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

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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

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

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

Research activity
- Perform at least one of the eight activities
  - 53% for Shared
  - 47% for Local
  - 66% for State
- Analyze and interpret study data and findings
  - 24% for Shared
  - 29% for Local
  - 14% for State
- Collect, exchange, or report data for a study
  - 21% for Shared
  - 37% for Local
  - 41% for State
- Identify research topics and questions that are relevant to public health practice
  - 23% for Shared
  - 27% for Local
  - 16% for State

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

- **Type of research activity**
  - Perform at least one of the eight activities: 33% Full time, 65% Part time
  - Analyze and interpret study data and findings: 8% Full time, 28% Part time
  - Collect, exchange, or report data for a study: 16% Full time, 39% Part time
  - Identify research topics and questions that are relevant to public health practice: 10% Full time, 23% Part time

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

- **Perform at least one of the eight activities**: 78% (57% employs epidemiologist, 21% does not)
- **Analyze and interpret study data and findings**: 42% (21% employs epidemiologist, 21% does not)
- **Collect, exchange, or report data for a study**: 55% (30% employs epidemiologist, 25% does not)
- **Identify research topics and questions that are relevant to public health practice**: 36% (17% employs epidemiologist, 19% does not)

**n=432**
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

- Prform at least one of the eight activities: 38% had heard, 65% had not heard
- Analyze and interpret study data and findings: 12% had heard, 28% had not heard
- Collect, exchange, or report data for a study: 18% had heard, 39% had not heard
- Identify research topics and questions that are relevant to public health practice: 10% had heard, 24% had not heard

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

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 [-2.520, 0.530] -2.0 0.659 [0.388, 1.071] 0.380</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.
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