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Diffusion of Practice-based Research in Local Public Health: What Differentiates Adopters from Non-Adopters?

Gulzar H. Shah Dr.
Georgia Southern University, gshah@georgiasouthern.edu

Kay Lovelace
University of North Carolina

Reba Novich
National Association of County and City Health Officials (NACCHO)

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Diffusion of Practice-based Research in Local Public Health: What Differentiates Adopters from Non-Adopters?

Gulzar H. Shah, PhD, MStat, MS; Associate Professor; Jiann-Ping Hsu College of Public Health

Kay Lovelace, PhD, MPH; Associate Professor, University of North Carolina at Greensboro

Reba Novich, MSW; Profile Program Manager, NACCHO

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Educational Need/Practice Gap:

• **Importance of PBR** is increasingly recognized for its contribution to public health practice across settings, populations, contexts, and cultures

• A large proportion of LHDs are not yet involved in PBR activities
Objectives

• To briefly discuss what constitutes practice-based research (PBR).

• To examine the level of local health departments’ (LHDs) involvement in various PBR activities.

• To highlight characteristics associated with LHDs’ performance of PBR activities.
Practice-Based Research:
“PBR functions as a strategy for designing, implementing, interpreting, and translating research studies in ways that are directly responsive to the information needs of public health practitioners and the communities they serve”

Data

Data drawn from 2010 National Profile of Local Health Departments Study (Profile):

• Study population: all 2565 LHDs
  • Overall response rate: 82% (2,107 respondents)

• Questions on PBR activities administered to a stratified random sample of 625 LHDs
  • Response rate: 83% (516 respondents)
Statistical Methods (Univariate/Bivariate)

- **Dependent Variables:**
  - LHDs performed no PBR activity vs. at least one (Dichotomous)
  - Number of activities performed (Count variable, ranging from 0-8)

- **Descriptive statistics (Percentages; Means)**

- **Bivariate analysis:**
  - ANOVA for subgroup mean number of activities;
  - For dichotomous dependent variable (no activity vs. some activity):
    - Chi-square/Cramer’s V for nominal measures of LHD characteristics (e.g. Governance Category)
    - Somers' d for ordinal measures of LHD characteristics (e.g. population category)
Statistical Methods (Multivariate)

• Zero-inflated negative binomial regression
  • Over-dispersion of the dependent variables (Poisson regression not suitable)
    • Equality of the mean and the variance assumed by the Poisson distribution
  • The dependent variable (Number of PBR activities performed by LHDs) had a large proportion of zeroes (37%); so zero inflated model was appropriate

• Used proper sampling weights:
  • To estimate unbiased population parameters based on sample statistics, in order to account for sampling and non-response bias
What % of LHD with no PBR activity: 20; 40; 50; or 60?
Percent of LHDs Participating in Practice-Based Research Activity in the 12 Months Prior to the Profile Survey, by Type of Activity

Figure 1: Percent of LHDs participating in practice based research activity in the 12 months prior to the Profile survey, by type of activity

- Identify research topics: 22.4%
- Develop research plans: 12.3%
- Recruit study sites and participants: 11.7%
- Collect data: 37.0%
- Analyze and interpret data: 26.2%
- Disseminate findings to stakeholders: 33.1%
- Apply findings: 26.4%
- Help other organizations: 15.6%
- None of the activities: 38.2%

Number of valid responses = 505
Percent of LHDs Performing At Least One PBR Activity in Past 12 Months by Population Size

Number of valid responses = 505
Percent of LHDs Identifying Research Topics in Past 12 Months by Population Size

<table>
<thead>
<tr>
<th>Size of population in LHD jurisdiction</th>
<th>Percent of LHDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10,000</td>
<td>20%</td>
</tr>
<tr>
<td>10,000-24,999</td>
<td>25%</td>
</tr>
<tr>
<td>25,000-49,999</td>
<td>37%</td>
</tr>
<tr>
<td>50,000-74,999</td>
<td>37%</td>
</tr>
<tr>
<td>75,000-99,999</td>
<td>45%</td>
</tr>
<tr>
<td>100,000-199,999</td>
<td>49%</td>
</tr>
<tr>
<td>200,000-499,999</td>
<td>66%</td>
</tr>
<tr>
<td>500,000-999,999</td>
<td>71%</td>
</tr>
<tr>
<td>1,000,000+</td>
<td>78%</td>
</tr>
</tbody>
</table>

Number of valid responses = 505
Percent of LHDs Performing Data Collection in Past 12 Months by Population Size

Number of valid responses = 505
Percent of LHDs Performing Data Analysis in Past 12 Months by Population Size

Number of valid responses = 505
Percent of LHDs Performing Specific PBR Activity in Past 12 Months by Type of Governance

<table>
<thead>
<tr>
<th>Research activity</th>
<th>Percent of LHDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform at least one of the eight activities</td>
<td></td>
</tr>
<tr>
<td>Analyze and interpret study data and findings</td>
<td></td>
</tr>
<tr>
<td>Collect, exchange, or report data for a study</td>
<td></td>
</tr>
<tr>
<td>Identify research topics and questions that are relevant to public health practice</td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>10% 20% 30% 40%</td>
</tr>
<tr>
<td>Shared</td>
<td>24% 29% 37% 41%</td>
</tr>
<tr>
<td>Local</td>
<td>14% 21% 27% 37%</td>
</tr>
<tr>
<td>State</td>
<td>47% 47% 53% 66%</td>
</tr>
</tbody>
</table>

Number of valid responses = 505
Percent of LHDs Performing Specific PBR Activity in Past 12 Months by Work Status of LHD Top Executive

<table>
<thead>
<tr>
<th>Type of research activity</th>
<th>Part time</th>
<th>Full time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform at least one of the eight activities</td>
<td>33%</td>
<td>65%</td>
</tr>
<tr>
<td>Analyze and interpret study data and findings</td>
<td>8%</td>
<td>28%</td>
</tr>
<tr>
<td>Collect, exchange, or report data for a study</td>
<td>16%</td>
<td>39%</td>
</tr>
<tr>
<td>Identify research topics and questions that are relevant to public health practice</td>
<td>10%</td>
<td>23%</td>
</tr>
</tbody>
</table>

Number of valid responses = 503
Percent of LHDs Performing Specific PBR Activity in Past 12 Months by whether they Employ Epidemiologist

<table>
<thead>
<tr>
<th>Research activity</th>
<th>Employs epidemiologist</th>
<th>Does not employ epidemiologist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prform at least one of the eight activities</td>
<td>57%</td>
<td>78%</td>
</tr>
<tr>
<td>Analyze and interpret study data and findings</td>
<td>42%</td>
<td>21%</td>
</tr>
<tr>
<td>Collect, exchange, or reporte data for a study</td>
<td>55%</td>
<td>30%</td>
</tr>
<tr>
<td>Identify research topics and questions that are relevant to public health practice</td>
<td>36%</td>
<td>17%</td>
</tr>
</tbody>
</table>

n=432
LHDs Performing Specific PBR Activity by whether they Performed Community Health Assessment (CHA) in Last Five Years

Number of valid responses =503
Percent of LHDs Performing Specific PBR Activity in Past 12 Months by knowledge of County Health Rankings Prior to Survey

Research activity

- Prform at least one of the eight activities: 38%
- Analyze and interpret study data and findings: 28%
- Collect, exchange, or report data for a study: 18%
- Identify research topics and questions that are relevant to public health practice: 10%

N=503
Percent of LHDs that Participated in Research Studies in the Past 12 Months by Population Size

Number of valid responses = 512
Percent of LHDs that Had Participated in Research Studies in the Past 12 Months by LHD Characteristics

- Had heard of County Health Rankings: 32%
- Had not heard: 9%
- Performed CHA: 35%
- Did not perform CHA: 19%
- Employs epidemiologist: 50%
- Does not employ epidemiologist: 21%
- Shared: 23%
- Local: 32%
- State: 18%
- Part time top exec: 11%
- Full time top exec: 31%

Number of valid responses = 508-512
RESULTS: MULTIVARIATE ANALYSIS

Dependent variable: total number of activities performed by each of the LHDs, with a range of zero to eight.
<table>
<thead>
<tr>
<th>LHD characteristics</th>
<th>Prediction of no activity performed (Zero Inflated part)</th>
<th>Prediction of one or more research activities (Negative Binomial Part) (n=440)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds Ratios [95% Conf. Interval] z</td>
<td>Incidence rate ratios [95% Conf. Interval] z</td>
</tr>
<tr>
<td>Population</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;10,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,000-24,999</td>
<td>-0.348 (-1.401, 0.705) 0.65 1.272 (0.802, 2.016) 1.020</td>
<td></td>
</tr>
<tr>
<td>25,000-49,999</td>
<td>-0.592 (-1.694, 0.510) -1.05 1.304 (0.830, 2.047) 1.150</td>
<td></td>
</tr>
<tr>
<td>50,000-74,999</td>
<td>-0.505 (-1.712, 0.701) -0.82 1.253 (0.777, 2.019) 0.920</td>
<td></td>
</tr>
<tr>
<td>75,000-99,999</td>
<td>-0.583 (-1.967, 0.801) -0.83 1.548 (0.909, 2.637) 1.610</td>
<td></td>
</tr>
<tr>
<td>100,000-199,999</td>
<td>-1.138 (-2.433, 0.158) -1.72 1.582* (1.002, 2.498) 1.970</td>
<td></td>
</tr>
<tr>
<td>200,000-499,999</td>
<td>-1.069 (-2.365, 0.226) -1.62 2.183*** (1.370, 3.478) 3.280</td>
<td></td>
</tr>
<tr>
<td>500,000-999,999</td>
<td>-1.903* (-3.570, -0.237) -2.24 2.224*** (1.386, 3.566) 3.310</td>
<td></td>
</tr>
<tr>
<td>1,000,000+</td>
<td>-2.328 (-5.182, 0.526) -1.6 2.053** (1.227, 3.435) 2.740</td>
<td></td>
</tr>
<tr>
<td>Governance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td>-1.375*** (-2.020, -0.731) -4.18 1.172 (0.924, 1.487) 1.310</td>
<td></td>
</tr>
<tr>
<td>Shared</td>
<td>-0.995 (0.216, 0.474) -4.18 1.172 (0.924, 1.487) 1.310</td>
<td></td>
</tr>
</tbody>
</table>
After controlling for all other variables in the model:

- LHDs with the following characteristics significantly **higher odds of performing at least one research activity**: 
  - serving a population of **500,000-999,999** compared to smallest pop size (<10,000)
  - with **local governance** compared to state
  - **full time top executive** compared to part time
  - had heard of the **county health rankings**
  - had performed **Community Health Assessments** in the last five years

**Prediction of number of PBR activities performed:**

- Population size significant predictor; none of the other variables were significant predictors
Conclusions:

• Economies of scale may matter, even when it is about performance of essential public health services and accreditation requirement (PHAB standard 10)?

• LHDs may play a **supporting role** to others’ research.

• The proportion of LHDs engaging in research activities is **encouraging**. Overall, about 62% of LHDs participated in at least one of the research activity.

• Research capacity among all LHDs is likely to increase as LHDs apply for accreditation from the national Public Health Accreditation Board or in their states because **at least three of the PHAB domains** require research skills.
Acknowledgements: Our sincere thanks to:
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Contact info: gshah@georgiasouthern.edu; 703-362 9101