

Assessing Public Health Department Employees' Willingness to Report to Work During an Influenza Pandemic

Nicole E. Basta, Sharlene E. Edwards, and Joann Schulte

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Objectives: During an influenza pandemic, public health employees will play a significant role in implementing community response and control protocols. We aimed to determine how informed health department employees are about pandemic response and how willing they are to report to work during a pandemic. **Methods:** We conducted an anonymous, electronic survey of 4 746 Florida county health department employees to assess willingness to respond. **Results:** Among the 2 414 respondents, willingness to report to work varied by the stage of the influenza pandemic and type of job duties, from 92.3 percent willingness given the lowest-risk scenario to 56.2 percent under the highest-risk scenario. Nurses and employees who had read one of the pandemic influenza plans were significantly more likely to be willing to respond. **Conclusions:** Nearly half of public health department employees are unwilling to report to work during the peak of an influenza pandemic when the public health response will be a vital component of pandemic containment and mitigation. In light of the current worldwide spread of novel influenza A (H1N1), there is an urgent need to better inform public health workers about their roles in pandemic response and to ensure that personal safety is a top priority.

KEY WORDS: disaster response, disease outbreak, pandemic influenza, public health practice, public health workforce

In June 2009, the World Health Organization declared the first influenza pandemic of the 21st century.¹ This outbreak of a novel influenza A (H1N1) virus began in Mexico in April 2009 and spread to over 100 countries resulting in over 55 000 reported cases and

230 deaths within weeks.² Early reports indicate that the virus causes a relatively mild illness, yet it is fairly transmissible.³ In addition to novel influenza A (H1N1), the threat of an avian influenza pandemic caused by influenza A (H5N1) remains. Since 2003, over 430 cases and 260 deaths worldwide have been attributed to the H5N1 avian influenza virus circulating in Asia, Europe, and Africa,⁴ raising concerns that a more severe pandemic may occur in the future.

In the United States and around the world, public health officials have stressed the importance of strategic planning, preparedness, and outbreak control. In light of the current situation, there is an increased urgency to ensure that the response to a pandemic situation is

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Corresponding Author: Nicole E. Basta, MPhil, Department of Epidemiology, School of Public Health, University of Washington, Box 357236, Seattle, WA 98195 (nbasta@u.washington.edu).

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Nicole E. Basta, MPhil, is an epidemiology PhD student at the University of Washington and a predoctoral research associate at the Hutchinson Cancer Research Center, Seattle. Previously, she was a Florida epidemic intelligence service fellow with the Florida Department of Health.

Sharlene E. Edwards, MPH, is the public health preparedness planner for Pinellas County Health Department, St Petersburg, Florida. Prior to her current position, she served as the Florida epidemic intelligence service fellow assigned to Polk County Health Department.

Joann Schulte, DO, MPH, is a medical officer at National Institutes of Health, Bethesda, Maryland, and oversees a Phase III clinical trial, evaluating efficacy of a candidate vaccine for genital herpes. Before joining NIH, she spent 15 years with the Centers for Disease Control and Prevention as a medical epidemiologist.

both timely and effective. The typical influenza season in the Northern Hemisphere is just months away and health officials must act now to mitigate the impending threat of novel influenza A (H1N1).

Yet, despite the significant resources that have been devoted to strengthening the public health infrastructure, uncertainty exists about whether the public health workforce will respond to a severe infectious disease outbreak. Research has focused primarily on the willingness of doctors, nurses, hospital personnel, and first responders to render direct care to individuals during an outbreak.⁵⁻⁸ However, in the event of a worldwide pandemic, local health departments will also play a significant role in carrying out response and control protocols in the communities that they serve. These vital activities could include providing essential services, conducting disease surveillance to identify cases in the community, dispensing antivirals and vaccines, implementing plans for isolation and quarantine, educating the public about prevention, and others aimed at mitigating pandemic spread.

Little is known about public health employees' knowledge about and willingness to respond to a pandemic event. A study in Maryland reported that nearly half of the 308 public health employees surveyed are unlikely to report to work during a pandemic.⁹ In this survey, self-reported belief in the importance of one's role in pandemic response and familiarity with the duties that would be required, among other factors, were associated with being likely to respond.⁹ Another survey of healthcare workers in New York City indicated that less than half were willing to report to a SARS (severe acute respiratory syndrome) outbreak, though more than 80 percent were willing to respond to snow storms or environmental disasters.¹⁰ In this study, women and those with childcare and eldercare obligations were less likely to be willing to report to catastrophic disasters. Fear and concern for family and self were most often reported as reasons why individuals were not willing to report.¹⁰ Such studies offer some insight into the expected availability of healthcare professionals, but, to our knowledge, none have explored how the willingness of public health employees varies on the basis of the pandemic phase and the level of personal risk. The coordinated effort of the public health workforce as a pandemic emerges is a key component of the community response efforts necessary to contain pandemic spread. Consequently, information about the expected availability of the public health workforce and their knowledge and training is key to ensuring the highest level of readiness.

The Florida Department of Health (FDOH), in an effort led by the state health office and its 67 affiliated county health departments, has been actively planning the response efforts to be undertaken in the event of

a pandemic. We conducted a survey to assess how knowledgeable county health department employees are about pandemic influenza response, what their primary concerns will be in the event of a pandemic, and their willingness to respond to an influenza pandemic. We also sought to ascertain whether the stage of the pandemic, the type of job duties assigned, and individual characteristics were associated with employees' willingness to respond in the event of a pandemic. We hypothesized that the pandemic stage, the level of personal exposure risk, having attended a training session, having read the state or county pandemic influenza response plan, and being a nurse would be significantly associated with a willingness to respond.

● Methods

We conducted an anonymous, 23-question Web-based survey of Florida county health department employees. Participants were randomly selected using a stratified cluster sample. The 67 county health departments, containing more than 13,500 employees, were ordered by the number of employees, and then stratified into three roughly equally-sized groups on the basis of the total number of employees. This ensured a representative sample across health departments of different sizes that vary by resource availability, services provided, and other characteristics. Given our sample size calculation and accounting for an expected low response rate (62%), we aimed to invite 4 632 county health department employees to participate. Counties were randomly selected from the stratified list, with roughly one-third of the estimated sample size being selected from each of the three strata. The health department directors of the randomly selected county health departments were contacted to solicit their participation. One county refused participation and the next willing county in that stratum (similar in employee population size) from the alternate list was entered into the study. In total, 20 counties with 4 746 staff members were randomly selected to participate (14 counties with a small number of employees, 4 counties with a medium number of employees, and 2 counties with a large number of employees).

All staff members employed in the selected county health departments who had an FDOH e-mail address were sent an anonymous, on-line survey link that remained active for 4 weeks from November 17, 2006, to December 15, 2006. The questionnaire asked about the respondent's sex, age, education, if he or she is a nurse, current department in which he or she worked, prior attendance at a pandemic influenza training or exercise, knowledge about pandemic response, and greatest concern during a pandemic. The format for five

of these survey questions was based on a previously published survey.⁹ We solicited information about willingness to respond to a pandemic given four scenarios specifying the pandemic stage (early vs peak) and the job duties required (face-to-face contact with clients vs no face-to-face contact), and what the FDOH could do to make an individual more likely to report to work. A five-point Likert scale was used for questions about knowledge, confidence, and how likely an individual was to report given a specific scenario.

Study investigators and health department directors sent several reminder e-mails to all employees to encourage participation. To maintain strict anonymity given the sensitive nature of the survey questions, participants were not required to log in to complete the survey, and the link remained active for the entire 4-week study period. To identify and eliminate duplicate entries, we used a combination of 10 demographic variables. Each of the 230 sets of duplicates was ordered by the date and time of submission, the first entry was saved, and all subsequent matches entered more than 24 hours later were excluded from all analyses.

The frequency of responses is provided in the descriptive analysis. For questions where respondents could select "other" and write in their own answers, the answers were grouped with the appropriate listed response when the written answer clearly corresponded to one of the choices provided.

Responses were weighted on the basis of the sampling fraction and the response rates to account for the complex sampling design. The FDOH Human Resource Management Division provided demographic data for all employees' sex and ages to calculate the weights. Forty-four respondents could not be assigned appropriate weights given the demographic information available. These responses were included in the descriptive analyses but not in the weighted regression analyses.

We analyzed four specific scenarios to determine the relationship between the willingness to report to work and a combination of the pandemic stage (early vs peak) and the job duties required (no face-to-face contact with clients [low-risk] vs face-to-face contact [high-risk]) (Table 1). The first scenario describes a situation in the early pandemic stages, which would be defined by the World Health Organization as the "pandemic alert" period,¹¹ and which we denote "early pandemic." The second scenario, which corresponds to the World Health Organization "pandemic" period and describes a time at the peak of a pandemic, we refer to as "pandemic peak." We defined "low-risk job duties" as those with no face-to-face contact with others who could be infected. We defined "high-risk job duties" as those requiring face-to-face contact with people who could be infected.

TABLE 1 ● The pandemic scenarios presented to the respondents^a

Consider the following scenario:
 Florida has identified its first human case of pandemic influenza; however, at this time there is *no* widespread human-to-human transmission.
 Under these circumstances:

1. If your work duties *did not* require you to have direct face-to-face contact with people who could be infected, how likely would you be to report to work?
2. If your work duties *did* require you to have direct face-to-face contact with people who could be infected, how likely would you be to report to work?

Consider the following scenario:
 It is the peak of the influenza pandemic, when widespread human-to-human transmission *is* occurring in Florida and worldwide.
 Under these circumstances:

3. If your work duties *did not* require you to have direct face-to-face contact with people who could be infected, how likely would you be to report to work?
4. If your work duties *did* require you to have direct face-to-face contact with people who could be infected, how likely would you be to report to work?

^aIn the results, scenario 1 is referred to as "early pandemic, low-risk job duties," scenario 2 as "early pandemic, high-risk job duties," scenario 3 as "pandemic peak, low-risk job duties," and scenario 4 is referred to as "pandemic peak, high-risk job duties."

When asked "how likely would you be to report to work" given each scenario, respondents could choose "very likely," "somewhat likely," "neither likely nor unlikely," "somewhat unlikely," or "very unlikely." We modeled each of the four scenarios (early pandemic/low-risk job duties, early pandemic/high-risk job duties, peak pandemic/low-risk job duties, and peak pandemic/high-risk job duties) using unadjusted and adjusted logistic regression with those likely to report (those very likely or somewhat likely) compared with those unlikely to report (those somewhat unlikely or very unlikely) as the outcome. Those who selected "neither likely nor unlikely to report" were excluded from this analysis. Sex, age, education, department, nursing degree, having attended training, and having read either the state or county pandemic influenza plan were included in the models as the a priori predictors of interest on the basis of our hypotheses. Data were analyzed using SAS statistical software (version 9.1.3, SAS Institute Inc.). In particular, the "proc surveylogistic" function was used to account for the stratified cluster sample design and to assign the appropriate weights. Unadjusted and adjusted odds ratios, 95 percent confidence intervals, and *P* values based on the Wald test are reported. This study was approved by the FDOH Institutional Review Board on October 16, 2006, and approval was renewed on October 4, 2007 (protocol number: H06094).

TABLE 2 ● The descriptive demographics of the 2414 survey respondents

Demographics	Frequency (%)
Sex	
Male	503 (20.8)
Female	1 880 (77.9)
Missing	31 (1.3)
Age, y	
≤24	83 (3.4)
25–34	373 (15.5)
35–44	535 (22.2)
45–54	769 (31.9)
≥55	639 (26.5)
Missing	15 (0.6)
Education	
High school or less	1 154 (47.8)
Associates or bachelors	725 (30.0)
Masters or higher	442 (18.3)
Other	40 (1.9)
Missing	53 (2.2)
Department	
Nonmedical services ^a	443 (18.4)
Clinical services ^b	1 078 (44.7)
Disease control ^c	672 (27.8)
Health record services ^d	100 (4.1)
Other ^e	81 (3.4)
Missing	40 (1.7)
Nurse	
Yes	492 (20.4)
No	1 894 (78.5)
Missing	28 (1.2)

^a**Nonmedical services** include administration, human resources, and information technology.

^b**Clinical services** include clinical/dental services and health promotion/health education/school health/healthy start/healthy families/Women, Infants, and Children.

^c**Disease control** includes disease control (hepatitis, sexually transmitted diseases/HIV, tuberculosis, immunizations, etc), epidemiology, and environmental.

^d**Health record services** include medical records and vital statistics.

^e**Other** includes only those who chose the other category.

● Results

Overall 2414 (51%) unique responses to the survey were received. The response rate for small counties was 65 percent (910/1 391), medium counties 61 percent (986/1 621), and large counties 30 percent (518/1 734). Respondents were primarily women (77.9%), aged 45 to 54 years (31.9%), not nurses (78.5%), had a high school education or less (47.8%), and were employed in clinical services departments (44.7%) (Table 2). Respondents resembled the demographic makeup of the entire FDOH employee population by sex and age; 80.3 percent of all county health department employees in Florida are women and 30.2 percent are aged 45 to 54 years.

Of all respondents, 55.5 percent had attended at least one pandemic influenza presentation, training, or exercise in the previous 12 months. Of these, 13.1 percent (176/1 340) had attended four or more trainings during the same period. The FDOH has drafted a statewide pandemic preparedness plan and requires that all county health departments write a county-specific plan. Nearly half (48.9%) of the respondents had read all or part of the FDOH pandemic preparedness plan, and 46.2 percent had read all or part of their county-specific pandemic preparedness plan; 39.5 percent had read all or part of both plans.

A total of 42.3 percent of respondents indicated that, based on their current knowledge, they would be very/somewhat confident answering questions from the community during a pandemic. Thirty percent reported that they would be very/somewhat unconfident answering questions and 26.7 percent indicated that they were neither confident nor unconfident. When asked how familiar they were with the kind of response activities that will be led by their county health department during an influenza pandemic, 57.9 percent responded that they were very/somewhat familiar with the response activities. Yet only 44.6 percent reported that they were very/somewhat familiar with what their specific job responsibilities would be in the event of a pandemic.

When asked what would be their greatest concern during the peak of an influenza pandemic, 72.6 percent of respondents selected family health and safety, 14.2 percent selected personal health and safety, 4.6 percent selected “other,” 3.8 percent selected basic needs (food and water), 2.7 percent provided no answer, 1.4 percent selected financial stability, and 0.8 percent selected job security.

Respondents were asked what the FDOH could do to increase their chances of reporting to work during an influenza pandemic. Only 3.5 percent chose “there is nothing that the health department could do”; 17.5 percent chose “ensure the health and safety of all staff members by providing necessary resources”; 6.5 percent chose “provide support for staff families (child-care, basic needs, etc)”; 5.8 percent chose “provide additional information and training about pandemic influenza response”; and 61.8 percent chose “all of the above.”

Willingness to respond declined with the progression of the pandemic and when face-to-face contact was required. During the early pandemic, 92.3 percent of respondents were very/somewhat likely to report if performing low-risk jobs duties, whereas only 66.4 percent were very/somewhat likely to report during the early pandemic if required to perform high-risk job duties (Table 3). A total of 12.3 percent of respondents reported that they were neither likely nor unlikely to

TABLE 3 ● Responses of the 2 414 Florida county health department employees on their likelihood of reporting to work given each of four pandemic influenza scenarios described in Table 1^a

Scenario	Respondents likely to report to work		
	Likely	Unlikely	Neither
Early pandemic, low-risk job duties	2 228 (92.3)	58 (2.4)	101 (4.2)
Early pandemic, high-risk job duties	1 603 (66.4)	482 (20.0)	297 (12.3)
Pandemic peak, low-risk job duties	1 996 (82.7)	222 (9.2)	158 (6.5)
Pandemic peak, high-risk job duties	1 357 (56.2)	689 (28.5)	337 (14.0)

^aValues given are number (percentage). Percentages may not equal 100 due to missing responses.

report to work in the early pandemic period and perform high-risk job duties.

At the pandemic peak, 82.7 percent responded that they were very/somewhat likely to report and perform low-risk job duties. Those employees very/somewhat likely to report decreased to 56.2 percent at the pandemic peak when high-risk job duties would be required. Given this same scenario, 14.0 percent of respondents indicated that they were neither likely nor unlikely to respond.

Willingness to respond declined 26 percentage points when high-risk duties were required compared with low-risk duties within each stage of the pandemic (early and peak). On the other hand, willingness to respond declined only 10 percentage points when comparing early pandemic, low-risk duties to pandemic peak, low-risk duties and when comparing early pandemic, high-risk duties and peak pandemic, high-risk duties.

The results of the unadjusted and adjusted analyses of employees' willingness to report to work given each of the four scenarios are shown in Tables 4 and 5. When all predictors were taken into account, those who have read either the state or county pandemic influenza response plan were significantly more likely to report a willingness to respond to all four scenarios than those who had not (odds ratio [95% confidence interval]—early pandemic/low-risk duties 3.1 [2.0–4.8], early pandemic/high-risk duties 1.7 [1.3–2.2], pandemic peak/low-risk duties 1.5 [1.2–2.0], and pandemic peak/high-risk duties 1.8 [1.4–2.2]). Nurses were significantly more likely to report a willingness to respond to three of the four scenarios than those who were not nurses (odds ratio [95% confidence interval]—early pandemic/low-risk duties 3.0 [1.3–7.1], early pandemic/high-risk duties 2.0 [1.5–2.6], and pandemic

peak/high-risk duties 1.9 [1.4–2.6]). Having attended pandemic influenza training in the last year was not significantly associated with willingness to respond to any scenario based on the adjusted analyses (Tables 4 and 5). The results of the logistic regression for the early pandemic, low-risk job scenario should be interpreted with caution as the number of respondents who indicated an unwillingness to respond was very low (*n* = 57), resulting in small numbers in several of the comparison categories.

In summary, for the highest-risk scenario (Table 5), which describes the peak of the pandemic when face-to-face job duties are required, several groups were significantly more likely to indicate a willingness to report to work during a pandemic. Employees who work in the clinical services department and disease control compared with those who work in nonmedical services (reference category), employees who are nurses, employees who had read either the state or county pandemic influenza plan, and employees aged 35 years and older compared with employees under 24 years of age were significantly more likely to report a willingness to respond to this scenario.

During the pandemic peak, if low-risk duties are required, Florida public health employees who had read the state or county pandemic influenza plan were more likely to indicate a willingness to report to work (Table 5).

During the early pandemic period if high-risk duties are required, employees with a master's degree or higher, employees who work in the clinical services department and disease control, nurses, and employees who had read either the state or county pandemic influenza plan were significantly more likely to indicate a willingness to report to work (Table 4).

The Florida public health workers most likely to respond in the early pandemic, when job duties are low-risk, are those who work in health records compared with those who work in nonmedical services, those who are trained as nurses, and those who have read either the state or county pandemic influenza plan. One should note that this analysis was based on a small number of participants who were unlikely to respond (Table 4).

● Discussion

Our results indicate that while the majority of Florida public health employees are willing to respond early in a pandemic when individual risk is low, only 56 percent are willing to respond at the peak of a pandemic given a higher-risk scenario. While more than half of the employees attended pandemic influenza training in the year prior to the survey (2006), less than half

TABLE 4 • Factors associated with the likelihood of reporting to work during the early influenza pandemic period if low-risk job duties are required and if high-risk job duties are required^a

	Early pandemic, low-risk job duties				Early pandemic, high-risk job duties			
	Likely to report, <i>n</i> (%) ^b	Unlikely to report, <i>n</i> (%) ^b	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Likely to report, <i>n</i> (%) ^b	Unlikely to report, <i>n</i> (%) ^b	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Sex								
Male	462 (92.8)	11 (2.2)	1.0	1.0	358 (71.9)	90 (18.1)	1.0	1.0
Female	1 731 (92.5)	46 (2.5)	0.85 (0.38–1.89)	0.86 (0.40–1.87)	1 218 (65.1)	384 (20.5)	0.85 (0.65–1.11)	0.96 (0.75–1.25)
Age, y								
≤24	76 (95.0)	1 (1.3)	1.0	1.0	43 (53.8)	25 (31.3)	1.0	1.0
25–34	329 (88.4)	18 (4.8)	0.07 (0.01–0.32) ^e	0.07 (0.01–0.40) ^d	214 (57.5)	97 (26.1)	1.03 (0.67–1.58)	0.83 (0.48–1.41)
35–44	485 (91.9)	12 (2.3)	0.15 (0.03–0.90) ^c	0.12 (0.02–0.80) ^c	351 (66.5)	87 (16.5)	1.98 (1.25–3.14) ^d	1.48 (0.94–2.32)
45–54	711 (93.8)	14 (1.8)	0.18 (0.03–1.16)	0.15 (0.02–1.00)	527 (69.5)	144 (19.0)	1.75 (1.21–2.53) ^d	1.26 (0.85–1.87)
≥55	592 (93.7)	12 (1.9)	0.17 (0.03–0.94) ^c	0.14 (0.02–0.91) ^c	441 (69.8)	121 (19.1)	1.74 (1.20–2.52) ^d	1.09 (0.71–1.68)
Education								
High school or less	1 038 (91.4)	31 (2.7)	1.0	1.0	715 (62.9)	245 (21.6)	1.0	1.0
Associates/bachelors	672 (93.7)	15 (2.1)	1.28 (0.79–2.07)	1.26 (0.82–1.94)	483 (67.4)	149 (20.8)	1.08 (0.94–1.24)	0.81 (0.68–0.95) ^c
Masters or higher	412 (94.1)	8 (1.8)	1.49 (0.58–3.82)	1.62 (0.72–3.66)	336 (76.7)	59 (13.5)	1.92 (1.26–2.93) ^d	1.61 (1.08–2.40) ^c
Other	35 (89.7)	2 (5.1)	0.48 (0.14–1.63)	0.57 (0.16–2.07)	21 (53.8)	9 (23.1)	0.76 (0.36–1.60)	0.82 (0.48–1.42)
Department								
Nonmedical services	415 (94.5)	9 (2.1)	1.0	1.0	276 (62.9)	102 (23.2)	1.0	1.0
Clinical services	973 (91.4)	34 (3.2)	0.63 (0.42–0.94) ^c	0.59 (0.38–0.90) ^c	697 (65.4)	216 (20.3)	1.24 (0.96–1.61)	1.31 (1.07–1.59) ^d
Disease control	619 (93.8)	9 (1.4)	1.39 (0.49–3.90)	1.40 (0.54–3.60)	484 (73.3)	104 (15.8)	1.62 (1.30–2.03) ^e	1.68 (1.30–2.17) ^e
Health record services	92 (93.9)	1 (1.0)	9.96 (1.68–59.1) ^c	12.23 (1.82–82.4) ^c	53 (53.5)	29 (29.3)	0.74 (0.50–1.09)	0.92 (0.57–1.47)
Other	65 (85.5)	3 (3.9)	0.38 (0.15–0.97) ^c	0.80 (0.29–2.20)	49 (64.5)	13 (17.1)	1.60 (0.67–3.81)	1.48 (0.64–3.42)
Nurse								
No	1 710 (91.8)	53 (2.8)	1.0	1.0	1 182 (63.5)	409 (21.8)	1.0	1.0
Yes	466 (95.3)	3 (0.6)	3.45 (1.43–8.33) ^d	2.99 (1.26–7.11) ^c	380 (77.7)	61 (12.5)	2.11 (1.58–2.82) ^e	1.97 (1.52–2.56) ^e
Training								
No	818 (92.2)	20 (2.3)	1.0	1.0	535 (60.3)	203 (22.9)	1.0	1.0
Yes	1 238 (93.8)	30 (2.3)	1.13 (0.75–1.68)	0.69 (0.47–1.03)	951 (72.0)	231 (17.5)	1.59 (1.31–1.94) ^e	1.18 (0.98–1.44)
Read plan								
No	947 (90.9)	36 (3.5)	1.0	1.0	621 (59.6)	268 (25.7)	1.0	1.0
Yes	1 242 (93.9)	21 (1.6)	2.26 (1.36–3.77) ^d	3.09 (2.00–4.80) ^e	953 (72.0)	205 (15.5)	1.94 (1.59–2.37) ^e	1.70 (1.28–2.24) ^e

Abbreviations: CI, confidence interval; OR, odds ratio.

^aThese results include both the unadjusted and adjusted logistic regression models.^bSubtotals may not equal total sample size and percentages may not equal 100 due to missing responses.^cIndicates significant result at the $P < .05$ level.^dIndicates significant result at the $P < .01$ level.^eIndicates significant result at the $P < .001$ level.

reported that they would be confident answering questions from the public during a pandemic and less than half knew what their own job duties would be. Based on these data, it is clear that opportunities exist to better inform and educate the public health workforce about pandemic influenza response. An effective response to an influenza pandemic will require community-wide response and control measures for which public health departments are responsible. Florida employees' willingness to respond to a pandemic decreased when the scenario described the peak of the pandemic and when face-to-face contact would be required to carry out response and control activities. These scenarios describe

increasing levels of personal risk, culminating in a situation with widespread person-to-person influenza transmission where health department employees would need to interact face-to-face with potentially infectious people in order to carry out their job duties. The decrease in willingness to report to work when the stage of the pandemic was held constant and the level of risk increased suggests that risk of infection and personal safety are likely to be significant barriers to response during a widespread infectious disease event. Indeed, more than 85 percent of respondents selected family and personal health and safety as their greatest concern during a pandemic.

TABLE 5 ● Factors associated with the likelihood of reporting to work during the peak of an influenza pandemic if low-risk job duties are required and if high-risk job duties are required^a

	Pandemic peak, low-risk job duties				Pandemic peak, high-risk job duties			
	Likely to report, n (%) ^b	Unlikely to report, n (%) ^b	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Likely to report, n (%) ^b	Unlikely to report, n (%) ^b	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Sex								
Male	410 (82.3)	47 (9.4)	1.0	1.0	310 (62.2)	129 (25.9)	1.0	1.0
Female	1 555 (83.1)	171 (9.1)	1.04 (0.80–1.36)	1.01 (0.77–1.33)	1 020 (54.5)	552 (29.5)	0.83 (0.64–1.07)	0.81 (0.62–1.05)
Age, y								
≤24	63 (78.8)	8 (10.0)	1.0	1.0	34 (42.5)	34 (42.5)	1.0	1.0
25–34	285 (76.6)	49 (13.2)	0.62 (0.28–1.39)	0.74 (0.29–1.87)	158 (42.5)	147 (39.5)	0.96 (0.62–1.49)	0.92 (0.59–1.42)
35–44	437 (82.8)	46 (8.7)	1.12 (0.46–2.74)	1.07 (0.39–2.91)	300 (56.8)	134 (25.4)	2.08 (1.35–3.21) ^e	1.84 (1.25–2.73) ^d
45–54	654 (85.1)	57 (7.5)	1.33 (0.60–2.98)	1.42 (0.60–3.36)	459 (60.6)	189 (24.9)	2.19 (1.46–3.28) ^e	1.92 (1.27–2.91) ^d
≥55	526 (83.2)	58 (9.2)	1.02 (0.42–2.50)	1.00 (0.36–2.77)	379 (60.0)	177 (28.0)	1.94 (1.34–2.81) ^e	1.56 (1.03–2.36) ^e
Education								
High school or less	942 (82.9)	103 (9.1)	1.0	1.0	625 (55.0)	322 (28.3)	1.0	1.0
Associates/bachelors	597 (83.3)	65 (9.1)	0.94 (0.72–1.23)	0.93 (0.67–1.28)	388 (54.1)	230 (32.1)	0.83 (0.72–0.95) ^d	0.68 (0.56–0.81) ^e
Masters or higher	367 (83.8)	42 (9.6)	0.91 (0.70–1.8)	0.81 (0.60–1.11)	275 (62.8)	110 (25.1)	1.28 (1.10–1.48) ^d	1.14 (0.99–1.32)
Other	26 (66.7)	6 (15.4)	0.50 (0.20–1.24)	0.61 (0.28–1.32)	20 (51.3)	10 (25.6)	1.07 (0.42–2.76)	1.22 (0.53–2.83)
Department								
Nonmedical services	371 (84.5)	43 (9.8)	1.0	1.0	238 (54.2)	138 (31.4)	1.0	1.0
Clinical services	871 (81.8)	96 (9.0)	1.11 (0.90–1.36)	1.23 (0.96–1.57)	598 (56.2)	308 (28.9)	1.15 (0.94–1.40)	1.32 (1.06–1.64) ^e
Disease control	564 (85.5)	55 (8.3)	1.13 (0.88–1.44)	1.18 (0.90–1.55)	387 (58.6)	176 (26.7)	1.24 (1.00–1.54)	1.37 (1.07–1.76) ^e
Health record services	81 (81.8)	10 (10.1)	1.22 (0.88–1.69)	1.29 (0.88–1.89)	43 (43.4)	33 (33.3)	0.85 (0.60–1.19)	0.99 (0.68–1.46)
Other	52 (68.4)	11 (14.5)	0.62 (0.31–1.23)	0.59 (0.30–1.17)	46 (60.5)	16 (21.1)	1.70 (1.0–2.91)	1.48 (0.91–2.41)
Nurse								
No	1 526 (82.0)	179 (9.6)	1.0	1.0	984 (52.8)	576 (30.9)	1.0	1.0
Yes	422 (86.3)	38 (7.8)	1.22 (0.89–1.68)	1.06 (0.76–1.49)	336 (68.7)	98 (20.0)	1.99 (1.43–2.78) ^e	1.93 (1.41–2.64) ^e
Training								
No	729 (82.2)	84 (9.5)	1.0	1.0	448 (50.5)	282 (31.8)	1.0	1.0
Yes	1 118 (84.7)	118 (8.9)	1.20 (0.94–1.53)	1.04 (0.85–1.27)	806 (61.1)	348 (26.4)	1.45 (1.17–1.78) ^e	1.09 (0.93–1.28)
Read plan								
No	827 (79.4)	118 (11.3)	1.0	1.0	501 (48.1)	362 (34.7)	1.0	1.0
Yes	1 135 (85.8)	100 (7.6)	1.62 (1.24–2.12) ^e	1.54 (1.18–2.00) ^d	827 (62.5)	318 (24.0)	1.85 (1.51–2.28) ^e	1.77 (1.44–2.18) ^e

Abbreviations: CI, confidence interval; OR, odds ratio.

^aThese results include both the unadjusted and adjusted logistic regression models.

^bSubtotals may not equal total sample size and percentages may not equal 100 due to missing responses.

^cIndicates significant result at the $P < .05$ level.

^dIndicates significant result at the $P < .01$ level.

^eIndicates significant result at the $P < .001$ level.

Barnett et al¹² argue that those public health workers called upon to respond in emergency situations will face a number of barriers given their risk perceptions. To address these concerns, safety measures should be implemented and clear roles and expectations should be delineated before an emergency. In another survey, 90 percent of public health nurses indicated that they would face at least one barrier while reporting to work during an emergency, with care of a child or an elder, transportation, and personal health being the most common.¹³ Our results suggest that measures such as ensuring the health and safety of all staff members by providing necessary resources could increase the num-

ber of employees reporting to work during a pandemic. That less than 4 percent of respondents indicated that there is nothing that the health department could do to increase their willingness to respond is encouraging, suggesting that decisions made by health departments can have an effect on the majority of employees' decision to report during a pandemic.

This is the largest study of its kind that specifically addresses the willingness of public health employees to respond to an influenza pandemic, an important consideration as the United States and the world continue to prepare for a severe pandemic event. Although our response rate (51%) was on par with other surveys of

this type and survey respondents resembled the profile of the FDOH employee population based on age and sex, we could not determine whether nonrespondents were similar to respondents with respect to level of knowledge, training, willingness to report to work, and other important characteristics. If anything, it is likely that those who completed the survey may be those employees most likely to report to work during a pandemic. In addition, these results may tend to overestimate the willingness of health department employees in other states to report to work during a pandemic because FDOH employees have significant experience in disaster response. They are routinely called upon to respond to natural disasters (hurricanes) by manning special-needs shelters and conducting injury and illness surveillance in the immediate aftermath. Given these considerations, that only 56.2 percent of respondents are likely to report to work during the highest-risk pandemic scenario is cause for concern. Based on the results of this survey, efforts to ensure employees' safety, the safety of their families, and to better communicate with employees about pandemic response prior to an event should be a priority in pandemic planning.

In the 20th century, three well-known influenza pandemics, varying in severity, occurred.¹⁴ Currently, we are facing the threat of novel influenza A (H1N1), which has strained the public health infrastructure and led to school closures and other control measures in many countries including the United States and Mexico. Anecdotal evidence from the FDOH, where the Emergency Operations Center was activated for more than a month, indicates that employees were willing to respond to this threat, which was perceived as mild. However, as our results suggest, the higher the level of personal risk associated with a pandemic event the less likely employees may be to report to work. There is uncertainty about the severity of influenza illness that may be observed when influenza season begins later this year. Public health officials must act now to address these concerns and ensure that the public health workforce is poised to respond to current and future pandemic threats.

As novel influenza A (H1N1) has demonstrated, mitigating a pandemic will require the commitment of the entire public health workforce. The responsibilities of the public health workforce will likely include distributing antivirals and vaccines and possibly upholding quarantine and isolation orders, all of which may be crucial to the containment and control of the pandemic.¹⁵⁻¹⁷ Public health officials are in a position to ensure an effective public health community response by educating employees about the nature of their specific duties and the resources that would be available

to protect them and their families. These results provide vital information about the knowledge, concerns, and expected availability of the Florida public health workforce during a pandemic and should be considered seriously given the current situation.

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