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Evidence-based public health practice among program managers in

local public health departments

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28 Acknowledgments

29 This study was supported in part by Robert Wood Johnson Foundation's grant no. 69964 (Public
30 Health Services and Systems Research) and by Cooperative Agreement Number U48/DP001903
31 from the Centers for Disease Control and Prevention (the Prevention Research Centers Program).

32 We also thank members of our research team: Beth Dodson, Rodrigo Reis, Peg Allen, Kathleen
33 Duggan, Robert Fields, and Katherine Stamatakis, and Drs. Glen Mays and Douglas Scutchfield
34 of the National Coordinating Center for Public Health Services and Systems Research,
35 University of Kentucky College of Public Health.

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37 Word counts: Abstract = 299; Text = 3,414

38 Includes 2 tables and 1 figure

39 Key words: evidence-based public health; organization and administration; public health
40 practice; quality improvement; translational research

41 **Evidence-based public health practice among program managers in**
42 **local public health departments**
43

44 **Abstract**

45 *Objectives.* We assessed the use of administrative-evidence based practices (A-EBPs) among
46 managers of programs in chronic diseases (CD), environmental health (EH), and infectious
47 diseases (ID) from a sample of local health departments (LHDs) in the U.S.

48 *Design.* Program managers completed a survey consisting of six sections (biographical data, use
49 of A-EBPs, diffusion attributes, use of resources, and barriers to, and competencies in, evidence-
50 based public health (EBPH)) with a total of 66 questions.

51 *Participants.* The survey was sent electronically to 168 program managers in CD, 179 in EH, and
52 175 in ID, representing 228 LHDs. The survey had previously been completed by 517 LHD
53 Directors.

54 *Measures.* The use of A-EBPs was scored for 19 individual A-EBPs, across the five A-EBP
55 domains, and for all domains combined. Individual characteristics were derived from the survey
56 responses, with additional data on LHDs drawn from linked NACCHO Profile survey data.
57 Results for program managers were compared across the three types of programs and to
58 responses from the previous survey of LHD directors. The scores were ordered and categorized
59 into tertiles. Unconditional logistic regression models were used to calculate odds ratios (ORs)
60 and 95% confidence intervals (CIs), comparing individual and agency characteristics for those
61 with the highest third of A-EBPs scores to those with the lowest third.

62 *Results.* The 332 total responses from program managers represented 196 individual LHDs.
63 Program managers differed (across the three programs, and compared to LHD Directors) in
64 demographic characteristics, education, and experience. The use of A-EBPs varied widely across
65 specific practices and individuals, but the pattern of responses from directors and program
66 managers was very similar for the majority of A-EBPs.

67 *Conclusions.* Understanding the differences in educational background, experience,
68 organizational culture, and performance of A-EBPs between program managers and LHD
69 directors is a necessary step to improving competencies in EBPH.

70

71 **Introduction**

72 Public health programs and policies have largely been credited with gains in longevity
73 and quality of life in the previous century, with notable achievements in the reduction of
74 morbidity and mortality from vaccine preventable diseases, tobacco use, and motor vehicle
75 accidents.^{1,2} Developing, identifying, and implementing public health measures for which there
76 is clear evidence of impact have taken on increasing importance in the context of recent forces of
77 change, including the national voluntary accreditation program for governmental public health
78 agencies³, the Affordable Care Act⁴, and political and economic pressures subsequent to the
79 2007-2008 recession.⁵ Evidence-based public health (EBPH) - described as the integration of
80 science-based interventions with community preferences to improve the health of populations⁶ -
81 has been widely promoted through the use of the *Guide to Community Preventive Services*⁷ for
82 over a decade; however, it is only recently that efforts to measure the reported performance of
83 evidence-based practices have been undertaken.⁸⁻¹⁰

84 Identifying administrative evidence-based practices (A-EBPs) in public health – the
85 infrastructural and operational milieu which supports and facilitates EBPH – has been a
86 particular recent focus within the emerging field of Public Health Systems and Services Research
87 (PHSSR).^{8,9,11} Five major domains of A-EBPs that are modifiable in the short term have been
88 identified; these include practices in workforce development, leadership, organizational climate
89 and culture, relationships and partnerships, and financial processes. In a survey of 517 directors
90 of local health departments (LHDs), Brownson *et al* documented highest performance in A-EBPs
91 related to relationships and partnerships and lowest performance in practices related to the
92 organizational culture and climate of the agency.⁹ While these data reflect the important
93 perspectives of LHD directors, there is less known about the knowledge and performance of A-

94 EBPs among program managers, who are more often directly responsible for priority setting and
95 operations related to specific program areas. This is particularly relevant for managers of
96 programs in chronic diseases, environmental health, and infectious diseases, three arenas in
97 which there have been significant contributions to the overall improvements in health alluded to
98 earlier. The purpose of this article, therefore, is to document the performance of A-EBPs among
99 program managers and contrast this with LHD directors, in an effort to identify the specific
100 facilitators, barriers, and training needs requisite for expanding EBPH.

101

102 **Methods**

103 Data on the use of A-EBPs were collected from responses to a nationwide survey of
104 LHDs. The sampling frame, questionnaire development and testing, and data collection steps
105 have been described previously.^{9,12} Briefly, a stratified random sample of 1,067 US LHDs was
106 drawn from the database of 2,565 LHDs maintained by the National Association of County and
107 City Health Officials (NACCHO), with stratification by jurisdictional population. The survey
108 instrument was based in part on a public health systems logic model and related frameworks¹³⁻¹⁶
109 and previous EBPH-focused research with state and local health departments, where validated
110 and standardized questions existed.¹⁷⁻²² The questionnaire consisted of six sections (biographical
111 data, A-EBPs, diffusion attributes, barriers to EBPH, use of resources, competencies in EBPH),
112 with a total of 66 questions. The A-EBPs section of the instrument was based on a recent
113 literature review and consisted of 19 questions that were newly developed.⁸ Survey instrument
114 validity and reliability were documented through cognitive response testing (with 12 experts in
115 the field) and test-retest processes (involving 90 LHD practitioners), which resulted in a survey

116 instrument with high reliability, with Cronbach's alpha values for the A-EBPs questions ranging
117 from 0.67 to 0.94.²³

118 Data were collected using an online survey (Qualtrics software²⁴) that was delivered
119 nationally to email accounts of 1,067 LHD directors, reduced to 967 after excluding non-valid
120 email addresses. In their responses, LHD Directors (or designee's) were asked to identify
121 managers/leaders in three program areas within their LHD: chronic diseases (CD), environmental
122 health (EH), and infectious diseases (ID). The online survey was subsequently sent to each
123 program manager directly, including 168 program managers in CD, 179 in EH, and 175 in ID
124 (with a small number of these sent to the same individual who served as program manager for
125 two or more programs), representing 228 LHDs. For LHD directors who provided no contact
126 information for these program managers it is not known if they simply chose not to provide such
127 information or if no such positions existed in their LHD. There were 517 valid responses to the
128 survey (response rate (RR) of 54%) from LHD Directors, 110 (RR 65.5%) from CD managers,
129 118 (RR 65.9%) from EH managers, and 120 (RR 68.6%) from ID managers. The 332 total
130 responses from program managers represented 196 individual LHDs.

131 Individual characteristics were derived from the survey responses, with additional data on
132 LHDs drawn from linked NACCHO Profile survey data.²⁵ The use of A-EBPs was scored for 19
133 individual A-EBPs, across the five A-EBP domains, and for all domains combined. The scores
134 were ordered and categorized into tertiles. Unconditional logistic regression models were used to
135 calculate odds ratios (ORs) and 95% confidence intervals (CIs), comparing individual and
136 agency characteristics for those with the highest third of A-EBPs scores to those with the lowest
137 third. Adjusted odds ratios were derived from a final regression model, which included
138 significant variables and covariates that contributed to the fit of the model. For the adjusted ORs

139 the variables that were retained were population jurisdiction, governance structure, census
140 regions, and highest degree.

141

142 **Results**

143 The individual characteristics of program managers and LHD directors are provided in
144 table 1. Program managers tended to be younger than LHD directors. The vast majority of CD
145 and ID program managers were female, while the preponderance of EH managers were males.
146 While there was little difference in the average number of years in their current position, LHD
147 directors tended to have more overall work experience in public health, followed closely by EH
148 managers. Managers of CD programs tended to have the least number of years in both current
149 and overall work experience. Overall, program managers had less formal education compared to
150 LHD directors, but there were notable differences in education across the three program areas.
151 Almost half of ID managers had nursing degrees as their highest degree, much greater than for
152 any other individual category. One quarter of ID managers obtained a Master of Public Health
153 (MPH) as their highest degree, while this was true for less than 10% of EH managers. Program
154 managers tended to represent LHDs with larger jurisdictions compared to LHD directors.

155

156 <<insert table 1 about here>>

157

158 As with LHD directors, responses on the use of A-EBPs varied widely across specific
159 practices and individuals, but the pattern of responses from directors and program managers was
160 very similar (figures 1a-e). The A-EBP showing the lowest response across all individuals was
161 for “hiring people with a public health degree” (30.1% for all program managers and 35.6% for

162 LHD directors – data not shown), while the A-EBP with the highest response rates were for
163 “having a variety of funding sources”. At the level of A-EBP domain, program managers were
164 least likely to engage in leadership, while LHD directors showed least use of practices that
165 reflected the LHD organizational climate and culture. Overall, program managers and LHD
166 directors reported highest use of A-EBPs in the domain of relationships and partnerships. For
167 every domain, directors reported higher values than the sum total of program managers, although
168 this difference was minimal for workforce and organizational climate.

169

170 <<insert figure 1 about here>>

171

172 Managers of CD programs tended to show the highest level of A-EBP performance
173 compared to EH and ID managers; the highest response for any domain (including by LHD
174 directors) was in the performance of A-EBPs in relationships and partnerships by CD managers.
175 For program managers, the greatest relative difference (highest use - lowest use/total use) across
176 domains was in performance of leadership A-EBPs, while the least relative difference was for
177 workforce development. These relative differences are visually apparent in figures 1a-e.

178 Predictors of performance of A-EBPs for the three groups of program managers were
179 similar to LHD directors for most characteristics of interest (table 2), including age (older
180 compared to younger), education (higher degrees compared to lower degrees) and jurisdictional
181 population (larger compared to smaller). After adjustment for all statistically significant bivariate
182 predictors there were limited significant findings in comparing the highest to the lowest tertile of
183 attaining A-EBPs among program managers - working in locally governed LHDs predicted
184 higher performance of A-EBPs compared to working in LHDs under state or shared governance

185 (adjusted OR 1.0 compared to OR of 0.1 [95% CI 0.02, 0.5]). This finding is in contrast to
186 predictors for LHD directors, where working in state-governed LHDs predicted highest use.

187

188 <<insert table 2 about here>>

189 **Discussion**

190 Performance measurement in public health has most frequently focused on the agency
191 and characteristics of the agency director, based most often on responses from a single
192 individual, i.e., the director or designee'.^{26,27} To our knowledge, this is the first nationwide report
193 on the performance of specific practices at both the top leader as well as program leadership
194 levels, providing insights on EBPH across and within LHDs. While LHD directors and program
195 managers report similar levels of performance in many of the A-EBPs, there are differences in
196 both performance and individual characteristics which have important implications for
197 improving competencies in EBPH.

198 It is not surprising to find differences in performance of A-EBPs and individual
199 characteristics across the three programs areas of chronic disease, environmental health, and
200 infectious diseases – such differences reflect not only the differences in program content, but the
201 history and organizational milieu of these programs. Chronic disease programs are among the
202 newer major programs to be established at state and local health department levels, and the data
203 on time in current position and overall experience in public health among CD managers in this
204 study may reflect this history.²⁸ Although New York State initiated cancer reporting as early as
205 1911, it wasn't until 1985 that the first National Conference on Chronic Disease Prevention and
206 Control was held, and 1988 when CDC established the National Center for Chronic Disease
207 Prevention and Health Promotion.²⁹ At the state level, it wasn't until 1993 when all states had

208 established tobacco control and prevention programs, and 1995 when all states had established
209 screening programs for breast cancer.²⁹ The relative higher scores for CD program managers in
210 supporting training for EBPH, leadership in EBPH, and in the domain of relationships and
211 partnerships are consistent with earlier emphases on CD programs in general and cancer control
212 and prevention specifically. Meissner *et al* described internal and external factors that contribute
213 to success in controlling cancer in the public health setting, which included leadership, use of
214 data, training, and the importance of linkages and coalitions for developing, implementing, and
215 maintaining community-based programs.³⁰ Brownson and Bright defined “cross-cutting areas of
216 focus that will enhance efforts in chronic disease control”, which included a focus on data and
217 science, community and decision-maker support, and meaningful collaborations.²⁹

218 In contrast to CD programs, ID programs are among the oldest and most well-established
219 programs in public health, reflecting the initial focus of most governmental public health
220 agencies in controlling epidemics of diseases such as yellow fever, smallpox, and tuberculosis.²⁸
221 Among these three program areas, ID programs are most often connected with clinical care, so it
222 is not surprising to find that almost half of ID managers have a nursing degree as their highest
223 degree. Of the three programs, EH has the greatest variability across LHDs: in many states, EH
224 activities are under the purview of the state and local public health agency, while in others EH
225 functions are carried out by separate agencies at either the state or local level, or both.^{31,32} EH
226 activities also vary significantly by size of the LHD and jurisdictional population: EH activities
227 in smaller LHDs, with smaller jurisdictional populations tend to be limited to inspection of food
228 establishments and public facilities such as hotels/motels, swimming pools, and daycare
229 facilities, while EH activities in large metropolitan LHDs may include air and water quality,
230 radiation control, and noise pollution.³¹ Overall, only 11 of the 34 EH-related activities included

231 in the 2010 NACCHO Profile study are provided by more than 50% of LHDs.³¹ Such differences
232 across program areas are also reflected in the educational background of program managers,
233 which also influences organizational culture, e.g., only 7.4% of EH program managers had an
234 MPH as their highest degree, compared to 12.4% for CD managers and 24.3% for ID managers.
235 The training of program managers overall compared to LHD directors further highlights these
236 differences, as 17.7% of directors had a doctoral degree as their highest degree, compared to
237 5.5% for program managers.

238 It is possible that some of the variation observed - e.g., access to evidence-based decision
239 making - across the three types of programs is related to the availability of evidence-based
240 practice guidelines. The recommendations in the *Guide to Community Preventive Services*³³
241 pertain in large part to chronic diseases. There are a few recommendations that pertain directly to
242 infectious diseases (HIV/AIDS, STIs; vaccinations; and pandemic influenza), but fewer for
243 environmental health (smoke-free policies – often enforced by EH staff; indoor air pollution
244 regarding asthma; and the built environment regarding physical activity). Because of this, it may
245 be that program managers in ID and EH rely more on best practices guidelines within their
246 disciplines.

247 These findings show some similarities to those from a 2011 NACCHO study, involving a
248 survey of 521 LHD staff in three programmatic areas (tobacco prevention, HIV/AIDS
249 prevention, and immunization) to explore their knowledge, attitudes, and practices related to
250 EBPH in general, and *The Community Guide*, specifically.¹⁰ This study identified several factors
251 associated with increased familiarity with, confidence in skills, or use of EBPH, including level
252 of education (highest degree), specific training in skills needed for EBPH, and funder
253 requirements to use evidence-based interventions. In addition, staff in tobacco prevention

254 programs – one of the programs under the chronic diseases umbrella - were more likely to report
255 that funders required the use of evidence-based practices, and they were more familiar with *The*
256 *Community Guide* than staff in HIV/AIDS or immunization programs. In contrast to findings in
257 the current study, however, the NACCHO study found that neither age nor tenure in public
258 health were associated with EBPH awareness, skills, or use; and, that the lower levels of
259 awareness, confidence in skills, and use of EBPH among staff in smaller LHDs disappeared after
260 controlling for education and training in EBPH-related activities.

261 There was a notable difference in governance structure as a predictor of the performance
262 of A-EBPs for LHD directors compared to program managers. For LHD directors, working in a
263 state-governed LHD was a greater predictor of performance, while working in locally-governed
264 LHDs was a greater predictor for program managers. One can only speculate that for program
265 managers, local autonomy provides an organizational climate more conducive to program-level
266 leadership, while state-governed LHDs may have higher requirements and expectations for LHD
267 directors than locally-governed LHDs. Historically, studies have come to different conclusions in
268 examining correlates of higher overall performance, with some reporting higher performance
269 scores for LHDs which are part of a centralized, state-governed public health system, while
270 others have reported higher performance scores for LHDs in decentralized governance
271 relationships.^{26,34-36} Determining how organization influences performance, and whether there
272 may be distinct advantages of one governance structure over another remains a topic of intense
273 interest within PHSSR.³⁷⁻³⁹

274 The differences in educational background, experience, and performance of A-EBPs
275 between LHD directors compared to program managers, as well as across the three different
276 types of programs, have direct relevance to training and improving competencies in EBPH.

277 Nurses, epidemiologists, and sanitarians, for example, differ in their specific focus on evidence –
278 individual, population, organizational; their skill sets are different; and, the context of practice –
279 clinical, population-focused, regulatory – is different. A “one size fits all” approach to training
280 and strengthening EBPH competencies will not work. Recognizing these differences also
281 acknowledges that major program areas within state and local health departments have been
282 “siloesd” over many decades, primarily due to the program-specific nature of their funding.^{28,40}
283 Wiesner described this as one of four “diseases in disarray”: a “hardening of the categories”.⁴¹ A
284 focus on EBPH in general, and A-EBPs in particular, may provide a pathway out of these siloes
285 and a softening of the categories.

286 These findings, combined with more detailed data on performance of A-EBPs by LHD
287 directors⁹, bring a special focus to nursing in public health. One of the strongest predictors of A-
288 EBP performance is size of the LHD jurisdictional population, with LHD directors in larger
289 populations (>25,000) up to seven times more likely to be high-performing than those in
290 jurisdictions < 25,000, and a nursing degree is the most common single degree of LHD directors
291 in those smaller jurisdictions. Whether these differences reflect different capacities of LHDs
292 simply on the basis of size, whether there is a different focus and skill set among LHD directors
293 who are nurses, or whether small LHDs have a special history and affinity for having nurses as
294 directors is not clear. Overall, 21.7% of program leaders and 18.8% of LHD directors had a
295 nursing degree as their highest degree, with a notable presence of nurses among ID program
296 managers as described earlier. The importance of nursing as a major entry point for future public
297 health professionals has been recognized by the Institute of Medicine in its reports on *Who will*
298 *keep the public healthy?*⁴², and *The Future of Nursing: Leading Change, Advancing Health*⁴³,
299 with several recommendations on education and leadership development, e.g., the placement of

300 nursing students in public health practice settings and the development of leadership programs in
301 public health nursing. This renewed emphasis on nursing and public health, given the differences
302 noted above for small LHDs, lends itself well to practice-based research which can be actionable.

303 While differences in leadership practices and performance by both directors and program
304 managers have been well described in the general literature on leadership⁴⁴, there is very little
305 published information specific to public health. In a study focused on knowledge and use of
306 *America's Health Rankings*, Erwin *et al* noted differences in responses to key informant
307 interviews involving the top state health official compared to program leaders, reporting that
308 “Although the majority of [state health officials] are aware of [*America's Health Rankings*],
309 there appears to be less penetration and much less understanding of the methodology in the
310 rankings at the programmatic level.”⁴⁵(p.411) The use of *America's Health Rankings* differed as
311 well, with state health officials using the rankings as more of a policy lever and communications
312 tool, while program directors used the rankings as source of data for comparing with
313 adjoining/similar states. In a current project on setting budgets and priorities, Leider *et al* report
314 important differences when comparing practices among state health department directors, deputy
315 directors, and program managers in environmental health, emergency preparedness, and maternal
316 and child health.⁴⁶ The agency director was much more likely to report frequent use of decision
317 or prioritization tools for resource allocation in fiscal year 2011 compared to program managers,
318 and there were distinct differences in such practices across the programs studied. The present
319 study adds to these studies regarding the importance of considering whom to target for survey
320 response, particularly for studies that focus on performance, as perspectives may differ according
321 to who responds.

322 There are notable limitations to this study. First, all data are self-reported, and there were
323 no attempts to verify the accuracy of responses. Second, the responses may have been biased
324 towards larger LHDs, as the larger the agency the more likely it is to have program managers for
325 all three programs studied. Third, the response rates for LHD directors (54%) and program
326 managers overall (66.8%) were modest and may introduce additional bias by directors and
327 managers serving larger LHDs.

328 In conclusion, performance of A-EBPs varies between LHD directors and program
329 managers, as well as across different public health program areas. Understanding the differences
330 in educational background, experience, and organizational culture for program managers is a
331 necessary step to improving competencies in EBPH. A common path to improving such
332 competencies may be one means to reduce the silo-reinforcing nature of public health funding.
333 This has important implications for quality improvement –related initiatives such as national
334 voluntary public health accreditation, with standards focused on workforce development and
335 evidence-based public health, but especially for the standards focused on administration and
336 management. The identification of A-EBPs provides a stronger evidence-based platform for
337 revising standards and measures for administrative practices, and this current study provides
338 real-world evidence of how different capacities in achieving A-EBPs exist across different types
339 of programs and levels of leadership. This can be useful not only to those involved in
340 administering accreditation, but also for public health agencies which are preparing for
341 accreditation.

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Legend for Figure 1:

Figure 1. Administrative evidence-based practices in local health departments, Directors and Program Managers, United States, 2012