties are already allocating a high proportion of funds to service delivery. Keeping administrative expenditures low is difficult when they have such a vast array of projects and sources of funding. Operating on less than 10 percent administrative expenses is unlikely, so in order to achieve increased fiscal efficiency, it will be necessary to evaluate this issue at the level of services provided. This analyses follows.

The cost-benefit analysis (*Table 2* on page 4) compared each of the service areas according to cost per person benefiting from the program (*Table 2*, column 2) and the portion of the cost that was recovered by billing for the service (column 5). (The spreadsheet used to create *Table 2* is available in the appendix.) For example, elderly home care cost \$79.06 per person served, 34.5 percent of that cost was recovered from billing for the service. Conversely, the public portion of support for this service was only 65.5 percent of the total cost. The same analysis was done for all the services listed in *Table 2*.

Table 2. Cost-benefit analysis of services provided in the Southeast Central Region of North Dakota

Number Served in Region	Cost(\$)/ Person	Service-Generated Income	Public Subsidy (\$ per person)	Percent of Cost Dependent on Public Subsidy	Services Provided in More than Two Counties	Rank by Cost per Beneficiary (1=lowest cost)	Rank by Public Subsidy as Percent of Total Cost (1=lowest percent)
53,943	\$0.25	\$0.00	\$0.25	100.0%	Emergency Preparedness	1	17
53,943	\$15.57	\$0.00	\$15.57	100.0%	Tobacco Prevention	2	17
22,572	\$16.28	\$0.14	\$16.15	99.2%	Health Education	3	15
7,512	\$23.51	\$4.31	\$19.20	81.7%	School Nursing	4	8
103	\$30.89	\$0.00	\$30.89	100.0%	Worksite Wellness	5	17
384	\$33.59	\$0.57	\$33.02	98.3%	Tuberculosis Screening	6	14
1,690	\$47.55	\$0.04	\$47.51	99.9%	Traffic Safety	7	16
3,414	\$48.42	\$2.65	\$45.77	94.5%	Title III/Aging Services	8	12
4,044	\$56.81	\$15.21	\$41.60	73.2%	Environmental Health	9	7
3,350	\$58.02	\$9.85	\$48.18	83.0%	WIC	10	9
204	\$66.42	\$52.19	\$14.23	21.4%	Jail Nursing	11	1
378	\$75.28	\$1.87	\$73.41	97.5%	Car Seats, Injury Prevention	12	13
10,886	\$78.05	\$37.41	\$40.64	52.1%	Immunizations	13	5
2,087	\$79.06	\$27.28	\$51.79	65.5%	Elderly Home Care	14	6
13,736	\$114.00	\$7.52	\$106.48	93.4%	Office Nurse/Nurse of the day	15	11
1,606	\$133.75	\$104.17	\$29.58	22.1%	Certified Home Care	16	2
486	\$206.28	\$122.95	\$83.33	40.4%	Health Tracks (children on Medicaid)	17	4
248	\$230.55	\$0.00	\$230.55	100.0%	Women's Way (breast and cervical cancer screening)	18	17
262	\$246.56	\$19.22	\$227.34	92.2%	MCH Home Visits	19	10
21	\$260.31	\$0.00	\$260.31	100.0%	Tobacco, Baby and Me	20	17
828	\$290.28	\$188.96	\$101.31	34.9%	Family Planning	21	3
283	\$344.57	\$0.00	\$344.57	100.0%	Chronic Disease Management	22	17
72	\$2,090.90	\$0.00	\$2,090.90	100.0%	Ryan White	23	17

The services were then ranked by cost per beneficiary, with one being the lowest cost (Table 2, column 7). Emergency preparedness and tobacco prevention were ranked first and second lowest cost per beneficiary. Alternatively Ryan White (subsidized HIV care) and chronic disease management were the most expensive per beneficiary. Finally, each service was ranked by public subsidization as a portion of the total cost, with one being the service with the lowest subsidized portion (Table 2, column 8). The highest ranked service was jail nursing, where the LPHUs were being reimbursed 78.6 percent of the cost of providing jail nursing services and the other 21.4 percent was dependent on public subsidy.

Figure 1. Infographic comparing the size of the workforce devoted to five representative services to the size of the population served by that service.

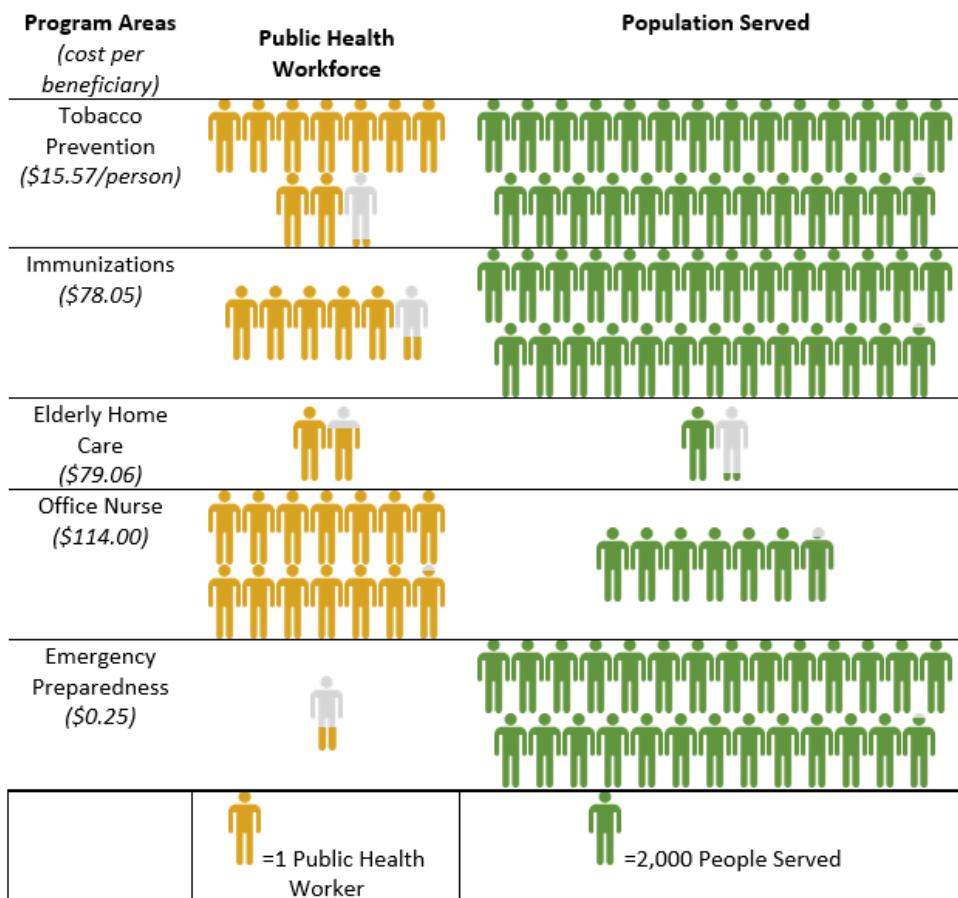


Figure 1 (page 5) highlights several public health service areas that the Southeast Central Region of North Dakota considered to be high priority services. This infographic illustrates the number of public health workers devoted to these service areas (column 2), and the cost per beneficiary (column 1), in comparison to the number of people who benefit from the service (column 3). Here one can see that the number of staff members devoted to covering the clinic as office nurses is large, and serve a relatively small number of patients. Additionally, it is delivered at a high cost (\$114.00 per beneficiary). The same comparisons can be made for the other services shown in *Figure 1*. From *Figure 1*, one also can see what a large number of persons in the health care workforce are devoted to tobacco cessation and control activities. Tobacco prevention is a high priority public health activity, but as the tobacco settlement money declines, it will be challenging to fund this service and support a substantial portion of the public health workforce.

DISCUSSION

The purpose of this project was to identify opportunities for improved efficiency and improved quality of service delivery through greater cross-jurisdictional collaboration. The delivery of public health services is one of the main objectives of the LPHUs, so it was imperative that the cost-benefit of the public health services was analyzed.

The positive total margin of 2 percent in the Southeast Central Region determined by the PHUND\$ analysis shows the LPHUs are administering their budget responsibly. Their revenue exceeds their expenses. This is in comparison to 400 LPHUs around the country, whose average total margin is -3 percent. Some government agencies are in the habit of overspending and then requesting additional funding to cover the difference, but this is not responsible and does not give a positive impression to legislators and the general public.

The Southeast Central Region also has shown high efficiency as demonstrated by only spending 13.78 percent of their revenue on administrative expenses. This is compared to other U.S. LPHUs, who spend on average 20.44 percent on administrative expenses. This shows that the Southeast Central Region of North Dakota is putting its workforce to work delivering services, and doing so with a minimum of administrative expenses.

The cost-benefit analysis allowed the public health administrators to see the true cost of delivering a service. It also allowed for a comparison of the cost-benefit of different services. Determining the portion of the cost of a service that depends on public subsidization allowed the administrators to evaluate the vulnerability of the service in the face of sequestration and declining funding. In this analysis one can see the relative financial sustainability of jail nursing and the vulnerability of tobacco prevention work, in the absence of complete subsidization.

There were many challenges and opportunities that this gap analysis has revealed. There is evidence that rigorous evaluation of the financial and service operations of the LPHU can lay the groundwork for significant reform and improvement (4). This gap analysis has demonstrated many areas of operation at the LPHU that can be considered when one is striving to improve the overall performance.

The results of this analysis also was used by boards and respective leaders from the LPHU to evaluate how each service related to broader strategic planning. This included consideration of benefit achieved for the cost, essentiality of that service to the achievement of their mission, financial sustainability of the service, strength of the evidence suggesting the value of the service, and ranking of that service in meeting distinct local needs.

Service provision from a public health perspective should give priority to population-based needs, in particular to those people with limited or no access. But in the competitive climate, it is necessary for public health to be more innovative (5). It is possible that the collaborative can strengthen sustainability by increasing the number of billable services, such as medication fills, foot care and chronic disease management. However, this may or may not align with their mission. The LPHUs and their health boards would benefit from strategic planning which includes restating their expectation for the balance between billable and subsidized services.

Clinical services offer the strongest revenue-generation potential (5). There is much debate currently over whether LPHUs should be providing clinical services. The trend nationally is to discontinue clinical services, but this trend assumes that the Affordable Care Act, including Medicaid expansion, will successfully address health care service deficiencies in some

populations (6). But in rural areas, the LPHUs are the only subsidized health care available for many underserved patients, and therefore are compelled to continue to provide some clinical services (7).

The current organizational structure in LPHUs is heavily reliant on governmental transfers of funds or contracting to purchase public health services. The sustainability of this model is threatened by both economic and political swings. If the economy declines, as has been the case since 2008, public funds available for public health are limited, and cuts and so-called sequestration are inevitable (8-10). Likewise, when conservative political forces hold sway, support for public services wanes. Public health has two possible responses to this situation. They can increase advocacy efforts and intensify campaigning for increased public health funding. Alternatively, they can become more entrepreneurial and seek ways to increase revenue through such entrepreneurship (5). In order to do so, they need sufficient political independence, and discretionary funding, such as property tax levies and reimbursement for clinical services to have discretionary funds available to innovate. The North Dakota Southeast Central Regional Network LPHUs are receiving comparable revenue per capita to other U.S. counties, \$48.23 and \$50.33, respectively. However, these Southeast Central Region of North Dakota LPHUs have a significantly greater portion of that revenue coming from local county and city sources, \$21.83 and \$15.38, respectively. Being thus less dependent on state and federal revenue, they are able to be more innovative under this local authority.

All that being said, traditional public health services offer only limited entrepreneurial opportunities (5). Barriers facing public health entrepreneurship include a governmental culture that does not support entrepreneurship, governance structures that are unsuited to developing revenue-generating activities, public budgets, and management challenges, such as inability to replace underperforming employees.

Limitations

It is not possible to create a unit to measure “benefit” that is consistent across all public health services. For example, the benefit a person receives from living in a community with good

smoke-free legislation, or from receiving a vaccination, or from receiving a home medical visit, or from receiving general environmental health services, are not equal in value. However, in this paper, they are treated as equivalent.

CONCLUSION

Public health in the U.S. faces the competing challenges of increasing work responsibilities and decreasing revenue. In this era of declining public health revenues and sequestration, LPHUs are expected to do more with less. This paper has introduced the experience of one public health region to face this challenge by evaluating their financial performance using cost-benefit analysis. This process has allowed this public health region to manage their work plan more strategically. It also has provided the evidence they need to make a stronger case to their constituents and their legislators regarding their current level of financial efficiency, and the justification for increasing the funding they receive.

REFERENCES

1. Carman A, Timsina L, Scutchfield F. Quality improvement activities of local health departments during the 2008-2010 economic recession. *Am J Prev Med.* 2014;46(2):171-4.
2. Ingram R, Bernet P, Costich J. Public health services and systems research: The current state of finance research. *J Public Health Man.* 2012;18(6):515-9. doi: 10.1097/PHH.0b013e31825fbb40.
3. Leep C, Shah G. NACCHO National Profile of Local Health Departments study: The premier source of data on local health departments for surveillance, research, and policy making. *J Public Health Man.* 2012;18(2):186-9.
4. Honore PA, Stefanak M, Dessens S. Anatomy of a public health agency turnaround: The case of the General Health District in Mahoning County. *J Public Health Man.* 2012;18(4):364-71.
5. Jacobson PD, Wasserman J, Wu HW, Lauer JR. Assessing Entrepreneurship in Governmental Public Health. *Am J Public Health.* 2015;105(S2):S318-S22. doi: 10.2105/AJPH.2014.302388.
6. Hsuan C, Rodriguez HP. The adoption and discontinuation of clinical services by local health departments. *Am J Public Health.* 2014;104:124-33.
7. Institute of Medicine. For the public's health. Investing in a healthier future. Washington, DC: Institute of Medicine; 2012.
8. Willard R, Shah G, Leep C, Leighton K. Impact of the 2008-2010 economic recession on local health departments. *J Public Health Man.* 2012;18(2):106-14. doi: 10.1097/PHH.0b013e3182461cf2.
9. McDonough J. Budget sequestration and the U.S. health sector. *N Engl J Med.* 2013;368:1269-71. doi: 10.1056/NEJMp1303266.
10. Ye J, Leep C, Newman S. Reductions of budgets, staffing, and programs among local health departments: Results from NACCHO's economic surveillance surveys, 2009-2013. *J Public Health Man.* 2015;21(2):126-33. doi: 10.1097/PHH.0000000000000074.

APPENDIX. COST BENEFIT ANALYSIS

Services	Costs								Income	Public subsidy		Beneficiaries	
	A FTEs for that service	B Avg annual salary	C (A*B) Personnel cost	D Transportation (miles per month)	E (D*\$.58*12) Transportation cost	F Supply cost per year	G (Operation cost* [A/total FTEs]) ^a Apportioned operating costs	H (C+E+F+ G) Total cost (per year)		I Service- generated income ^b	J (H-I) Public subsidy (\$ per person)	K (J/H) % of cost dependent on public subsidy	L Number of individuals served per year
Immunizations													
Tobacco Prevention													
Health Tracks (children on Medicaid)													
Blood Pressure Screening													
Elderly Home Care													
Medication Fills/Set-ups													
Foot Care													
Office Nurse/Nurse of the day													
Limited Environmental Health													
Car Seats													
Injury Prevention													
Tuberculosis Screening													
MCH Home Visits													
Diabetes Screening													
Family Planning													

Services	Costs								Income	Public subsidy		Beneficiaries	
	A FTEs for that service	B Avg annual salary	C (A*B) Personnel cost	D Transportation (miles per month)	E (D*\$0.58*12) Transportation cost	F Supply cost per year	G (Operation cost* [A/total FTEs]) ^a Apportioned operating costs	H (C+E+F+ G) Total cost (per year)		I Service- generated income ^b	J (H-I) Public subsidy (\$ per person)	K (J/H) % of cost dependent on public subsidy	L Number of individuals served per year
Emergency Preparedness													
Women's Way (breast and cervical cancer screening)													
Worksite Wellness													
Lipid testing													
HIV													
Ryan White													
Health Education													
Tobacco, Baby and Me													
School Nursing													
Title III/Aging Services													
Chronic Disease Management													
WIC													
Traffic Safety													
Jail Nursing													
Certified Home Care													
Total													

^a Operation cost refers to the entire operational budget for the LPHU.

^b Service generated income is all income received for that service, whether insurance reimbursement, CMS payment, or out-of-pocket payment.