Perceptions of Public Health 3.0: Concordance Between Public Health Agency Leaders and Employees

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ABSTRACT

Context and Background: The newest era of public health, deemed "Public Health 3.0," supports cross-sector collaborations to address social determinants of health. These activities often require collaborations with nontraditional public health entities. As this new era begins, it is important to understand perceptions of the public health workforce with regard to Public Health 3.0.

Objective: To assess perceptions of support toward Public Health 3.0 activities by the public health workforce, identify characteristics associated with support, and measure concordance in support between agency directors and the general workforce.

Design: This cross-sectional study utilizes the 2017 Public Health Workforce Interests and Needs Survey to understand support and concordance regarding Public Health 3.0 activities by a nationally representative sample of governmental public health employees. Logistic regression models are used to identify characteristics associated with support of each 3.0 activity and concordance.

Main Outcome Measures: Governmental public health employees' opinions on how involved their agency should be in the K-12 education system, the economy, the built environment, transportation, housing, social connectedness, and health equity within their jurisdiction and concordance in support of involvement between agency directors and the general workforce.

Results: Overall, individual perceptions supporting involvement were highest for health equity and social connectedness and lowest for transportation. Supervisory status, education, and being at a local health department were associated with greater odds of supporting all 3.0 activities. Concordance with agency directors was greatest among other executives relative to nonsupervisors.

Conclusions: There is overall generally high support of many 3.0 activities, but there are gaps in agreement by supervisory status, gender, race/ethnicity, education, role type, and jurisdiction. Findings may help support agency leaders in better communicating the role of their agencies in Public Health 3.0 activities, and workforce education regarding such activities may be necessary for the success of Public Health 3.0's success.

KEY WORDS: leadership, Public Health 3.0, public health workforce, training needs

In recent years, several influential groups have described the need for public health to expand its role through collaborations with nontraditional public health entities.[1-3] This need was driven by the increased understanding of the role that social determinants of health (SDH), such as education, housing, and the built environment, play on population health. Cross-sector collaborations between state and local public health agencies and entities involved in these activities have been proposed as a way to better address these SDH and improve health equity. This effort, called "Public Health 3.0," specifically suggests that public health departments act as coordinators across these collaborators for their communities.

Increasing collaboration and organizing community efforts toward improved population health and health equity under Public Health 3.0 may create additional management, budgetary, and workforce demands.[4] Given these additional agency pressures, there is an urgent need for public health leaders to be able to mobilize the frontline public health

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workforce and their collaborators to accomplish these objectives.[3-7] The success of this new responsibility requires support from public health leaders and their ability to motivate their staff. A recent national survey of public health leaders found that 76% to 93% of supervisors and executives reported confidence in their ability to manage change within the agency[8]; however, it did not ask respondents how prepared they are for collaboration or how well they are currently managing change within or outside of their agencies. There have been numerous examples of public health partnering with various organizations including schools and hospitals as well as nontraditional partners outside the scope of health such as faith communities.[9-13] Yet much of what has been studied about such collaborations preceded the Public Health 3.0 initiative. Recently, anecdotal reports have shared examples of Public Health 3.0 collaborations such as with a community health and literacy center in Philadelphia (the Live Well Allegheny Initiative), sponsored through a partnership between the city and the local children's hospital[14] which includes collaboration between the health department, schools, restaurants, workplaces, and governmental agencies targeting chronic disease prevention[1,15] Another example (California's Accountable Communities for Health) is a statewide initiative that includes a variety of partners and a unique funding model.[1] Although anecdotal reports are informative and provide examples for other health departments, little is known about the general perception of the public health workforce about implementation of the Public Health 3.0 initiative or how well senior leaders and mid-level managers may be communicating the changes proposed by Public Health 3.0 within their agencies.

The purpose of this article is to describe the extent to which all public health workers, including frontline workers, supervisors, and executives, perceive the role of their agencies in Public Health 3.0. In addition, we examine whether differences exist between the perspectives of agency directors and frontline public health workers about the role of their agency in Public Health 3.0. To accomplish these goals, we utilize recently collected national data of public health workers' perceptions of how involved they believe their agency should be in several activities aligned with Public Health 3.0 including education, housing, transportation, and the built environment. Low perceptions of involvement or differences in perceptions by leadership status may have implications for public health's ability to meet the goals of Public Health 3.0 and may support leaders during this transition. Findings from this study will be of particular interest to the organizations supporting Public Health 3.0 and public health leaders.

Methods

Study design and population studied

This cross-sectional study considers governmental public health workers' perceptions of the role of their agencies in 2017. Overall, this study assesses 3 questions in 3 separate analyses. First, what are workers' perceptions of the involvement of their agencies in various activities that align with the Public Health 3.0 mission? Second, is there agreement about involvement between types of employees by their supervisory status? Third, is there agreement between state and local employees?

This study used 2017 data from the Public Health Workforce Interests and Needs Survey (PH WINS).[16] PH WINS is administered by the Association of State and Territorial Health Officials (ASTHO) and surveys local and state public health employees about their educational background, job and workplace satisfaction, training needs, and intentions to leave their employment. The survey first began in 2014, and this is the second wave of data collection for the survey. Based on sampling and response, the survey is nationally representative of the state and local governmental public health workforce; however, no local health departments serving fewer than 25 000 people or with fewer than 25 employees were included in nationally representative samples.

Independent variables

The primary independent variable of interest was *supervisory status* (ie, nonsupervisory, supervisor, manager, or executive). This variable is used to examine concordance in perspectives between agency directors and individuals across each supervisory level. To identify the most senior leaders in an agency, a new variable "agency director" was generated from individuals who were both "executives" and indicated that their role was department/bureau director, deputy director, health officer, or public health agency director.

Other individual and agency characteristics were used as covariates in the analyses to account for other differences in responses. Individual respondent characteristics include *age*, *gender*, *race/ethnicity*, *highest degree attained, having a formal public health education* (at the bachelor's level or above), and *role type*. Survey respondents were asked to select their role type from a list of more than 60 roles. These included "administrative/staff," "clinical and lab," "public health sciences," and "social services and other." "Administrative/staff" includes roles such as attorney, business support, grant specialists, and human resources. "Clinical and lab" includes roles such

as community health workers, laboratory workers, medical examiners, public health nurses, and physicians. "Public health sciences" includes roles such as epidemiologists, disease intervention specialists, environmental health workers, and health educators. "Social services and other" includes social workers and all other respondents. Individuals who identified their role as clerical personnel, custodian, or other (n = 10 890) or were part-time (n = 3324) were removed from the sample, as they are likely not in the position to carry out or influence Public Health 3.0 efforts in their agency. In addition, 315 individuals who responded that their role was department/bureau director, deputy director, health officer, or public health agency director but did not state that they were either managers or executives were removed, as this indicated that one of the questions was answered incorrectly. Finally, those missing key characteristics such as supervisory status were removed from the sample. Agency covariates include a categorical measure of *size of the agency (ie, size of the population served by tertile [small, medium, large])*, *governance structure*, and *jurisdiction* (*state/local*).

Dependent variables

The first set of dependent variables examined for the analysis was individual perceptions of how involved respondents believe their agency should be in various activities aligned with Public Health 3.0 (further referred to as *involvement*). These activities include the K-12 education system, economy, the built environment, housing, transportation, social connectedness, and health equity within their jurisdiction. Individuals were able to respond on a 4-point Likert scale from "not at all involved" to "very involved." These variables were transformed into a binary indicator for any perceived involvement where "not at all" and "not very involved" were considered "little to no involvement" and "somewhat" to "very involved" were considered "involved."

Concordance of involvement perceptions was calculated between agency directors and all other agency employees. Within each agency, a summary of perceived involvement by the collective agency directors was calculated by averaging the binary variable for involvement across the leaders in the agency. If more than 50% of the directors responded that their agency should be involved in that activity, the agency director average perception was considered "involved." For each of the nonagency director respondents, *concordance* was calculated on the basis of their perceived involvement compared with the summary agency leadership involvement. For example, if 60% of the agency's directors thought that their agency should be involved, the agency director perception was involved. If one of the nondirectors from that agency also reported their agency should be involved, there was concordance.

Analysis

Descriptive statistics were performed to summarize respondents included in the study. Differences in characteristics, perceptions of involvement, and concordance across supervisory levels were assessed using χ^2 tests for all individual, job, and agency characteristics.

Logistic regression models were conducted to understand which characteristics are associated with *perceived involvement* in Public Health 3.0 activities. Individual models were conducted for each Public Health 3.0 activity at the individual respondent level. Supervisory status was the primary independent variable of interest, and all of the individual and agency characteristics described earlier were included as additional covariates in the models.

Concordance between employees and agency directors was modeled using a logistic regression at the individual level. Agency director responses were used to calculate the summary agency director involvement, and, ultimately, the concordance outcome variable but were then removed from the sample for this model. All individual and agency characteristics described earlier were included as covariates in the model.

All analyses were weighted using nationally representative and replication weights of the public health workforce provided by ASTHO and were conducted in Stata version 15 (College Station, Texas). This study was deemed nonhuman subjects research by the Indiana University institutional review board.

Results

The 2017 PH WINS received 43 697 respondents. After excluding responses as noted in the methods, our sample size was 27 050. As a weighted sample, this represents 109 942 governmental public health workers. Of the weighted sample considered, 68% were nonsupervisors, 18.7% supervisors, 11.3% managers, and 2% executives (Table 1). Gender, age, education level, having a formal public health degree, role type, tenure in public health practice, agency jurisdiction, governance, and size all differed significantly by supervisory status. Age and number of years of service are reflective of supervisory roles; younger and less-experienced workers are less likely to be in supervisory roles, whereas older, more-experienced workers are more likely to be in higher leadership roles. A higher proportion of managers and executives have master's and doctoral degrees than those in other

TABLE 1
Descriptive Statistics by Supervisory Status[a]

	Total (n = 109 942; 100%)	Nonsupervisor (n = 73 747; 67.1%)	Supervisor (n = 20 227; 18.4%)	Manager (n = 12 270; 11.2%)	Executive (n = 1 629; 1.5%)	Agency Director (n = 2 069; 1.9%)
Gender[b]						
Female	81 223 (73.9)	55 275 (75.0)	15 677 (77.5)	7 974 (65.0)	1 044 (64.1)	1 253 (60.9)
Male	28 294 (25.7)	18 165 (24.6)	4 500 (22.2)	4 249 (34.6)	578 (35.5)	801 (38.9)
Other	416 (0.4)	308 (0.4)	51 (0.3)	47 (0.4)	6 (0.4)	4 (0.2)
Race/ethnicity						
White	67 319 (61.2)	43 543 (59.0)	13 443 (66.5)	7 741 (63.1)	1 051 (64.5)	1 540 (75.1)
Black or African American	17 445 (15.9)	12 021 (16.3)	2 356 (11.6)	2 545 (20.7)	239 (14.7)	285 (13.9)
Asian	6 341 (5.8)	4 312 (5.8)	1 359 (6.7)	496 (4.0)	104 (6.4)	72 (3.5)
Hispanic or Latino	12 351 (11.2)	9 222 (12.5)	2 011 (9.9)	884 (7.2)	150 (9.2)	83 (4.1)
Other	919 (0.8)	673 (0.9)	158 (0.8)	68 (0.6)	13 (0.8)	7 (0.3)
≥2 races	5 547 (5.0)	3 975 (5.4)	904 (4.5)	534 (4.4)	71 (4.4)	62 (3.0)
Age[c]						
≤25 y	2 615 (2.4)	2 455 (3.3)	126 (0.6)	15 (0.1)	13 (0.8)	6 (0.3)
26-35 y	19 287 (17.6)	15 675 (21.3)	2 757 (13.6)	741 (6.0)	87 (5.3)	126 (6.2)
36-45 y	25 205 (22.9)	17 317 (23.5)	4 701 (23.3)	2 556 (20.8)	294 (18.0)	338 (16.5)
46-55 y	32 160 (29.3)	19 331 (26.2)	6 389 (31.6)	5 156 (42.0)	574 (35.2)	710 (34.7)
56-65 y	26 387 (24.0)	16 923 (22.9)	4 612 (22.8)	3 496 (28.5)	585 (35.9)	771 (37.7)
≥66 y	4 163 (3.8)	2 047 (2.8)	1 643 (8.1)	315 (2.6)	76 (4.7)	92 (4.5)
Education level[d]						
No college/ associate's degree	24 903 (22.7)	19 657 (26.7)	3 754 (18.6)	1 266 (10.3)	175 (10.8)	51 (2.4)
Bachelor's	45 659 (41.5)	33 154 (45.0)	7 542 (37.3)	4 140 (33.7)	376 (23.1)	447 (21.6)
Master's	33 400 (30.4)	18 340 (24.9)	7 593 (37.5)	5 751 (46.9)	736 (45.2)	979 (47.3)
Doctorate	5 980 (5.4)	2 596 (3.5)	1 338 (6.6)	1 112 (9.1)	341 (21.0)	592 (28.6)
Public health degree[d]						
No public health degree	89 987 (81.8)	62 035 (84.1)	16 167 (79.9)	9 402 (76.6)	1 210 (74.3)	1 174 (56.7)
Public health degree	19 955 (18.2)	11 713 (15.9)	4 060 (20.1)	2 868 (23.4)	419 (25.7)	895 (43.3)
Role type[d]						
Administrative	19 221 (17.5)	13 134 (17.8)	3 125 (15.4)	1 612 (13.1)	435 (26.7)	915 (44.2)
Clinical and laboratory	35 001 (31.8)	25 841 (35.0)	7 032 (34.8)	1 820 (14.8)	307 (18.9)	0 (0.0)
Public health sciences	49 322 (44.9)	29 611 (40.2)	9 147 (45.2)	8 588 (70.0)	823 (50.5)	1 154 (55.8)
Social services	6 398 (5.8)	5 161 (7.0)	924 (4.6)	250 (2.0)	64 (3.9)	0 (0.0)
Tenure in public health practice[d]						
0-5 y	32 060 (29.2)	26 181 (35.5)	3 833 (18.9)	1 531 (12.5)	288 (17.7)	227 (11.0)
6-10 y	19 294 (17.6)	13 391 (18.2)	3 706 (18.3)	1 723 (14.0)	250 (15.4)	224 (10.9)
11-15 y	16 928 (15.4)	10 294 (14.0)	3 277 (16.2)	2 872 (23.4)	226 (13.9)	260 (12.6)
16-20 y	17 083 (15.5)	10 463 (14.2)	4 160 (20.6)	1 899 (15.5)	271 (16.7)	289 (14.0)
≥21 y	24 570 (22.3)	13 418 (18.2)	5 252 (26.0)	4 245 (34.6)	593 (36.4)	1 063 (51.5)
Jurisdiction[c]						
Local	76 357 (69.5)	52 017 (70.5)	14 045 (69.4)	7 859 (64.1)	1 006 (61.8)	1 430 (69.1)
State	33 585 (30.5)	21 720 (29.5)	6 182 (30.6)	4 411 (35.9)	623 (38.2)	639 (30.9)
Governance[d]						
Decentralized	67 091 (61.0)	46 017 (62.4)	11 770 (58.2)	7 180 (58.5)	711 (43.6)	1 413 (68.3)
Centralized	15 227 (13.9)	9 851 (13.4)	3 051 (15.1)	1 890 (15.4)	200 (12.3)	236 (11.4)
Shared	19 820 (18.0)	12 743 (17.3)	3 849 (19.0)	2 366 (19.3)	585 (35.9)	277 (13.4)
Mixed	7 804 (7.1)	5 137 (7.0)	1 557 (7.7)	835 (6.8)	133 (8.2)	142 (6.9)
Agency tertile[d]						
Small	8 234 (7.5)	5 860 (7.9)	1 424 (7.0)	622 (5.1)	65 (4.0)	263 (12.8)
Medium	29 615 (26.9)	20 161 (27.3)	5 261 26.0)	3 018 (24.6)	426 (26.1)	749 (36.5)
Large	72 076 (65.6)	47 726 (64.7)	13 542 (67.0)	8 629 (70.3)	1 138 (69.9)	1 041 (50.7)

[a]Counts presented represent the weighted counts. Differences by category were evaluated using χ^2 tests. Tertiles were calculated for local separately from state. Agency tertile for the respondents is reflective of their tertile within their state or local jurisdiction. Agency directors include those who reported being an executive and that their role was department/bureau director, deputy director, health officer, or public health agency director. Agency directors were left in the sample even if missing demographic job characteristics to assess summary perceptions among agency leaders. Because of this, sums may not reach the maximum sample size for all variables.

[b]$P < .05$.

[c]$P < .01$.

[d]$P < .001$.

roles. A higher proportion of nonsupervisors and supervisors are in clinical and lab positions than managers and executives, and the majority of managers and executives are in public health sciences roles.

Forty-six state and 145 local agencies were examined in the current study determined by having responses to the survey from both agency directors and nonagency directors. This sample of just over 23 000 respondents (unweighted) was used for the concordance models. While the state sample had representation from most states, the local sample included a smaller proportion (5.7%) of the total population of local health departments in the country. Nearly 78% of the local agencies in the sample with both agency directors and nonagency director responses were in the largest tertile of local agencies, and 72.6% were from agencies with decentralized governance.

Individual perceptions of support of agency involvement

The most common Public Health 3.0 activity that the overall workforce feel their agency should be involved in is health equity (87.4%), followed by social connectedness (77.7%) (Figure 1). The least common activity in which individuals felt their agency should be involved was transportation (55.8%). In bivariate analyses, perceptions of involvement were significantly associated with *supervisory level* for all activities besides education ($P = .12$). Across all activities aside from health equity, agency directors most frequently believed their agency should be involved in each public health 3.0 activity and perceptions generally decreased with each lower *supervisory level*.

Multivariate logistic regression results showed significantly greater odds of perceived involvement for agency directors than nonsupervisors for all Public Health 3.0 activities, with the greatest magnitude of difference between agency directors and nonsupervisors being for the built environment (OR = 4.05, $P < .001$) (Table 2). Other executives and managers also showed greater odds of involvement for the economy, built environment, and health equity compared with nonsupervisors. Individual perceptions of supervisors were not significantly different from those of nonsupervisors for any Public Health 3.0 activities.

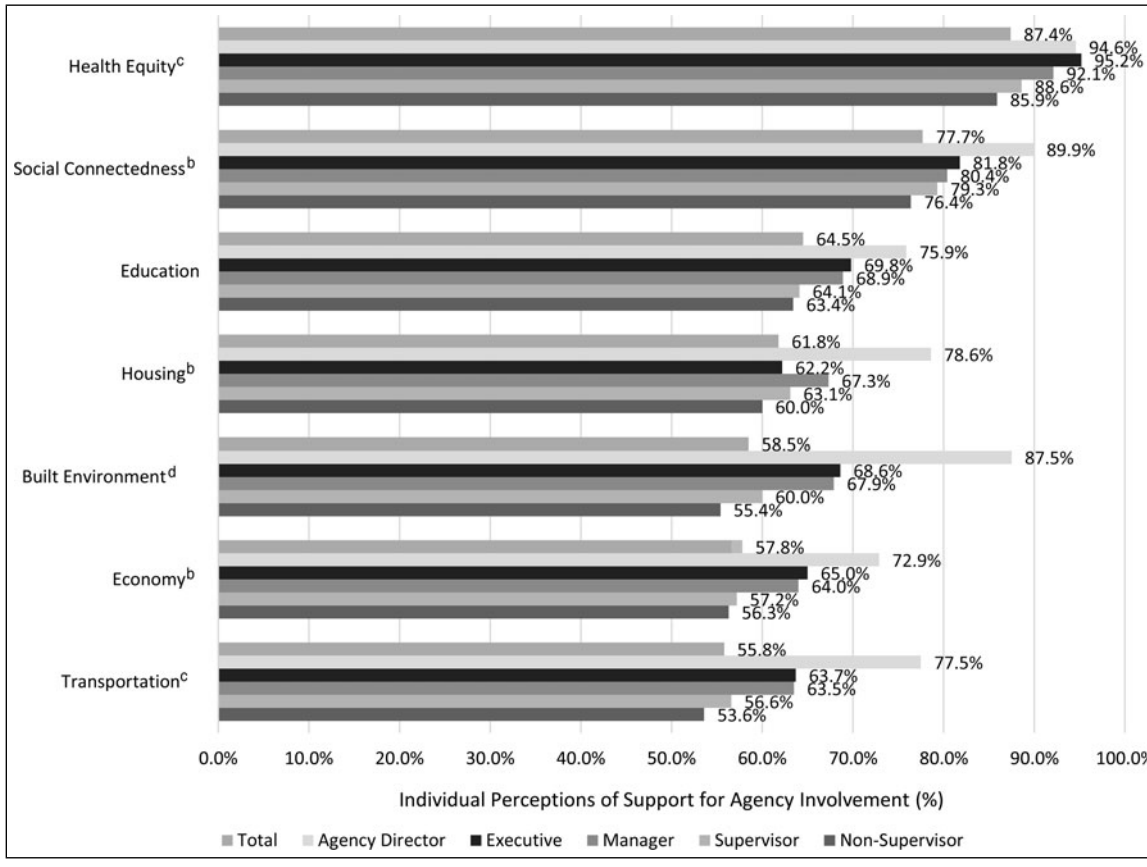

FIGURE 1 Perceptions Supporting Involvement in Public Health 3.0 Activities by Employee Supervisory Status[a]

[a]Significance represents significant differences in support of agency involvement by supervisory status in bivariate analyses. [b]$P < .05$. [c]$P < .01$. [d]$P < .001$.

TABLE 2
Individual Perceptions of Involvement in Public Health 3.0 Activities[a]

	Health Equity	Social Connectedness	Education	Housing	Built Environment	Economy	Transportation
Supervisory level							
Nonsupervisor	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Supervisor	1.24	1.16	1.01	1.09	1.09	1.03	1.08
Manager	1.95[b]	1.30	1.27	1.24	1.47[c]	1.42[c]	1.48[c]
Executive	3.28[b]	1.39	1.28	1.02	1.55[d]	1.52[c]	1.50
Agency director	2.69[d]	2.48[b]	1.58[d]	1.90[c]	4.05[b]	2.32[b]	2.85[b]
Gender							
Female	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Male	0.54[b]	0.52[b]	0.73[b]	0.75[b]	0.73[b]	0.68[b]	0.64[b]
Other	0.42[d]	0.39[c]	0.71	0.65[d]	0.54[d]	0.58[d]	0.76
Race/ethnicity							
White	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Black or African American	1.50	1.94[d]	1.80[d]	1.82[c]	1.54[d]	2.42[b]	2.05[c]
Asian	0.53[b]	0.69[b]	0.67[c]	0.67[d]	0.63[c]	1.08	0.77
Hispanic or Latino	1.01	1.08	1.21[c]	1.07	1.08	1.42[b]	1.34[b]
Other	1.52	1.45	1.22	1.0	0.89	1.77[c]	1.19
≥2 races	0.88	1.15	1.11	1.14	1.10	1.40[b]	1.31[c]
Education level							
No college or associate's degree	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Bachelor's	0.94	1.02	0.90	1.07	1.13[d]	0.85[b]	1.00
Master's	2.04[b]	1.74[b]	1.32[c]	1.63[b]	1.99[b]	1.26	1.73[b]
Doctorate	1.66[d]	1.63[c]	1.42[c]	1.74[b]	1.89[b]	1.11	1.68[b]
Public health degree							
No public health degree	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Public health degree	1.18	1.45[c]	1.20[d]	1.31[d]	1.59[b]	0.95	1.25[d]
Role type							
Administrative	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Clinical and laboratory	1.08	0.88	0.84[d]	0.95	0.84	1.11	1.18[d]
Public health sciences	0.91	0.75[b]	0.84[d]	1.08	0.95	1.01	1.04
Social services and other	0.76	1.00	0.81[d]	1.18	0.69[c]	1.04	1.15
Jurisdiction							
Local	Ref	Ref	Ref	Ref	Ref	Ref	Ref
State	0.66[b]	0.61[b]	0.58[b]	0.60[b]	0.60[b]	0.67[b]	0.61[b]
Governance							
Decentralized	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Centralized	0.98	0.83[d]	0.90	0.69[b]	0.83[d]	0.85[c]	0.75[c]
Shared	1.02	0.93	1.04	0.74[b]	0.80[d]	0.95	0.88
Mixed	0.99	0.88[d]	1.11	0.77[c]	1.05	0.99	0.86

[a]Results shown are from individual logistic regressions for each Public Health 3.0 activity. Each model also included controls for agency size in tertiles, tenure in public health practice, and age (results not shown). Estimates provided are odds ratios. Odds ratios can be interpreted as percent greater odds, given a characteristic relative to the reference group (Ref). For example, agency directors have 52.6% greater odds of responding that their agency should be involved in the K-12 education system in their jurisdiction relative to nonsupervisors.

[b]$P < .001$.

[c]$P < .01$.

[d]$P < .05$.

For at least 5 of the 7 Public Health 3.0 activities, having a public health degree, a master's or doctorate, and being black or African American were associated with greater odds of perceived involvement. Being male or working at a state health department was associated with lower odds of perceived involvement for each activity. When significant, Asian race, nonbinary or other gender, and centralized governance were associated with lower odds of perceived involvement than being white, female, and having decentralized governance, respectively.

Concordance in perceptions between agency directors and the general workforce

Figure 2 presents perspectives of workforce concordance with agency directors. Concordance differed significantly by supervisory status for health equity ($P < .001$), social connectedness ($P = .03$), education ($P = .002$), housing ($P = .02$), and the built environment ($P < .001$) in bivariate analyses. The highest proportion of concordance was between agency directors and other executives across all 3.0 activities. The second highest proportion of concordance with agency directors was among managers; however, for housing, concordance was second highest between supervisors and agency directors.

In multivariate logistic regression analyses, executives had greater odds of agreeing with their agency directors than nonsupervisors for the following activities: education (OR = 1.51, $P = .003$), housing (OR = 1.33, $P = .02$), social connectedness (OR = 1.40, $P = .047$), and health equity (OR = 1.64, $P = .025$) (Table 3). The only activity in which there was significantly different concordance between agency directors and managers compared with nonsupervisors was for activities focused on transportation (OR = 1.14, $P = .01$). Individuals with a public health degree were at significantly greater odds of concordance with directors than those without a public health degree with regard to the built environment (OR = 1.43, $P < .001$), transportation (OR = 1.20, $P = .02$), and social connectedness (OR = 1.17, $P = .02$). Across a majority of the 7 Public Health 3.0 activities, higher education

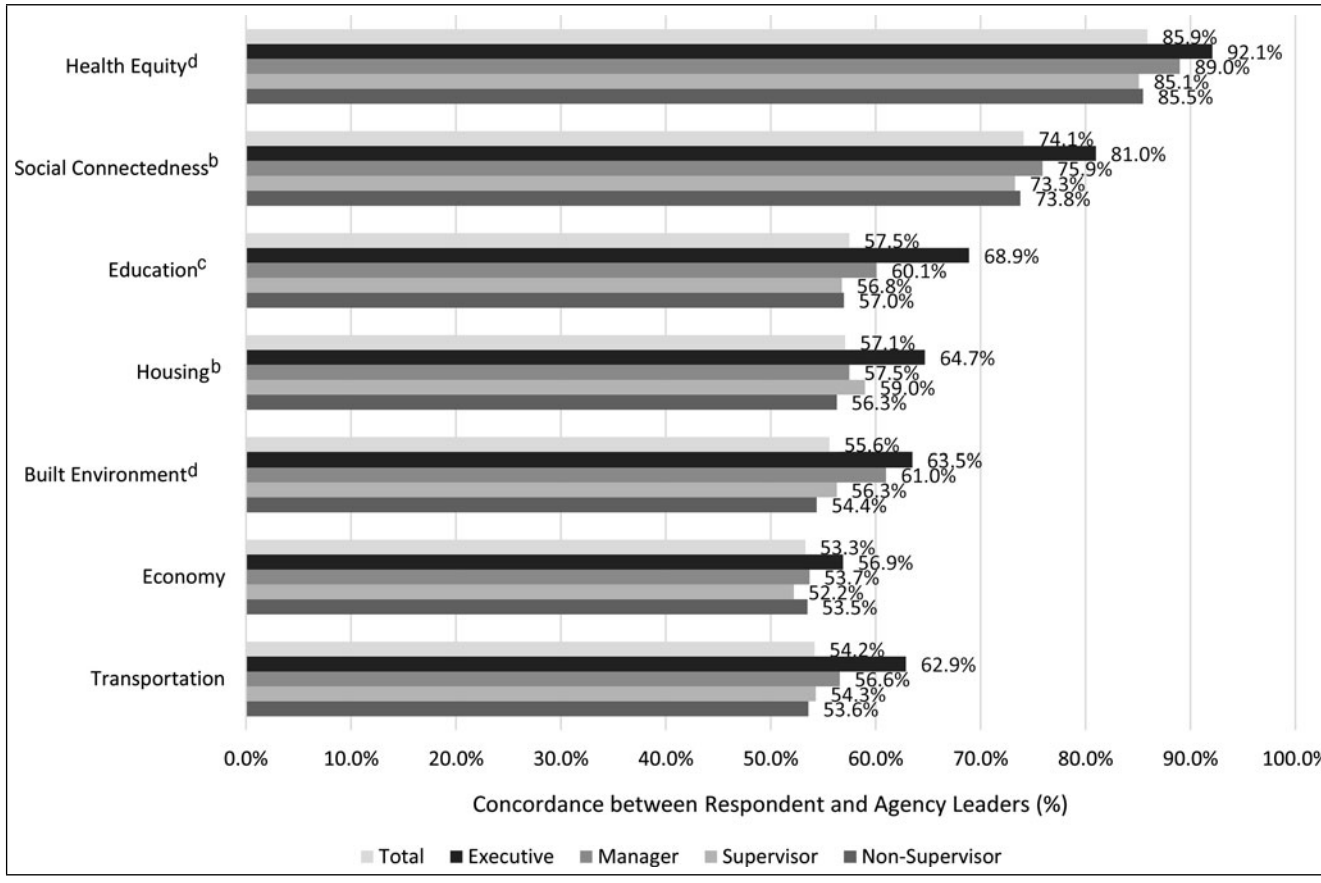

FIGURE 2 Percent of Concordance Between Directors and Employees Across Specific Levels of Supervisory Status for Public Health 3.0 Activities[a]
[a]Agreement was measured between directors (individuals who reported their role to be public health agency director, health officer, deputy director, or department/bureau director and reported themselves to be executives) and the rest of the workforce within agencies. Significance represents significant differences in agreement by supervisory status in bivariate analyses. [b]$P < .05$. [c]$P < .01$. [d]$P < .001$.

TABLE 3
Concordance in Perceptions of Involvement in Public Health 3.0 Activities Between the Workforce and Agency Directors[a]

	Health Equity	Social Connectedness	Education	Housing	Built Environment	Economy	Transportation
Supervisory level							
Nonsupervisor	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Supervisor	0.885	0.944	0.947	1.069	0.994	0.949	1.018
Manager	1.191	1.089	1.079	0.985	1.158	1.028	1.137[b]
Executive	1.645[b]	1.400[b]	1.512[c]	1.330[b]	1.302	1.162	1.462
Gender							
Female	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Male	0.707[d]	0.662[d]	0.852[d]	0.890[b]	0.804[c]	0.822[d]	0.820[c]
Other	0.560[b]	0.395[c]	0.867	0.629[b]	0.583[b]	0.572[b]	0.747
Race/ethnicity							
White	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Black or African American	1.063	1.401[d]	1.382[d]	1.176	1.046	1.476[d]	1.347[d]
Asian	0.487[d]	0.694[d]	0.902	0.807[b]	0.646[d]	1.026	0.884
Hispanic or Latino	0.871	1.062	1.149	1.129	0.945	1.143	1.257[c]
Other	1.397	1.182	0.854	0.900	0.798	1.110	1.194
≥2 races	0.771[b]	0.968	1.026	1.149[b]	1.090	1.153[b]	1.216[b]
Education level							
No college or associate's degree	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Bachelor's	1.240[d]	1.161[b]	1.059	1.211[d]	1.234[c]	0.937	1.058
Master's	2.017[d]	1.813[d]	1.360[d]	1.484[d]	1.731[d]	1.073	1.316[d]
Doctorate	2.232[d]	2.143[d]	1.438[d]	1.798[d]	1.985[d]	1.167	1.277[b]
Public health degree							
No public health degree	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Public health degree	1.192	1.169[b]	1.066	1.101	1.435[d]	1.004	1.204[b]
Role type							
Administrative	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Clinical and laboratory	0.826[b]	0.783[c]	0.783[d]	0.784[c]	0.749[d]	0.970	1.057
Public health sciences	0.932	0.856[c]	0.846[c]	0.927	0.953	0.995	1.025
Social services and other	0.579[d]	0.862	0.619[d]	0.892	0.682[c]	0.858	0.920
Jurisdiction							
Local	Ref	Ref	Ref	Ref	Ref	Ref	Ref
State	0.664[b]	0.603[d]	0.626[d]	0.524[d]	0.458[d]	0.744[d]	0.729[c]
Governance							
Decentralized	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Centralized	0.994	0.770[b]	1.038	0.924	1.107	1.062	0.889
Shared	1.058	0.860	1.151	0.676[d]	0.695[d]	0.862[d]	1.014
Mixed	1.010	0.678[c]	1.134	0.934	1.219[c]	0.971	0.886

[a] Results shown are from agreement logistic regressions for each Public Health 3.0 activity. Agreement was measured for individuals relative to the average for the leadership team within their agency. Each model also included controls for agency size in tertiles, tenure in public health practice, and age (results not shown). Estimates provided are odds ratios. Odds ratios can be interpreted as percent greater odds given a characteristic relative to the reference group (Ref).

[b] $P < .05$.

[c] $P < .01$.

[d] $P < .001$.

and being black or African American were significantly associated with agreement with directors similar to the models that examined individual perceptions of involvement. Males and individuals working at a state agency were consistently significantly less likely to agree with their directors than female and local agency respondents. Across the models for each activity, being Asian and having nonadministrative roles were only sometimes significant. In models wherein they were significant, being Asian and having nonadministrative roles were associated with lower odds of agreement with directors.

Discussion

Overall, more than half of the public health workforce believe their agency should be involved in various Public Health 3.0–related activities. Health equity is the most commonly supported activity, followed by social connectedness. This suggests that many public health employees are already in support of these activities. However, Public Health 3.0 activities that may be further from traditional public health work (ie, economy, transportation, and the built environment) may still need to garner support from the workforce before workers fully embrace new responsibilities in these areas or automatically think to include these activities in their ongoing interventions and other initiatives.

Generally, those who are in higher supervisory roles, have a public health degree, have a higher level of education, and are black or African American are more supportive of their agencies being involved in most Public Health 3.0 activities. Higher levels of support from individuals with higher-level degrees, individuals with formal public health education, and those in higher-level supervisory roles may be reflective of these individuals having more training on the importance and health impacts of social determinants related to these Public Health 3.0 activities and/or greater lived experience. Those individuals in higher-level supervisory roles may also be more aware of the bigger picture of the role of their agencies and thus are more supportive of these new 3.0 responsibilities. In a similar vein, state agencies tend to be much larger and are less involved in direct "boots-on-the-ground" work and interventions than local agencies, potentially making Public Health 3.0 activities more theoretical and less personal. This difference in size and focus of work may explain why state and centralized system employees tend to be less supportive of Public Health 3.0 activities than their local public health peers. The "boots-on-the-ground" perspective of local public health employees may translate into being more aware of the need or role of the Public Health 3.0 activities in supporting the communities they serve. However, less supportive perceptions of the activities among state respondents may be important, as many of the policies addressing efforts related to Public Health 3.0 activities may originate at the state level, especially within centralized systems.

Concordance in perceptions of involvement in 3.0 activities between the workforce and directors in an agency appears to be less consistent. Across the full workforce, less than 60% of the workforce agrees with its directors on the involvement of its agencies for transportation, housing, the built environment, the economy, and education. Other executive-level employees have greater odds of concordance with directors for education, housing, social connectedness, and health equity but not for other activities. Regarding transportation, managers have higher odds of concordance with senior leaders than nonsupervisors, but executive-level employees do not differ from nonsupervisors in terms of concordance with agency directors. Overall, concordance findings may suggest that while the agency directors are generally on board with Public Health 3.0 activities, the message is only being translated to those closest to them in the supervisory hierarchy (executive-level employees) and not for all types of activities. This may suggest the need for improved communication across silos about the potential value of Public Health 3.0 activities or enhanced education around the importance of Public Health 3.0 activities among the general public health workforce. Alternatively, the results may also reflect resistance to change regarding current roles and activities, posing a challenge in systems change management. Executives and agency leaders by virtue of lengthier experience may have witnessed firsthand the difficulties of meaningful community health status improvement and as a result are more willing to embrace newer models. Finally, differences by role type and supervisory status may reflect the current siloed public health approach or the narrow scope of nonagency directors.

The concordance results, if validated by further research, may represent the most important findings in this study. Although not vast, they illustrate the gulf between viewpoints of where senior policy makers are headed and perspectives of other staff members. Contemplating the public health practice of the future, how will visionary leaders effectively translate their concepts to the workforce that will be entrusted with 3.0 implementation? Although staff with higher education and public health degrees appear supportive, have their education and preparation provided them with tools for successful cross-sectoral collaboration? Notably, most directors and staff members share support for the major elements of Public Health 3.0, providing a solid foundation for a clarion call to action.

Implications for Policy & Practice

- This study is the first to consider the public health workforce's perceptions of support and involvement in various Public Health 3.0–related activities.
- There is general support for most 3.0 activities, although gaps in support may be present within the levels of supervisory status, gender, race/ethnicity, educational background, jurisdiction, and governance structure.
- Despite concordance on involvement for 3.0 activities generally, involvement typically does not translate throughout the agency from senior leaders to the entire workforce.
- These findings may facilitate public health agency leaders understanding of perceptions of the workforce and their support of the 3.0 activities. Greater insight may prove useful for informing strategies around leader communication of such ideas and for ensuring workforce training needs are met regarding social determinants of health and Public Health 3.0 activities.

This study has several notable limitations. First, analyses are cross-sectional in nature (2017 only) and cannot assess any causal relationship between leadership status and perceptions of Public Health 3.0 activities. Second, many analytical models and comparisons were examined in this study. Conducting a high number of comparisons increases the risk for type I error or finding significant relationships by chance when such differences may not in fact exist. However, the relative consistency in significance and direction of coefficients across models suggests that the significant differences presented are likely true differences and not merely random events. Third, our analysis considered concordance, which could include either agreement that the agency should be involved or agreement that the agency should not be involved in a Public Health 3.0 activity. While concordance agreement findings should be interpreted with caution, it is important to note that based on individual perception analyses, the majority of directors supported 3.0 activity involvement. Finally, while most states have agency leader and workforce representation in the survey, agencies with both respondent types at the local level are much more rare, which limited the number of agencies represented and thus the generalizability of findings. The local agencies included in this study are generally large and have decentralized governance. As a relatively early study of Public Health 3.0 perceptions, we are unsure how larger, decentralized local agency respondents may differ from respondents from smaller, centralized agencies and therefore how our results may differ had there been more representation in the sample from such agencies.

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