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Health departments with a strong commitment to health equity have a more skilled workforce and engage in higher quality, more diverse collaborations

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Abstract

Health equity is a public health priority, yet little is known about commitment to health equity in health departments, especially among chronic disease prevention practitioners whose work places them at the forefront of addressing the top contributors to disparities in morbidity and mortality. A random sample of state chronic disease practitioners (N=537) was surveyed on health equity commitments, partnerships, and needed skills. A small percent of respondents worked primarily on health equity (2%) and more (9%) included health equity as one of multiple work areas. Individuals who rated their work unit's commitment to health equity as high were more likely to engage with sectors outside of health and rate their leaders as high quality and were less likely to identify skills gaps in their work unit. Opportunities exist to more fully address health equity in state public health practice through “big P” and “little p” policies, including those regarding resource allocation and staff training.

Introduction

The Centers for Disease Control and Prevention (CDC) defines health equity as a state in which no one is “disadvantaged from achieving this potential because of their social position or other socially determined circumstance.”(1) Social epidemiologist Margaret Whitehead put it more plainly, observing that health inequities are differences in health that are unnecessary, avoidable, unfair, and unjust.(2)

Public health has a longstanding commitment to serving the most vulnerable and furthering social justice. Achieving health equity is in the aims of many if not most national and

international public health efforts.(3–5) The growing health-in-all-policies movement is encouraging a more inclusive understanding of the contributors to health and well-being.(6) Recent surveillance data from the Association of State and Territorial Health Officials (ASTHO) and others suggests that health equity is increasingly being integrated into the infrastructure, resourcing, goals, and major activities of state health departments.(7,8)

State chronic disease practitioners are key in addressing equity, given that chronic diseases are responsible for a large population health burden and health disparities. In 1984, the landmark “Heckler Report” on minority health found that minority populations experienced 60,000 excess deaths each year, over 80% of which were attributable to six major causes including cardiovascular disease and cancer.(9) Analysis completed by the CDC (2011) confirmed that coronary heart disease remained the largest contributor to inequality in life expectancy between black and white Americans.(10) In 2017, Dwyer-Lindgren and colleagues found that the association between life expectancy and socioeconomic and race/ethnicity factors was largely mediated by behavioral and metabolic risk factors such as obesity, physical activity, hypertension, and diabetes.(11) These are the domains of chronic disease prevention and control.(12) Consequently, state-level chronic disease practitioners are uniquely situated to not only bear witness to health inequities but also intervene upon them.

Addressing health equity requires the concerted efforts of public health practitioners at all levels, but especially at the state level given the states’ role as the principle governmental entity responsible for protecting the public’s health in the United States.(13) State chronic disease prevention practitioners, in particular, will be critical partners in this work. However, we know little about how chronic disease and prevention practitioners engage with health equity work, largely because their perspectives are rarely included in health equity surveillance. Understanding this gap will be key to achieving health equity.

The purposes of this study are twofold. First, it seeks to understand how chronic disease prevention and health promotion practitioners in state health departments perceive health equity as part of their work. Second it aims to explain how leadership, collaborations, and skills differ among chronic disease prevention and health promotion offices with a strong staff-perceived commitment to health equity compare to those with a weaker commitment to health equity.

Methods

Our analyses are part of a study conducted by the National Association of Chronic Disease Directors (NACDD) in partnership with the Prevention Research Center at Washington University in St. Louis. NACDD is a professional organization dedicated to improving “the health of the public by strengthening state-based leadership and expertise for chronic disease prevention and control in states and at the national level.”(14) All states and most territories have chronic disease prevention and control divisions, and all staff working in these programs are members of NACDD.

Study population

Our sample consisted of 943 chronic disease prevention and control practitioners working in state health departments who were randomly selected from a roster of 2,771 NACDD members. Between January and March 2016, 571 of these individuals responded to an email invitation and took a 15-minute online survey. This study was approved by the Washington University in St. Louis Institutional Review Board.

Survey

This cross-sectional survey included questions on training, technical assistance, and practices within state health department chronic disease and health promotion offices (“work units”). The study described here focuses specifically on questions regarding work unit commitment to health equity and potential correlates of that commitment, including collaborations, leadership, and skills.

Perceptions of health equity commitment was operationalized using a composite variable computed as the sum of responses to three seven-point Likert-scale questions: *Health equity is explicitly stated as a shared priority in collaborations*; *My work unit adequately represents the cultural needs of communities and my state*; and *My work unit devotes staff time for addressing health equity*. We categorized the sum variable into tertiles. Finally, we created a binary variable comparing the top tertile (representing high commitment to health equity) to the bottom two tertiles (representing low-to-moderate commitment to health equity). Exploratory factor analysis confirmed that it was appropriate to consolidate these three questions into one construct.

To determine whether respondents viewed health equity as part of their job, we asked respondents to identify their primary area of work, with “health equity/social determinants of health” as one of 16 response options. Respondents were allowed to identify multiple areas if their work crossed multiple domains.

To examine the potential correlates of health equity commitment, we asked seven questions about the nature and quality of collaborations that the respondent’s work unit engages in, two questions about the skill and quality of the respondent’s work unit leader, 13 questions about the need for and availability of specific skills, and two questions about the use of evidence-based decision making. We used the questions pertaining to specific skills to quantify skills gaps, defined as the importance of the skill minus its availability and then operationalized as a binary top 50% (large gap) vs. bottom 50% (small gap).

Analyses

To understand how work units with a high commitment to health equity differed from work units with low-to-moderate commitments, we conducted bivariate analyses using Pearson’s chi-squared test and independent t-tests for categorical and continuous correlates, respectively. In addition to the correlates identified above, we also looked at individual characteristics including gender, age, race, education, and professional tenure; agency-level characteristics including governance structure, accreditation status, and size; and state-level

characteristics including CDC funding per capita, mortality ranking, health ranking, and poverty rate.

For each characteristic studied as a potential correlate of commitment to health equity, we calculated an odds ratio (OR) using logistic regression controlling for clustering by state. Accounting for clustering in this way acknowledges that individuals from the same health department and the same state are not independent from one another. We explored conducting multilevel multivariate analyses that controlled for individual-, agency-, and state-level characteristics but ultimately found that, since these characteristics were not significant at $\alpha=0.25$ at the bivariate level (see Exhibit 2), they were unlikely to be significant confounders at the multivariate level, based on Bursac and colleagues.(15)

Limitations

We used a self-reported survey to collect our data, which is susceptible to recall bias. Of the 943 individuals invited to participate, only 571 (60.6%) did so, suggesting that non-response bias is possible. We investigated for as much by looking for geographic differences between respondents and non-respondents and found response rates that were similar across states (within one standard deviation of the grand mean response rate). The consistency in geographical representativeness also suggests that other structural features of state health departments (e.g., size, accreditation status, governance structure) are similarly not skewed in our sample by non-response bias. However, it is possible that differences in other characteristics, like programmatic area, tenure, or education are present and beyond our ability to measure (given lack of detailed data on the 39% of the sample who did not respond). Additionally, the health equity questions upon which our analyses have not been psychometrically tested or validated. However, exploratory factor analysis suggested that operationalizing health equity as we did in this study was appropriate. Our survey only targeted chronic disease practitioners, though this was intentional given that chronic diseases are disproportionate contributors to health disparities in the United States. Nonetheless, perceptions of commitment to health equity may differ in other important areas of public health such as infectious disease, environmental health, and maternal and child health, which future investigations should explore.

Results

Participant and agency characteristics

As can be seen in the Supplementary Exhibit, participants represented a wide variety of programmatic areas who had, on average, been in their position for 6 years and in public health practice for 15.4 years. Approximately 80% had a graduate degree, were white, and were female. Over 50% were between the ages of 40 and 59 years. Agencies from all 50 states were represented with an average of 10.8 responses from each ($SD=7.4$). The number of respondents from a given state's health department ranged from 3 (Arizona) to 51 (New York). Most agencies (63.8%) were decentralized and less than half were accredited.

Health equity as a work area

As can be seen in Exhibit 1, the vast majority (89.3%) of practitioners did not identify health equity as part of their work. Few respondents (1.6%) identified health equity and the social determinants of health as their primary work area. Considerably more (9.1% or 52 respondents) included health equity as one of multiple work areas within their purview. Of these 52 individuals, most (47 respondents) identified health equity as one of four or more areas in which they worked and 24 identified it as one of 10 or more areas. Among the most commonly cited areas of work in addition to health equity were obesity prevention, physical activity, and nutrition (78.9% of the 52 individuals), cardiovascular health (75.0%), diabetes (71.2%), and epidemiology and surveillance (67.3%). Though not shown in Exhibits 1 or 2, there were no statistically significant differences in the individual-, state-, or agency-level features of the individuals working in health equity compared to those not working in health equity.

Correlates of strong commitment to health equity

Exhibit 2 contains the results of analyses examining the individual-, work unit-, agency-, and state-level correlates of commitment to health equity. None of the individual-, agency-, or state-level predictors were significantly associated with identifying a work unit as strongly committed to health equity.

Having a strong commitment to health equity was significantly associated with higher quality and more diverse partnerships. Individuals who rated their work units as having a strong commitment to health equity were more likely to strongly agree or agree that their work unit engages in partnerships that align with their work (OR= 2.9, 95% CI=1.8, 4.4), that partners are invested in mutual success (OR=2.7, 95% CI=1.8, 4.2), that they continuously learn from their partners (OR=3.2, 95% CI=2.0, 5.1), and that it is important to work with health and other sectors (OR=4.8, 95% CI=2.2, 10.6). They were also more likely to agree that their work unit collaborates effectively with health plans, health systems, and sectors outside of health (OR= 3.1, 95% CI=2.0, 4.8; OR=3.2, 95% CI=2.0, 5.1; OR=3.9, 95% CI=2.6, 5.8, respectively).

Strong commitment to health equity was significantly associated with perceived effective leadership. Individuals from such work units were more likely to strongly agree or agree that leadership is competent at managing change (OR=3.5, 95% CI=2.3, 5.3) and that leaders are high quality (OR=3.5, 95% CI=1.9, 6.4).

Work units with a strong commitment to health equity were more likely to encourage the use of evidence-based decision-making (EBDM) (OR=2.6, 95% CI=1.7, 4.0) and were more likely to be perceived as capable of leading EBDM (OR=2.7, 95% CI=1.9, 4.0).

Practitioners from these work unit were also significantly less likely to identify gaps in 12 of the 13 skills we asked about.

Discussion

Health equity is increasingly recognized as a matter of public health urgency and the social determinants of health are widely considered within the purview of public health. This study

examined both the extent to which state chronic disease practitioners consider health equity to be a primary area of work, as well as the characteristics of work units with high commitment to health equity compared to work units with low-to-moderate commitment.

Few state-level chronic disease practitioners see health equity as a primary area of work

We find that, while conceptual commitment to health equity may be widespread, less than 10% of state-level chronic disease practitioners agree that health equity falls within their purview and only 2% identify it as their primary focus. This picture seems to differ from others depicting a more robust state-level commitment to health equity. For example, ASTHO, which administered the Health Equity Minority Health Survey (also called the Minority Health Survey) in 2007, 2010, and 2014, has consistently reported extensive commitment to health equity in state health departments. In 2014, 81% of state health departments had a full-time equivalent staff resource and 85% had a primary organizational unit working on health equity or minority health.(16)

The incongruence between ASTHO's findings and ours could be a result of the different vantage points individuals in various roles in a state health department have into health equity work. Our respondents were state chronic disease prevention and health promotion practitioners, while ASTHO's respondents seem to be directors of health equity, minority health, and health disparities. If health equity is siloed in a separate office, chronic disease practitioners may not identify it as a primary area of their work or may not be collaborating with that office.(9–11) This is likely compounded by public health departments that are often organized into separate program areas that address specific diseases or risk factors and that are not well connected (often due to how funding is allocated at federal and state levels). It is also possible that the 9% of respondents who identify health equity as one of several work areas may be conceptualizing health equity as embedded in their primary areas of work, rather than as a specific area of focus.

In chronic disease programs, the emphasis on social determinants and health equity links back to the increased focus on policy and environmental approaches two decades ago, and the movement away from the earlier emphasis on individual- level interventions.(17) However, this shift to a policy/environmental focus is still underway, hampered in some chronic disease work units by restrictions on policy advocacy and conflicts with the legislative branch over authority for policy change as well as by skills gaps around influencing policy development.(18) The more pessimistic outlook on extent of engagement with health equity work captured in our survey relative to ASTHO's may reflect this incomplete transition to a policy/environmental-based orientation in chronic disease prevention and management.

Siloing health equity may be limiting

Siloization of health equity may be cause for concern. The American Public Health Association describes health equity as a framework within which public health practitioners from all disciplines can and should work.(8) Structurally isolating health equity may keep it from infusing into all areas of public health practice and may encourage the perception that health equity is the purview of those working in a dedicated, thereby obstructing practitioner

understanding of it as an approach to all public health pursuits. This is especially likely if the dedicated office is understaffed and not well integrated into existing programs run out of other parts of an agency.(8,19,20)

Work units committed to health equity are more skilled

Achieving health equity requires unique skills including the ability to listen to and build trust with affected communities and use data in effective and compelling ways.(8,21,22) The World Health Organization, in its final report from the Commission of Social Determinants of Health, describes a “backbone of action” comprised of the use of evidence to identify interventions that will work to close gaps in health outcomes; the application of surveillance to identify those gaps; and training of policymakers, advisors, and medical and health practitioners, among others.(5) It makes sense, therefore, that practitioners who rated their work unit’s commitment to health equity as strong also tended to rate the skills gaps in their work unit as smaller. These work units seem to be better equipped to prioritize programs and policies, use descriptive epidemiology and disease surveillance, conduct multiple types of evaluation, communicate with different stakeholder groups in different ways, and use evidence-based decision-making.

Departments that were perceived as actively working towards advancing health equity were also more likely to have leaders who were thought of as high quality and effective at managing change. Strong and skilled leadership is recognized as an important factor in furthering the work of health equity.(23–25) Organizational change management, especially, is a key skill needed to facilitate a work unit orientation towards health equity and to successfully engage other stakeholders outside the health department in participating in this work.(25,26) We can look at these differences as helpful indicators of the areas in which departments hoping to deepen their commitment to health equity should invest resources.

Work units committed to health equity engage in stronger, more diverse collaborations

The additional skills we found among work units with robust commitments to health equity may help them forge strong and effective partnerships and collaborations. Our study found that practitioners in these work units rated the quality of their partnerships (e.g., extent to which partnerships align, yield continuous learnings, and are invested in success) as significantly higher than individuals in work units with low-to-moderate commitments to public health. Developing strong partnerships is critical when tackling health inequity and the social determinants of health, which are, by definition, deeply rooted in institutions outside of health.(25) It is understandable, therefore, that we found that practitioners who work in work units that are focused on health equity also engage in a broader array of collaborations with stakeholders within and outside the health sector. Employees of these work units are over four times more likely to agree that it is important to work with health and other sectors.

Work units may be an influential level at which to focus efforts to strengthen commitments

Neither perceived commitment to health equity nor claiming health equity as a work area was correlated with individual respondent characteristics like education or years of experience in public health; structural differences in agencies like size, accreditation status,

or governance; or state-level features like health, poverty, mortality, or CDC funding per-capita. While further investigation of other characteristics at these levels (e.g., agency funding level, state mortality and morbidity disparities) is necessary, our findings suggest that practitioners' micro-environment (i.e., work-unit) exercises particular influence over perceptions of commitment to health equity. This makes the work unit a strategically important level at which to target trainings and other efforts to increase commitment to health equity. This is consistent with literature from the business sector showing the critical importance of mid-level managers (often equivalent to our work-unit level).(27)

Policy measures can further engrain health equity in state public health practice

Chronic diseases are the top contributors to health disparities in this country. Nonetheless, we find that chronic disease practitioners appear to rarely focus exclusively on health equity. Those who see their work unit as making strong commitments to health equity describe work environments and colleagues with skills that meaningfully differ from those who describe a weaker commitment. These findings have several policy implications:

- **Provide training, tools and best practices in health equity to chronic disease prevention units.** Continuing to train chronic disease practitioners in effective approaches to achieving health equity and providing tools and models of best practices is key. Several resources exist to help institutionalize an awareness of the structural and historical impediments to health and a robust and growing set of tools exists on this topic.(22,28)
- **Consider the implications of structurally committing to advancing health equity.** Separate offices of minority health, health disparities, or the like may inadvertently lead to the siloization of health equity, which may keep practitioners in other departments, like chronic disease prevention, from seeing health equity as a primary area of their work. Finding ways to collaborate among offices or merge priorities may create synergy among efforts.
- **Strengthen key skills for health equity work.** These include the ability to prioritize programs and policies, use epidemiology, conduct evaluations, and communicate with different stakeholder groups in order to facilitate strong and diverse partnerships. As Freudenberg et al. point out, these are fundamental domains of public health practice that can and should be developed into transitional and then transformative skills needed to advance health equity.(29)
- **Build health equity into downstream funding opportunities.** As funders of local community-level interventions, state health departments are in a position to develop policies and processes for aligning funding decisions with commitment to health equity by making health equity a requirement that guides the use of those funds (e.g., require hiring and collaborating with representatives of underserved communities, require health equity training). Building expectations for addressing health inequities into grants to local health departments could be one way of doing this.(30)
- **Broaden health equity surveillance to include the perspectives of chronic disease prevention practitioners and others whose work should intersect**

with health equity. Conventional approaches to health equity surveillance have helped encourage progress in this space. However, focusing surveillance efforts on the perspectives of leaders of offices of minority health, health equity, and health disparities yields an incomplete picture. By including the perceptions of chronic disease prevention and management practitioners and others that should be engaging in health equity work, we get a fuller, frontline-informed sense of where the work of health equity is flourishing and stagnating.

Ultimately, achieving health equity will also require Big P policies like those described by Berenson et al. (e.g., Medicaid expansion, minimum wage increases, fair housing laws).(31) Enacting such policies will require a level of public health advocacy, partnership, and technical skill that will only be possible if we make and sustain smaller p policies like those described above.

Conclusion

State health departments play a critical role in protecting the public's health in this country, and it is at this level that our conceptual commitments to achieving health equity must be clearly and sustainably operationalized. Chronic disease practitioners, by virtue of their work on the key contributors to health disparities, have key roles to play in advancing health equity. Instituting work-unit and departmental policies that make health equity the work of all public health practitioners and equipping practitioners with the knowledge, skills, and resources needed will expedite progress toward achieving health equity.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Exhibit 1.
Health equity as a work area
Sources/notes: SOURCE Authors’ analysis of data from primary data collection conducted in partnership with the National Association of Chronic Disease Directors (NACDD) and the Centers for Disease Control and Prevention (CDC) to evaluate the usefulness and impact of NACDD capacity-building activities.

Exhibit 2

Individual, Work Unit, Agency and State Characteristics by Perceived Department Commitment to Health Equity (N=537)

Characteristic	Bottom Two Tertiles n=374		Top Tertile n=163		OR *	95% CI
	%	(n)	%	(n)		
INDIVIDUAL CHARACTERISTICS (N=537)						
Female	80.5	318	85.6	148	1.5	0.9, 2.4
Age						
20-39 (ref)	28.2	111	24.3	42	1.0	—
40-49	26.7	105	28.3	49	1.6	0.6, 4.3
50-59	30.2	119	30.6	53	1.5	0.6, 3.8
60+	15.0	59	16.8	29	1.7	0.67, 4.2
White	78.3	311	75.1	130	0.8	0.5, 1.3
Education						
Bachelor's or less (ref)	20.2	80	22.5	39	1.0	—
MPH	18.4	73	15.6	27	0.8	0.4, 1.4
Other master's	24.7	98	11.0	19	0.9	0.5, 1.5
Nursing degree	8.6	34	22.5	39	1.1	0.6, 2.0
Doctoral degree	28.2	112	28.3	49	1.0	0.6, 1.6
Years in current position (m, SD)	6.1	5.8	5.5	5.0	1.0	0.9, 1.0
Years with current department (m, SD)	11.5	8.8	11.7	8.8	1.0	1.0, 1.0
Years in public health practice (m, SD)	15.4	9.8	15.4	9.9	1.0	1.0, 1.0
WORK UNIT CHARACTERISTICS						
Collaborations **						
Partnerships align	68.9	273	86.6	149	2.9	1.8, 4.4
Important to work with health and other sectors	82.8	328	96.0	166	4.8	2.2, 10.6
Continuously learn from partners	48.5	192	75.7	131	3.2	2.0, 5.1
Partners invested in success	62.4	247	82.1	142	2.7	1.8, 4.2
Collaborates effectively with health plans	22.2	88	47.4	82	3.1	2.0, 4.8
Collaborates effectively with health systems	42.2	167	70.4	121	3.2	2.0, 5.1
Collaborates regularly with sectors outside of health	31.8	126	64.0	110	3.9	2.6, 5.8
Leadership **						

Characteristic	Bottom Two Tertiles n=374		Top Tertile n=163		OR*	95% CI
	%	(n)	%	(n)		
Leadership is competent at managing change	45.0	178	73.4	127	3.5	2.3, 5.3
Leaders are high quality	56.4	224	80.9	140	3.5	1.9, 6.4
Commitment to evidence-based decision-making**						
Encourages the use of EBDM	54.4	216	75.1	130	2.6	1.7, 4.0
Can lead EBDM efforts	43.1	171	67.1	116	2.7	1.9, 4.0
Gaps in skills***						
Prioritizing programs/policies	49.6	195	25.9	44	0.3	0.2, 0.5
Uses of descriptive epidemiology	46.3	182	31.2	53	0.5	0.3, 0.8
Conducting chronic disease surveillance	37.8	149	28.7	49	0.7	0.5, 0.9
Using chronic disease surveillance	46.1	181	28.7	49	0.5	0.3, 0.7
Different evaluation designs	50.8	200	30.4	52	0.4	0.3, 0.6
Quantitative evaluation	38.1	150	22.9	39	0.5	0.3, 0.7
Qualitative evaluation	50.3	198	35.3	60	0.6	0.4, 0.8
Economic evaluation	46.2	182	27.4	46	0.4	0.3, 0.6
Communicating with policymakers	48.0	189	29.6	50	0.5	0.3, 0.8
Financial management	40.7	160	23.2	39	0.4	0.3, 0.6
Communicating with health care partners	55.0	216	30.4	51	0.4	0.3, 0.5
Written communications	38.1	150	28.0	47	0.6	0.4, 1.0
Leadership and management with diverse staff	45.6	179	25.2	42	0.4	0.3, 0.6
AGENCY CHARACTERISTICS (N=50)						
Size of population served						
Small (< 2,750,000)	26.2	98	28.8	47	1.0	—
Medium (2,750,001-6,250,000)	36.9	138	35.0	57	0.9	0.5, 1.4
Large (>625,000,000)	36.9	138	36.2	59	0.9	0.5, 1.5
Governance						
Decentralized	64.7	242	61.4	100	1.0	—
Mixed/Shared	15.8	59	13.5	22	0.9	0.6, 1.5
Centralized	19.5	73	25.2	41	1.4	0.8, 2.2
Accredited	43.6	163	46.0	75	1.1	0.7, 1.7

Characteristic	Bottom Two Tertiles n=374	Top Tertile n=163	OR*	95% CI
STATE CHARACTERISTICS (N=50)				
State health ranking quartile				
1 (25 th percentile)	35.8	134 30.7 50	1.0	—
2	16.0	60 16.0 26	1.2	0.6, 2.3
3	23.3	87 28.8 47	1.4	0.9, 2.3
4	24.9	93 24.5 40	1.2	0.8, 1.7
State mortality quartile				
1 (25 th percentile)	32.1	120 30.1 49	1.0	—
2	21.9	82 17.2 28	0.8	0.4, 1.6
3	24.1	90 30.7 50	1.4	0.8, 2.2
4	21.9	82 22.1 36	1.1	0.7, 1.7
CDC funding per capita (m, SD)	3.0	3.1 3.4 3.8	1.0	1.0, 1.1
Percent living in poverty (m, SD)	14.2	2.9 14.7 3.0	1.0	0.9, 1.1

Sources/notes: NOTES:

* ORs calculated taking into consideration clustering

** Operationalized as % who agree or strongly agree vs. all else

*** Defined as the importance of the skill minus its availability and then operationalized as a binary top 50% (large gap) vs. bottom 50% (small gap)

Boldface indicates significant at p<0.05

SOURCE: Authors' analysis of data from primary data collection conducted in partnership with the National Association of Chronic Disease Directors (NACDD) and the Centers for Disease Control and Prevention (CDC) to evaluate the usefulness and impact of NACDD capacity-building activities. Agency characteristics come from multiple sources including Association of State and Territory Health Officials Profile of State Public Health, 2014 (department size, governance), Public Health Accreditation Board, 2016 (accreditation status), CDC State Appropriations (CDC funding per capita), America's Health Ranking Annual Report, 2016 (state health ranking), CDC's MMWR (state mortality ranking), and the US Census, 2015 (state poverty rate).