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Amy A. Eyler

Cheryl Valko

Ramya Ramadas

Marti Macchi

Zarina Fershteyn

*See next page for additional authors*

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**Authors**

Amy A. Eyster, Cheryl Valko, Ramya Ramadas, Marti Macchi, Zarina Fershteyn, and Ross C. Brownson

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## Administrative Evidence-based Practices in State Chronic Disease Practitioners



Amy A. Eyler, PhD,<sup>1</sup> Cheryl Valko, MPH, RD,<sup>1</sup> Ramya Ramadas, MPH,<sup>1</sup>  
Marti Macchi, MEd, MPH,<sup>2</sup> Zarina Fershteyn, MPH,<sup>2</sup> Ross C. Brownson, PhD<sup>1,3</sup>

**Introduction:** Research and lessons from community implementation have informed evidence-based practices that can improve the effectiveness of health initiatives. Administrative evidence-based practices (A-EBPs) facilitate the role of public health departments in implementing the most effective programs and policies. The purpose of this study is to describe A-EBPs in relation to characteristics of chronic disease practitioners in state health departments.

**Methods:** Randomly selected chronic disease practitioners who worked in state health departments were invited to complete an online survey in 2016. The survey included questions on five domains of A-EBPs: workforce development, leadership, culture and climate, relationships and partners, and financial practices. State-level variables that could potentially affect the use of A-EBPs were collected and used in a regression model.

**Results:** Analysis was conducted in 2016 on data from 571 respondents. Mean percentages of those who strongly agreed/agreed were lowest for financial practices (41.49%) and leadership (42.33%) with higher means for culture and climate (54.52%) and relationships and partners (58.71%). State poverty level was the only significant predictor of A-EBP scores after adjusting for other covariates in a regression model.

**Conclusions:** These results show several areas of high agreement with A-EBP within the domains measured as well as opportunities for improvement. Highlighting the importance of A-EBPs to public health leadership level may enhance practice. There is also need for developing plans for an aging workforce and cultivating partnerships with health care and other sectors. Findings can be used to target training for enhancement of A-EBPs within state health departments.

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### INTRODUCTION

Public health programs and policies have substantially contributed to population health improvements over the past century.<sup>1,2</sup> Decades of empirical research paired with lessons learned from community implementation have informed evidence-based practices that can improve the effectiveness of health initiatives.<sup>3–5</sup> Evidence-based public health practices (EBPH), developed formally in the late 1990s, have several key characteristics: making decisions based on the best available peer-reviewed evidence (both quantitative and qualitative research), using data and information systems systematically, applying program planning frameworks, engaging the community in assessment

and decision making, conducting sound evaluation, and disseminating what is learned to key stakeholders and decision makers.<sup>4–6</sup> Capacity-building efforts for improving EBPH focus on public health practitioners' personal (e.g., knowledge and skills) and organizational (e.g.,

From the <sup>1</sup>Prevention Research Center in St. Louis, Brown School, Washington University in St. Louis, St. Louis, Missouri; <sup>2</sup>National Association of Chronic Disease Directors, Atlanta, Georgia; and <sup>3</sup>Division of Public Health Sciences and Alvin J. Siteman Cancer Center, Department of Surgery, Washington University School of Medicine, Washington University in St. Louis, St. Louis, Missouri

Address correspondence to: Amy A. Eyler, PhD, Prevention Research Center in St. Louis, Brown School, Washington University in St. Louis, St. Louis, MO 63130. E-mail: [aeyler@wustl.edu](mailto:aeyler@wustl.edu)  
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incentives for use) factors. The importance of EBPH is shown in national recommendations<sup>7</sup>—and is central in standards set forth by the Public Health Accreditation Board.<sup>8</sup>

Although the importance of EBPH is well established,<sup>3–5,7,9</sup> a gap remains between knowledge and practice.<sup>10</sup> Significant challenges exist in identifying the best ways to increase the awareness of and capacity for EBPH among public health practitioners.<sup>7,10,11</sup> Administrative evidence-based practices (A-EBPs) were developed to facilitate the role of health departments in implementing the most effective programs and policies. A-EBPs are agency-level structures and activities that are positively associated with performance measures.<sup>10</sup> For example, capacity is one of the main components of performance measurement because of its importance in enhancing abilities to carry out essential services of public health.<sup>12–14</sup> Several A-EBP constructs (e.g., leadership, relationships) determine capacity within health departments. Additionally, other administrative practices related to infrastructure, operational procedures, and environment can also support EBPH,<sup>9,11</sup> and ultimately population health outcomes, such as lower premature mortality and more favorable health status.<sup>15</sup> Based on an extensive review of the literature, Brownson et al.<sup>16</sup> identified five major domains of A-EBPs: workforce development, leadership, organizational culture and climate, relationships and partnerships, and financial processes. Workforce development refers to on-the-job trainings and competency-based education. Leadership includes the skills and backgrounds of public health leaders, their values and expectations, and their use of participatory decision making. Culture and climate within an organization can also impact A-EBPs.<sup>9–11</sup> Culture describes deeply held beliefs and values within an organization, whereas climate refers to shared perceptions and attitudes.<sup>17</sup> Aspects of this domain include free flow of information, support for innovation, and atmosphere for learning. The presence of inter-organizational relationships and a collaborative vision are also A-EBP qualities. Lastly, the domain of financial processes relates to funding allocation and fiscal policies and priorities.<sup>10</sup> Elements within these five domains are modifiable within a relatively short time frame, typically inexpensive to address, and when improved, can increase the capacity for health department impact.<sup>9,10</sup>

Several studies have explored different aspects of A-EBPs in local public health settings (e.g., patterns of use,<sup>9</sup> awareness,<sup>10</sup> training needs,<sup>4</sup> and within-organization differences<sup>16</sup>). In spite of the growing interest in this topic, little is known about the patterns and correlates of A-EBPs in state public health settings. State chronic disease practitioners are of particular interest, given that

chronic diseases are responsible for a large population health burden.<sup>18</sup> Much of this impact is preventable via risk reduction (e.g., tobacco use, poor nutrition, inadequate physical activity).<sup>19</sup> Consequently, state-level chronic disease programs can facilitate prevention and management of these conditions.

The purpose of this study is to describe A-EBPs in relation to characteristics of public health practitioners who work in chronic disease prevention and control in state health departments. Practitioners are those who direct or implement population-based intervention programs and are directly involved in program delivery, setting priorities, or allocating resources for programs related to chronic disease risk factors.

## METHODS

This analysis was part of a larger study conducted by the National Association of Chronic Disease Directors (NACDD) and the Centers for Disease Control and Prevention in collaboration with the Prevention Research Center at Washington University in St. Louis. NACDD is a national organization that supports state chronic disease directors to advocate for preventive policies and programs, encourage knowledge sharing, and developing partnerships for health promotion.<sup>20</sup> All states and most territories have identifiable chronic disease prevention and control divisions, and all staff working in these programs are members of NACDD. These members include a wide range of levels, from division/bureau directors to technical staff (e.g., epidemiologists, health educators, research analysts). NACDD offers programs and training initiatives through a variety of mechanisms in an effort to assist state health departments with planning and implementation of EBPH.

### Study Population

A sample of 943 chronic disease prevention and control practitioners working in state health departments received an e-mail with a description of the study and an invitation to complete a 15-minute online survey. The sample was randomly selected from a list of 2,771 NACDD members.

### Measures

The methods and development of the A-EBP assessment were developed based on the work of Brownson et al. and are described in detail elsewhere.<sup>9,10,16,21,22</sup> The A-EBP survey consisted of four questions pertaining to workforce development that assessed perceptions of the respondent's work unit as a whole. These yes/no questions included content related to access to training in quality improvement processes, performance assessment, evidence-based decision making, and effective management practices. The leadership section consisted of 11 statements with a 7-point response scale (1=strongly disagree to 7=strongly agree). These questions included concepts related to quality of leaders, evidence-based decision making, management, and unit capacity. The third A-EBP section of the survey assessed perceptions of organizational culture and climate. Ten statements with the same 1 to 7 response agreement scale that was used in the leadership section were

**Table 1.** State-Level Variables Used in Regression Modeling: Definitions and Sources

Variable	Definition	Source
State health department size	Characterized as small, medium, or large based on tertiles of the size of the population: Small=up to 2,750,000; Medium=2,750,001 to 6,250,000; and Large=more than 6,250,000	Association of State and Territory Health Officials Profile of State Public Health, 2014. <a href="http://www.astho.org/Profile/Volume-Three/">www.astho.org/Profile/Volume-Three/</a>
State health department accreditation status	Indication of whether the state health department has been accredited as of 2016 (Y/N)	Public Health Accreditation Board, 2016. <a href="http://www.phaboard.org/news-room/accredited-health-departments/">www.phaboard.org/news-room/accredited-health-departments/</a>
CDC funding per capita	Calculation of funds given to states by CDC divided by state population. Reported in dollar amount.	CDC State Appropriations. <a href="http://www.cdc.gov/statesystem/appropriations.html">www.cdc.gov/statesystem/appropriations.html</a>
State health ranking	Ranking of states based on health, environmental, and socioeconomic data. Data were divided into quartiles.	America's Health Rankings Annual Report, 2016. <a href="http://www.americashealthrankings.org/">www.americashealthrankings.org/</a>
State health department governance	Characterized by centralized, shared, or mixed, decentralized.	Association of State and Territory Health Officials Profile of State Public Health, 2014. <a href="http://www.astho.org/Profile/Volume-Three/">www.astho.org/Profile/Volume-Three/</a>
State mortality ranking	Number of deaths per 100,000 population, 2014, ranked and divided into quartiles 1 is lowest and 4 is highest	CDC, 2014. <a href="http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6332a7.htm">www.cdc.gov/mmwr/preview/mmwrhtml/mm6332a7.htm</a>
State poverty	Percent of population below the federal poverty level	U.S. Census, 2015 <a href="http://www.census.gov/data/tables/2016/deo/income-poverty/glassman-ac.html">www.census.gov/data/tables/2016/deo/income-poverty/glassman-ac.html</a>

CDC, Centers for Disease Control and Prevention.

included. These statements included topics such as encouragement of collaboration, access to research evidence, and supportive and innovative work environment. The last A-EBP construct included in the survey was perceptions of financial management. Four questions assessed financial transparency, type and structure of funding sources, and economic evaluation. Most of the questions have been previously tested for reliability.<sup>22</sup> In addition to A-EBP constructs, demographics such as age, gender, education, job position, number of years in position, years in public health, and state location were included in the survey. These covariates have been assessed in previous studies and have the potential to be determinants of A-EBPs within state chronic disease programs.<sup>22–24</sup>

The survey questions were entered into an online survey platform (Qualtrics) and distributed via e-mail to randomly selected practitioners. After initial deployment, study team members followed up with reminder e-mails and phone calls for an 8-week data collection period between January and March 2016.

In order to analyze patterns and correlates of use of A-EBPs, data on several state-level variables were collected. The authors hypothesized that factors such as health department size and governance, amount of the Centers for Disease Control and Prevention funding, and state health ranking may be correlated to the use of A-EBPs reported in the survey. These factors, descriptions, and sources are listed in Table 1.

### Statistical Analysis

Analyses were conducted in 2017. Descriptive statistics were calculated for the variables of interest. Percentages were calculated for those respondents indicating strongly agree or agree for each

variable, and a yes response for the variables within the workforce development construct. Because the workforce development construct was assessed with yes/no responses, only construct frequencies were calculated and it was not included in the overall A-EBP total score. Table 3 lists the frequencies as well as a mean percentage of agreement of items within the construct. For the main analyses, each item within the other three A-EBP domains (leadership, culture and climate, finance) was recoded with a range of –3 (strongly disagree) through 3 (strongly agree). The item scores were added into a total A-EBP score. For example, if a respondent reported strongly agree (scored as 3) to all 35 items within the four constructs, their total score would be 105. Using Stata, version 14, each of the observations was classified into mathematical tertiles based on their scores. In order to identify predictors and correlates of A-EBPs, a regression model was developed. A binary logistic regression was performed for total A-EBP scores, regressing the bottom tertile against the top tertile. Because characteristics may be similar among respondents from the same states, the average variable score for respondents in each state was used in the regression analysis. Each variable was computed to calculate the unadjusted OR. Significant unadjusted ORs ( $p < 0.10$ ) were then placed into a larger model, where ORs were adjusted by the other covariates.

### RESULTS

Of the initial sample of 973 NACDD members, 30 were deemed ineligible because of non-working e-mails or change in employment. Of the 943 eligible invitees, 571 participated in the survey (60.6% response). Table 2

**Table 2.** Description of Survey Respondents

Characteristic	n (%)
Age, years	
20–29	40 (7.0)
30–39	113 (19.9)
40–49	154 (27.1)
50–59	172 (30.3)
≥60	89 (15.7)
Total	568 (100)
Gender	
Female	467 (81.9)
Male	102 (17.9)
Other	1 (.2)
Total	570 (100)
Job position	
Program managers/coordinators	258 (45.2)
Director/division/department of bureau	78 (13.7)
Specialist	215 (37.6)
Other	20 (3.5)
Total	571 (100)
Degree	
Master of Public Health or PhD	187 (67.2)
Other master's degree	384 (32.8)
Total	571 (100)
Health department Census region	
Northeast	110 (19.8)
Midwest	142 (25.6)
South	126 (22.7)
West	163 (29.4)
Other	14 (2.5)
Total	555 (100)
Work experience	M (SD)
Years in current position	5.91 (5.58)
Years in public health	15.41 (9.83)

shows the characteristics of the respondents. Participants were located in each of the 50 states, Washington DC, and Puerto Rico; and almost equally represented among U.S. Census regions. Almost half of participants (45.2%) were program managers or coordinators with 37% reporting as specialists (e.g., epidemiologist, health promotion specialist) and 13.7% identifying as directors.

The majority (70.4%) of survey participants had a master's or doctorate degree. A third (32.7%) of participants had a master's or doctorate degree in public health, and 8.6% of those surveyed had a nursing-related degree. On average, survey participants have been involved in public health for 15.4 years and have spent an average of 11.6 years at their current agency/organization, and 5.9 years in their current position.

Frequencies of responses to each of the questions within the four constructs were calculated. Numbers and percentages are reported for respondents who indicated

strongly agree or agree for each item, and yes responses for items within the workforce development construct (Table 3). Within the leadership construct, the highest percentage of respondents agreed with the presence of quality leadership (63%) than any other item. The items with the lowest percentage of agreement were related to the future workforce in public health. Only 12.4% agreed that their department had a replacement plan for those who retire or move to another job and 13.8% agreed that there is a good pool of replacements. Within the culture and climate construct, 68.4% of respondents reported working in a department that encourages communication and collaboration. The lowest percentage of agreement by respondents in this construct was reported in the item on representing the cultural needs of the communities within their state (34%). Within relationships and partners, only two items had agreement percentages < 50%. Only 30% of respondents agreed that their health department collaborates with health plans and 41.7% agreed that they collaborate with sectors outside of public health. The vast majority (86.8%) agreed that developing partnerships with both health and other sectors is needed to address health issues within their state. In the financial practices construct, 31.2% of respondents agreed that economic evaluation is included in decision making about programs and policies and only 27.9% reported that their organization had a variety of stable and flexible funding sources.

Total A-EBP scores ranged from -99 to 102, with a mean of 38 and an SD of 30. The lowest and highest tertiles were used for total A-EBP scores and logistic regression analysis was computed for individual (age, gender, education, number of years in position, and years in public health), Health Department (size, accreditation status, governance), and state factors (the Centers for Disease Control and Prevention funding per capita, Census region, state health ranking quartiles, mortality quartiles, and poverty; Table 4). None of the individual or health department factors were statistically significant. However, there were several state-level factors that had significant unadjusted ORs. The likelihood of being in the highest tertile for A-EBP score was greater for the Midwest Census region (OR=1.91, 95% CI=0.90, 3.90) and Southern region (OR=2.0, 95% CI=1.10, 3.80) compared with the Northeast region. Respondents from states ranked in the third quartile state health rankings were 1.73 times as likely of being in the highest tertile for A-EBP scores as those in the healthiest states (i.e., first state health ranking quartile). Respondents in states within the highest (fourth) mortality quartile were more likely to be in the highest tertile for A-EBP scores (OR=1.62, 95% CI=1.0, 2.7) when compared with respondents in the states in the lowest (first) mortality

**Table 3.** Percentage Indicating Strongly Agree/Agree/Yes to Each AEBP Indicator

Domain/Item	n (%)
Workforce development: responded yes	
Training in quality improvement	428 (75.2)
Training in performance assessment	382 (67.1)
Training in evidence-based decision making (EBDM)	366 (64.2)
Training in effective management practices	353 (62.3)
Domain mean percentage of agreement (SD)	67.2 (5.7)
Leadership: responded strongly agree/agree	
Quality leaders	365 (63.9)
Encourages use of EBDM	347 (60.8)
Fosters staff participation	311 (54.5)
Leadership competent in managing change	306 (53.7)
Lead efforts in EBDM	288 (50.4)
Important to hire work experience in public health	286 (50.3)
Provides leadership training opportunities	243 (42.6)
Important to hire people with public health degrees	211 (37.0)
Provides public health training for those without previous public health training or education	150 (26.3)
Good pool of replacements for employees who retire or move to different job	79 (13.8)
Replacement plan for those who retire or move to a different job	71 (12.4)
Domain mean percentage of agreement (SD)	42.3 (17.9)
Culture and climate: responded strongly agree/agree	
Encourages communication and collaboration	390 (68.4)
Focuses on environmental and policy approaches to improve health (strongly disagree too?)	364 (63.9)
Access to information relevant to community needs	359 (63.0)
Access to current research evidence	346 (60.7)
Health equity is explicitly stated as a shared priority in collaborations	320 (56.0)
Skills needed in my work unit are reflected in the job descriptions for staff	318 (55.8)
Devotes adequate staff time for addressing health equity	278 (48.8)
Supports practices for high performance	275 (48.3)
Strives to create an innovative environment	264 (46.3)
Adequately represents the cultural needs of communities in my state	194 (34.0)
Domain mean percentage of agreement (SD)	54.5 (10.3)
Relationships and partners: responded strongly agree/agree	
Develop partnerships with both health and other work sectors to address our state's health issues	495 (86.8)
Partnerships have missions that align with work unit	423 (74.3)
Partner organizations invested in success of program(s)	390 (68.4)
Have partners who share resources	378 (66.4)
Learns from practice-based partners outside of our work unit	324 (56.8)
Fosters quality improvement processes	302 (53.1)
Collaborates effectively with health systems	289 (50.8)
Collaborates with sectors outside of health	237 (41.7)
Collaborates effectively with health plans	171 (30.0)
Domain mean percentage of agreement (SD)	58.7 (17.3)
Financial practices: responded strongly agree/agree	
Encourages accountability through transparent financial practices	313 (54.9)
Is funded through a variety of funding sources	297 (52.0)
Includes economic evaluation in its decision making about programs and policies	182 (32.0)
Has a variety of stable and flexible funding sources	159 (27.9)
Domain mean percentage of agreement (SD)	41.5 (17.5)

AEBP, Administrative Evidence-Based Practices.

**Table 4.** Logistic Regression on Individual, Health Department, and State-level Variables on Highest/Lowest Tertiles of A-EBP Scores

Characteristic	Highest tertile, N	Lowest tertile, N	Unadjusted OR (95% CI)	AOR (95% CI)
<b>Individual characteristic</b>				
Age, years				
20–29	12	18	1.0	—
30–39	30	43	1.23 (0.5, 3.3)	—
40–49	49	51	1.64 (0.6, 4.4)	—
50–59	63	52	1.95 (0.7, 5.2)	—
≥60	27	31	1.43 (0.5, 4.3)	—
Gender				
Male	33	40	1.0	—
Female	150	154	1.24 (0.7, 2.3)	—
Education				
Other degree	130	121	1.0	—
Public health degree	53	74	0.7 (0.4, 1.2)	—
Number of years in position, M (SD)	5.69 (5.70)	6.28 (5.71)	0.98 (0.95, 1.1)	—
Number of years in public health, M (SD)	16.01 (9.57)	15.06 (10.46)	1.01 (0.99, 1.03)	—
<b>Health department characteristic</b>				
Health department size				
Small	52	53	1.0	—
Medium	70	62	1.15 (0.6, 2.2)	—
Large	52	69	0.77 (0.4, 1.4)	—
Accreditation status				
No	100	104	1.0	—
Yes	74	80	0.96 (0.6, 1.6)	—
Governance				
Decentralized	111	116	1.0	—
Mixed/shared	21	30	0.73 (0.4, 1.2)	—
Centralized	42	38	1.16 (0.7, 2.0)	—
CDC funding per capita, M (SD)	3.24 (3.21)	2.98 (3.3)	1.02 (0.9, 1.2)	—
<b>State-level characteristic</b>				
Census regions				
Northeast	25	44	1.0	1.0
Midwest	50	46	1.91 (0.9, 3.9)	1.93 (0.7, 5.1)
South	45	39	2.0 (1.1, 3.8)	1.7 (0.6, 4.4)
West	55	56	1.73 (0.8, 3.7)	1.9 (0.9, 4.3)
Other	5	5	1.76 (0.99, 3.2)	—
<b>State health ranking quartiles</b>				
1 (highest ranked)	50	70	1.0	1.0
2	24	26	1.29 (0.6, 3.0)	0.6 (0.2, 1.3)
3	52	42	1.73 (0.9, 3.3)	0.6 (0.2, 1.9)
4 (lowest ranked)	48	46	1.5 (0.9, 2.4)	0.2 (0.03, 1.2)
<b>Mortality quartile</b>				
1 (lowest mortality)	43	63	1.0	1.0
2	37	39	1.39 (0.7, 2.8)	1.77 (0.9, 3.6)
3	53	45	1.73 (0.9, 3.3)	2.04 (0.8, 5.3)
4 (highest mortality)	41	37	1.62 (1.0, 2.7)	2.67 (0.4, 18.4)
Percentage under the poverty rate, M (SD)	14.8 (2.9)	13.9 (3.1)	1.10 (1.0, 1.2)	1.21 (1.1, 1.3)

A-EBP, administrative evidence-based practices; CDC, Centers for Disease Control and Prevention.



quartile. When the highest and lowest tertiles of A-EBP scores were computed with percent of population under the federal poverty level, a 1% increase in poverty increases the odds of being in the highest tertile of A-EBP (OR=1.10, 95% CI=1.0, 1.2). Statistical significance remained only for the poverty variable after adjusting for the other covariates (AOR=1.21, 95% CI=1.10, 1.30).

## DISCUSSION

Efficient and effective public health programs are needed to address the growing complexity of health issues. In addition to the use of evidence-based interventions, quality administrative practices can help ensure successful initiatives within state health departments. The results from this study bring forth several findings that can help inform practice. First, as indicated by the low percentage of agreement in this sample, there is a need for preparing for changes in the current and future public health workforce. Less than 15% of respondents reported their health department having a replacement plan for employees who retire or leave, and having a pool of employees to replace them.<sup>25</sup> The diminishing ratio of public health workers and high percentages of those eligible for retirement are of concern to maintaining an effective public health system.<sup>26</sup> In a 2012 review of public health workforce research, recruiting and retaining highly trained, well-prepared employees, and succession planning to replace retirees was identified as an urgent priority.<sup>27</sup>

Second, five of the ten items under the leadership domain had percentage of agreement less than 50%. Actions from leaders are likely to influence evidence-based practice. For example, recent research shows a number of actions from leaders in public health agencies that may increase the use of scientific information in decision making. These actions include direct supervisor expectations for EBPH use and performance evaluation based partially on EBPH principles.<sup>24</sup> This is an opportunity for providing and assessing evidence-based training as a “top-down” strategy.

Third, the state-level practitioners in the sample report low levels of collaboration with health plans and health systems within their states. This is a continuing trend as the fields of primary care and public health have generally operated independently of each other over the last century.<sup>28</sup> The need for more integration between primary care and public health was outlined in a 2012 National Academy of Medicine Report “Primary Care and Public Health: Exploring Integration to Improve Population Health.” This report reviewed promising models of successful integration, which included shared goals, community engagement, aligned leadership,

sustainability, and collaborative use of data.<sup>29</sup> There is an urgent need to create this integrated system that leverages the complementary strengths of public health and health care to improve the health of individuals, communities, and the U.S. population.<sup>28</sup>

In addition to integrating with health care, there is a need for public health to collaborate in transdisciplinary teams in order to address complex health issues within today’s society. Only 42% of participants in this study reported working with other sectors outside of health. There is an opportunity to address this in early career training. In the report titled “Key Considerations for a 21st Century MPH Program,” The Association for Schools and Programs in Public Health identifies public health is “inherently interdisciplinary and inter-professional and, thus, MPH graduates must be prepared to function in increasingly interdisciplinary and inter-professional roles and settings.”<sup>30</sup> Developing strategies within education programs in addition to providing professional development on ways to enhance skills and best practices related to transdisciplinary work for practitioners may enhance collaboration.

Although the authors anticipated some level of relationship between the A-EBP scores and individual, health department, and state-level predictors, only one (the percent under federal poverty level) was statistically significant after adjusting for covariates. This suggests that gaps in A-EBPs are relatively consistent across individual- and group-level characteristics (at least for those in this study).

Based on the current findings, enhancing the awareness and knowledge of A-EBPs as well as the subsequent organizational and population health benefits may be a first step in improving uptake within state chronic disease practice. To inform best practices for enhancing A-EBPs, trainings and other capacity-building efforts show promise.<sup>31,32</sup> In addition to further study, academics and researchers in this field have a responsibility to develop and implement effective approaches for dissemination of findings related to these A-EBPs.<sup>33,34</sup> Partnering with groups, such as NACDD, to enhance and evaluate trainings is also needed.

## Limitations

This study has limitations that warrant mention. The sample of respondents comes from only NACDD members who work in chronic disease prevention and control and not public health practice as a whole. Other divisions of public health (e.g., infectious disease) warrant future study. Local agency research shows considerable variation across program areas.<sup>9</sup> Although the survey instrument was deemed valid and reliable,<sup>9</sup> individuals reported perceptions of the organization as a whole.

Lastly, there is an inherent limitation with cross-sectional studies in that causality cannot be inferred. In spite of these limitations, this is the first study of its kind to the authors' knowledge that explores A-EBPs within state health departments. These findings coupled with that of others exploring uptake of EBPH<sup>23,24,33</sup> can be used to inform not only future investigations of this topic but also technical assistance and support plans for health departments.

## CONCLUSIONS

These results identify some sizeable gaps in the use of A-EBPs within state health departments and the opportunity for enhancing training in these areas. There is a need for building workforce capacity, including developing replacement plans for a retiring public health workforce.<sup>35</sup> There are also significant opportunities to enhance awareness and acceptance of A-EBPs within public health leadership that may lead to increased use of these practices. A gap exists in partnerships between public health and health care, as well as other sectors. There is an opportunity to facilitate the development of these transdisciplinary collaborations that may enhance the use of A-EBPs and lead to more effective public health practice.

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