

Pandemic-related ability and willingness in home healthcare workers

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Abstract

Objective: To assess pandemic-related attitudes and behavioral intentions of home healthcare workers (HHCWs).

Design: Cross-sectional survey.

Setting: New York City.

Participants: A convenience sample of 384 HHCWs.

Main Outcome Variables: Ability and willingness to report to work during a pandemic influenza outbreak.

Results: A large proportion of HHCWs reported that they would be either unable or unwilling (or both) to provide care to their current (83 percent) or new (91 percent) patients during a pandemic. Ability was significantly associated with not having children living at home, having alternatives to mass transportation, not having a spouse/partner employed as a first responder or healthcare worker, and having longer tenure (ie, six or more years) in homecare. During an outbreak, 43 percent of HHCWs said they would be willing to take care of current patients and only 27 percent were willing to take care of new patients. Willingness to care for both current and new patients was inversely associated with fear for personal safety ($p < 0.01$). Provision of key elements of a respiratory protection program was associated with decreased fear ($p < 0.05$). Most participants (86 percent) had not received any work-based, pandemic-related training, and only 5 percent reported that their employer had an influenza pandemic plan.

Conclusions: Given that a large majority of the participating HHCWs would either be unable or

unwilling to report to duty during a pandemic, potential shortfalls in this workforce may occur. To counter this, organizations should focus on strategies targeting intervenable barriers to ability and to willingness (ie, the provision of a vaccine and respiratory protection programs).

Key words: home healthcare workers, ability, willingness, influenza pandemic, surge capacity

Introduction

Disasters often result in increased demand for healthcare services, sometimes far outpacing available supply. This results in a need for “surge capacity,” defined by the Agency for Healthcare Research and Quality as the “healthcare system’s ability to expand quickly beyond normal services to meet an increased demand for medical care in the event of bioterrorism or other large-scale public health emergencies.”¹ This ability is generally dependent on interorganizational and intraorganizational preparedness planning in terms of timely acquisition of additional supplies, staff, and structure.² Preplanning to meet personnel surge capacity needs is particularly important for a pandemic event as absenteeism may be high due to illness, thereby resulting in staffing shortages. Problematically, demand for services may be greatest when supply is lowest. Absenteeism unrelated to personal illness may also result from competing and conflicting responsibilities, for example, if a family member becomes ill or if schools are closed for extended periods.³⁻⁵ Consequently, healthcare facilities and health-related agencies are increasingly

considering strategies that can improve workers' ability to report, such as preplanning for child or elder care. However, there may also be staff shortfalls due to fear of contagion. Lack of willingness to respond during disasters involving infectious diseases, due to concerns for personal or family safety, is documented in several healthcare work groups.^{3,5-11} Reporting to duty during disasters has therefore been conceptualized into two domains: ability and willingness.⁷

Several recent studies predict that a serious, rapidly spreading pandemic would result in fairly substantial personnel shortages across a wide spectrum of healthcare occupations due to barriers that impact both the ability and the willingness to report to duty.^{6,8,11} Unfortunately, evidence-based research on organizational interventions that might effectively address nonillness-related absenteeism is lacking, although a number of recommendations have been made.^{4,8,12-16} These include ensuring that workers are cognizant of: their important role in the organization, their ethical obligations to their patients, and the need to prepare personal family emergency plans. Additionally, healthcare facilities are advised to identify other potential personnel resources to meet their surge capacity needs. To that end, the large home healthcare (HHC) workforce, which is predominantly comprised of paraprofessionals, is increasingly considered as a possible surge resource to other sectors.^{17,18}

Homecare is the fastest growing sector in healthcare and a vital link in the nation's healthcare infrastructure.¹⁹ Roughly 18,000 agencies, with an estimated 800,000 workers, provide care to an estimated eight million patients each year.^{20,21} Care demands of the frail, elderly homecare patient population (69 percent of homecare patients are 65 years and older and 17 percent are more than 85 years of age)²¹ are not insignificant. Patients often enter HHC with complex medical problems and multiple diagnoses, thereby requiring a high acuity of care.²¹ Thus, many homecare patients are highly reliant on their care providers.

The bulk of homecare is provided by HHC paraprofessionals, also referred to as "direct care workers" (eg, home health aides and personal and homecare aides), usually under the supervision of specialized HHC registered nurses or case managers.^{20,22} These

workers, generally female, low-wage earners, provide a wide range of essential services, such as help with activities of daily living, medication management, wound care, assistance with the use of medical equipment, as well as companionship and comfort care.^{20,21} Many instances of heroic efforts on the part of caregivers to reach their patients during times of crisis, such as soon after the World Trade Center disaster, attest to the high level of moral and professional obligation that many home healthcare workers (HHCWs) feel toward their patients.²³ It therefore seems difficult to imagine that HHCWs would abandon their patients under any circumstances, including in the event that they are mobilized to assist in other health sectors, such as long-term care or acute care. Nevertheless, in several state and local plan documents, HHCWs are identified as a source of surge capacity for staffing these sectors.^{17,18} However, the pandemic-related attitudes and behavioral intentions of this workforce remain largely unknown. To better understand and predict HHCWs' ability and willingness to respond during a pandemic, a survey of HHCWs employed in New York City (NYC) was recently conducted.

Methods

Study design and participants

In the fall of 2008, recruitment efforts were directed toward HHCWs attending a variety of union-sponsored workplace skills-building and academic training sessions. These sessions, routinely conducted at various locations throughout NYC, provide training to more than 18,000 homecare workers employed by various home attendant and home health aide agencies. By the end of the 4-week study period, a convenience sample of 388 HHCWs attending these sessions were successfully recruited to participate from a sample of 420 training attendees (92 percent response rate). A convenience sample was used given the well-recognized difficulties in recruiting HHCWs. The questionnaire was anonymous (ie, there were no personal identifiers of any type). On average, the questionnaire took 20 minutes to complete. As an incentive, study participants received one free scratch-off lotto ticket.

Completed questionnaires were returned to the study office in sealed envelopes. The research protocol had the prior approval of the Columbia University Medical Center Institutional Review Board (IRB). All study materials including the questionnaire are available from the corresponding author.

Questionnaire development and design

A 31-item study questionnaire (including several contingency questions) was developed based on a conceptual framework, which was an adaptation of DeJoy's Behavioral Diagnostic Model.^{24,25} This model provides a framework for integrating both individual and organizational factors as they relate to workers' ability and willingness to work under potentially hazardous conditions. The model also served to guide the development of individual items and response categories, with the input of a panel of study experts. The questionnaire, written in English, was prepared at a sixth-grade reading level using the Flesch-Kincaid Grade Level Readability Test, automated in Microsoft Word.²⁶ A final draft of the study questionnaire was reviewed by disaster preparedness and HHC experts for content and criterion validity using previously published measures of ability and willingness.⁷ The questionnaire included items that addressed six major domains: demographics, work characteristics, agency-level pandemic planning, personal pandemic planning, the outcome variables, ability and willingness to report to duty, and barriers to ability and willingness. As many HHCWs might not be familiar with pandemic influenza, a very brief overview was included in the questionnaire to provide context for the pandemic-related questions. Similarly, a photograph of an N-95 respirator was included in the questionnaire to provide a visual reference to the device.

Study measures

Demographics. This measure consisted of nine items addressing age, gender, education, marital status, spouse/partner's occupation as a first responder or healthcare worker, number of children living at home, tenure in HHC, method of transportation to work, and alternative method of transportation to work. One additional item on past personal history of seasonal

influenza infection was also included. Excluding the item "How old are you?," all demographic items were closed-ended.

Work characteristics. Three items addressed the following work characteristics: patient load, average age of patients, and health status of patients. Patient load was measured by the question: "In a typical week, about how many patients/clients do you usually take care of?" for which participants selected from five categorical response choices. Age of patients was measured using the following question: "On average, how old are your patients?" with four categorical response options. Patient health status was measured with one item: "Are any of your patients considered 'high risk' (eg, on ventilation, bed-bound)?" with two possible responses: "yes" and "no."

Agency pandemic planning. The following six items addressed agency pandemic planning: the availability of a free seasonal influenza vaccine (*Can you get a free flu vaccine at your job?*); availability of respirator masks; training on use of respirator masks; fit-testing on respirator masks; training on pandemic influenza outbreak; and existence, distribution, and discussion of a pandemic influenza plan with staff. One item was included on pandemic influenza outbreak training: "Have you received any training at work on a pandemic flu outbreak?" There was one item on agency pandemic plans, as follows: "Does your agency have a pandemic flu outbreak plan?" Two contingent questions followed the agency pandemic plan item as follows: "If yes, did they give you a copy of this plan?" and "If yes, has your agency talked to you about this plan?" Three items ("Does your employer give you respirator face masks to use while you are working?," "Have you been trained to use respirator masks?," and "Have you been fit-tested for the respirator mask that you currently use?") addressed key elements of a respiratory protection program (RPP). This section had response categories including "yes," "no," "don't know" and "not sure/I don't use one." The internal consistency estimate of responses for the entire sample (N = 384) on this respiratory protection subscale yielded a Cronbach alpha of 0.61 (95% confidence interval [CI] = 0.54-0.68).

Personal pandemic planning and attitudes.

Seven items addressed personal pandemic planning and attitudes: intentions to take a pandemic influenza vaccine, trust in respirators (in general), trust in respirators (during a pandemic influenza outbreak), discussion of respirators with other HHCWs, barriers to respirator use, emergency child care plans, and preferred method of training on pandemic influenza. Most items in this group were measured using “yes,” “no,” and “not sure” response choices. The item on barriers to respirator use listed 12 possible response reasons why one might not wear a respirator mask; participants were instructed to check all that applied. In addition, participants interested in learning more about an influenza pandemic outbreak were instructed to select the preferred method of future training from a list of choices: “video,” “web site,” “in-service seminar,” “telephone hotline,” or “other.”

Ability and willingness to report to work in the event of a pandemic influenza outbreak.

Self-reported ability to report was measured by a question “Do you have reasons that would make it hard for you to show up for work during a pandemic outbreak?” with the following six response categories: (1) “child care (if schools are closed and/or my spouse/partner has to work),” (2) “fear for my personal safety (afraid I could catch it at work),” (3) “fear for my family’s safety (afraid I could bring home the disease),” (4) “problems planning or finding another way to get to work if bus/subway is not running,” (5) “need to stay home to take care of disabled, sick, or elderly adult family members,” and (6) “other” reasons. Two items assessed willingness, including willingness to care for *current* patients during a pandemic outbreak and willingness to care for *new* patients who are sick with a pandemic strain of influenza. Willingness items were measured using response choices: “willing,” “not willing,” and “not sure.” For analysis purposes, the responses were dichotomized into two categories: “willing” versus “not willing/not sure.”

Factors associated with ability and willingness to report to duty.

A 10-item list of factors (eg, availability of pandemic vaccine, hazard duty pay, patient obligation, respirator availability, provisions

for family care) was used to identify important barriers and facilitators associated with either ability or willingness.

Statistical analysis

Of the 388 collected questionnaires, four were excluded from data analysis because of incomplete or missing data, resulting in a sample of 384 participants (final response rate = 91 percent). All data were entered into a database and then frequencies of the data were reviewed and double-checked by the study’s data manager to ensure accuracy of data entry. After data cleaning (eg, logic checks) and editing procedures, basic descriptive analysis of the data (eg, frequencies, histograms, and measures of central tendency) was performed. The data met the assumptions required by the intended statistical testing procedures, and level of significance was set at an alpha level of 0.05, two-tailed. Pearson’s χ^2 analysis was used to assess relations between categorical items and ability and willingness outcomes. Where appropriate, odds ratios (ORs) and their 95% CI were estimated. Significant predictor variables at the univariate level were entered into logistic regression models to determine their joint contributions to the willingness outcome variables. Tests for interactions and collinearity were performed. All analyses were conducted using SPSS 16.0.1 version.²⁷

Results

Demographics

The majority of the sample was female (96 percent). The mean age was 49 (SD = 10.22) years and ranged from 18 to 77 years. Approximately one-third of the sample (30 percent) did not graduate from high school. Length of tenure as a HHCW varied, with most participants (61 percent) reporting six or more years of work experience in the field. Detailed demographic information is given in Table 1. With respect to personal history of seasonal influenza illness, 51 percent of respondents reported a positive history of infection.

Work characteristics

The majority of participants (75 percent) provided care to only one or two patients during a typical week.

Table 1. Description of the sample of home healthcare workers (N = 384)	
Characteristics	n (Percent reporting)*
Gender	
Female	369 (96.1)
Male	15 (3.9)
Age	
	$\bar{x} = 48.9$ y
	$SD^{\pm} = 10.2$ y
Highest educational degree	
Did not graduate from High School	111 (30.4)
High school diploma or general educational development (GED) degree	155 (42.5)
Some college or bachelor's degree	64 (17.5)
Some graduate school or graduate degree	35 (9.6)
Marital status	
Married/partner	186 (49.6)
Unmarried/no partner	189 (50.4)
Spouse/partner is a first responder or healthcare worker	
Yes	21 (6.3)
No	314 (93.7)
Have children at home	
Yes	211 (56.1)
No	165 (43.9)
Years worked in home healthcare	
Less than 1	14 (3.7)
2 to 5	135 (35.2)
6 to 10	103 (26.9)
10 or more	130 (33.9)
Number of patients/clients cared for in a typical week	
1 to 2	286 (75.3)
3 to 5	75 (19.7)
6 to 10	12 (3.2)
11 to 15	2 (0.5)
16 or more	5 (1.3)

Table 1. Description of the sample of home healthcare workers (N = 384) (continued)	
Characteristics	n (Percent reporting)*
Average age of patients/clients, years	
0 to 14	5 (1.4)
15 to 45	16 (4.4)
45 to 64	52 (14.3)
65 or more	290 (79.9)
Patients/clients considered “high risk” (eg, on ventilation, bed-bound)	
Yes	150 (41.6)
No	211 (58.4)
Mode of transportation to work	
Bus, train, or subway	327 (89.1)
Car	20 (5.4)
Walk	19 (5.2)
Other	1 (0.3)
Alternate mode of transportation	
Car (own or borrow)	101 (28.5)
Walk	74 (20.9)
I could not get to work	90 (25.4)
Other	89 (25.1)
Prior illness with seasonal influenza	
Yes	190 (50.8)
No	184 (49.2)
\bar{x} , Mean; SD, Standard deviation. *Column numbers may not add to 384 due to missing values.	

A large proportion of HHCWs (80 percent) reported that their patients were 65 years or older, and 42 percent reported that their patients were at “high-risk” (eg, on ventilation or bed-bound). Only 29 percent of HHCWs said they thought that their patients had an alternate care plan if they were not available to care for them, the remainder reported that their patients did not have a plan (15 percent), that only some of their

patients had a plan (8 percent), or that they did not know if their patients had such a plan (48 percent).

Agency pandemic planning

Very few participants (5 percent) reported that their employer had a pandemic plan; of these, 10 participants had been provided with a copy and the same number reported that their employer had discussed

the plan with them. Similarly, a small proportion of participants reported that their employer had key elements of a RPP in place. For example, only 16 percent of HHCWs reported that a respiratory mask was made available to them by their employers; of these 57 HHCWs, 41 had been trained on how to use them, and only 16 had been fit-tested on the mask that they were provided. Thirty-three percent of the sample reported that they were provided with an annual, free (seasonal) influenza vaccine by their employer. Finally, a large majority of participants (86 percent) reported they had not received any training at work on pandemic outbreaks. However, nearly all (96 percent) said they were interested in learning more about pandemic influenza, with in-service seminars the most preferred mode of pandemic training, followed by video training.

Personal pandemic planning and attitudes

Less than half of HHCWs (44 percent) agreed that a respirator mask with a good fit would protect them from a pandemic outbreak, 38 percent were unsure, and only 11 percent of respondents thought that their peers would wear a respirator during a pandemic even if it was provided. The most commonly identified barriers to using respirators included: lack of familiarity with them (31 percent), discomfort (29 percent), difficulty in breathing (24 percent), not available at work (23 percent), and not wanting to “scare” their patients (23 percent). Regarding vaccination against a pandemic strain, 59 percent of HHCWs reported that they would accept a pandemic vaccine if it were offered to them during an outbreak. With respect to their personal emergency planning, 62 percent of those with children at home had made personal plans for children to be cared for if they had to work extra hours. Personal contingency plans (eg, driving [29 percent] and walking [21 percent]) had also been made for mass transportation alternatives.

Fear of contagion during a pandemic was reported by 41 percent of participants, and slightly more (43 percent) were afraid for their families. HHCWs who had received at least one of three RPP elements were more than one and a half times *less likely* to fear for their personal safety (OR = 1.7, 95% CI = 1.10-2.72, $p < 0.05$). Furthermore, those who had been provided

with two of three of the RPP elements were nearly *twice as likely* to think that respirators would provide them with good protection during an influenza pandemic outbreak (OR = 1.8, 95% CI = 1.02-3.17, $p < 0.05$).

Ability and willingness to work in the event of a pandemic influenza outbreak

More than half of the sample (62 percent) reported that they would not be *able* to report to work during a pandemic. Facilitating factors for ability were as follows: “being paid more money” (33 percent), “having a safe place to bring children and family members while I am working” (28 percent), and “being paid to stay home if I get sick” (25 percent). The most commonly reported barriers to HHCWs’ ability included: transportation problems if mass transit was not in operation (37 percent), lack of child care (22 percent), and lack of care for disabled, sick, or elderly family members (16 percent). Those who reported two or more barriers to ability were more than one and a half times *less likely* to be willing to report to duty and care for *new* patients (OR = 1.7, 95% CI = 1.03-2.77). Factors significantly associated with increased ability included: no children living at home (OR = 1.5, 95% CI = 1.00-2.38, $p < 0.05$), six or more years of tenure in homecare (OR = 1.6, 95% CI = 1.05-2.53, $p < 0.05$), and having alternatives to mass transit for daily transportation (OR = 2.0, 95% CI = 1.02-4.08, $p < 0.05$). Ability was inversely associated with spouse/partner employment (ie, not having a spouse/or partner employed as a first responder or healthcare worker; $p = 0.032$, Fisher’s exact test).

With respect to *willingness*, 43 percent reported that they would be willing to take care of their *current* patients during a pandemic. However, a lower percentage (27 percent) would similarly be willing to care for *new* patients who were infected. The most commonly reported reason for lack of willingness was fear; specifically, “fear for my family’s safety” (43 percent) and “fear for my personal safety” (41 percent). Facilitators for willingness included: “being given a vaccine to protect me” (70 percent), “being confident that the mask would protect me” (51 percent), “being given a respirator mask” (47 percent), “if I thought my patients really

Table 2. Factors significantly associated with home healthcare workers' willingness to report to duty and care for current and new patients during an influenza pandemic (N = 384)

	OR	95% CI	p value
Willingness to provide care during a pandemic to:			
Current patients			
Lack of fear for personal safety during a pandemic	2.09	1.35-3.24	0.001
Provision of a safe and effective pandemic vaccine	1.98	1.29-3.05	0.002
Believe that current patients depend on them	1.96	1.29-2.97	0.002
Provision of prior respirator training	1.64	1.05-2.58	0.031
New patients			
Lack of fear for personal safety during a pandemic	2.20	1.32-3.64	0.002
Provision of prior fit-testing of respirator mask	2.08	1.07-4.07	0.029
Current patients have an alternative care plan	2.00	1.23-3.23	0.005
Lack of fear for their family's safety during a pandemic	1.75	1.07-2.84	0.025
Provision of respirator mask by employer	1.67	1.05-2.65	0.030

needed me” (47 percent), and “if my family was guaranteed to get the vaccine quickly” (37 percent).

Factors significantly associated with willingness to care for both current patients and new patients were identified (Table 2). For *current* patients, these included: lack of fear for personal safety, provision of a safe and effective pandemic vaccine, belief that current patients depend on them, and history of prior respirator training. The most important factors associated with willingness to care for *new* patients were: lack of fear for personal safety during a pandemic, provision of prior fit-testing of respirator mask, current patients having an alternative care plan, lack of fear for family's safety during a pandemic, and provision of a respirator mask by employer. There were no demographic or work characteristic variables that were significantly associated with willingness.

The proportion of HHCWs who were either unable to report or unwilling, or both, was very high. Eighty-five percent of HHCWs were not able and/or not willing to care for current patients and 91 percent were

similarly unable/unwilling for new patients. This potentially represents the “worst case” scenario, in terms of absenteeism.

We also examined the joint contributions of the significant variables associated with willingness to care for *current* patients; using logistic regression models, the only variable to remain in the models was fear ($p < 0.001$). In addition, multicollinearity among the predictors was not found, and there was no evidence of interactions among the predictor variables. Therefore, while elements of the RPP and other variables listed in Table 2 were associated with willingness to care for current patients, fear was the strongest predictor. When we similarly examined these relations with respect to willingness to care for *new* patients, we found that two variables, fear for personal safety (OR = 2.1, 95% CI = 1.27-3.53, $p = 0.004$) and prior respirator fit-testing (OR = 2.3, 95% CI = 1.07-4.22, $p = 0.032$), entered into the model, indicating that both fear and respirator fit-testing were independently associated with willingness to care for new patients.

Discussion

Our findings suggest that both individual factors (such as fear) and organizational factors (such as respiratory protection) are important determinants for willingness. In terms of ability, although many of the barriers were at the individual-level, the majority of the facilitating factors were primarily organizational (eg, provision of transportation and child care). These factors were predicted by DeJoy's model, and therefore this provides a helpful conceptual framework for considering both individual and organizational factors with respect to ability and willingness.

We compared our findings to other published studies on healthcare workers' ability and willingness to report to duty during various disaster scenarios. Although only a few studies have specifically addressed pandemic events, one study, conducted in Singapore by Cheong et al.,⁶ found much higher rates of willingness in a large sample of tertiary and community hospital healthcare workers (84 percent and 89 percent, respectively) when compared with our sample. However, a substantial percentage (26 percent) of tertiary care hospital workers in that study reported that they might seek other employment rather than risk occupational exposure. The difference in results between their study and ours might be explained, at least in part, by cultural or experiential differences (eg, more than one-third of the Singapore sample were employed in healthcare during the severe acute respiratory syndrome [SARS] outbreak in 2003).⁶ Differences could also be due to varying degrees of professional responsibility, although a substantial percentage of our sample (47 percent) reported that they would be more willing to report to duty if they thought that their patients really needed them.

In contrast to these results, our findings (eg, 43 percent willing to report) are more similar to those found in three US-based studies. For example, Irvin et al.⁸ found that 50 percent of the hospital workers in their study would report to work as usual during a pandemic, and, for a subset of nurses within this sample, only 44 percent were willing to work. Our findings are also somewhat comparable with the results reported by Balicer et al.¹¹ They found that 54 percent of their sample of Maryland health department work-

ers was willing to report to duty during a pandemic influenza outbreak. More recently, in a study by Basta et al.,²⁸ less than half of their respondents were willing to work during the peak of an influenza pandemic. Although it is interesting to compare rates across these studies, given the variability in methodology and sample populations, as well as the limited number of studies for comparison, sweeping generalizations are not possible.

Concerning the feasibility of HHCWs serving as staff surge capacity for other sectors, our results suggest that this might be problematic. When we combine the proportion of HHCWs who are either unable or unwilling (or both), a very small percentage may be available for current or new patients (15 percent and 9 percent, respectively) *within* the homecare sector. This makes their availability to serve as surge in *other* sectors unlikely. This also suggests that it might be prudent to include nonillness-related absenteeism in surge capacity modeling, although this is rarely done.²⁹ The rationale for not including this is based on the fact that healthcare workers tend to have very high rates of response to a wide range of disasters events,^{10,30,31} however, a highly lethal pandemic may prove otherwise. In the SARS outbreaks, although relatively high response rates were observed, burn-out, mental-health distress, and other problems were not uncommon.^{10,32} The SARS outbreaks were limited and brief; had they gone on longer and spread further, staff shortages may well have occurred. Depending on actual pandemic conditions, such as disease severity, availability of a pandemic vaccine, school closings, etc, the barriers we identified in our study may potentially result in severe shortfalls, and the task of caring for vulnerable homecare patients may fall on family, neighbors, friends, and community organizations and agencies.

Our findings, however, also point toward possible facilitating strategies. For example, strategies that might remove barriers to ability, such as child care and transportation assistance should be relatively straightforward to plan for, although individual HHCWs may need organizational support (such as car pooling, van service, day care services, etc). More complex and complicated solutions are needed to address

fear. While the issue of fear, dread, and risk perception is beyond the scope of this report, it seems reasonable to assume that by providing key elements of a pandemic preparedness plan, including infection control plans, homecare agencies can help reduce fear, and thereby increase willingness. If employees believe that their organization can be trusted to protect them from harm, willingness will almost certainly increase, although this has not been tested, to our knowledge, in an experimental design.

Given that we found extremely scant evidence of agency-level pandemic preparedness, this should be the focus of intervention. For example, most HHCWs in our study had never received any pandemic training, only a third were provided with a free seasonal influenza vaccine, and almost none (only 5 percent) reported that their agency had a pandemic plan. Respiratory protection programs were similarly sub-optimal, with few workers provided with masks, training, and fit-testing. These preparedness elements will not be easy to implement quickly, and therefore planning should be well underway and on-going. Guidance on preparedness planning in homecare is available. For example, the Centers for Disease Control and Prevention (CDC) published a check list for homecare agencies that includes: preparing a written plan, multi-agency/organizational coordination, education and training of homecare personnel, including infection control measures, patient/family preplanning, and an occupational health plan.³³ Additionally, guidance on respiratory protection has been published by the Occupational Safety and Health Administration (OSHA), National Institute of Occupational Safety and Health (NIOSH), as well as the CDC.³⁴⁻³⁶ There is also a new educational document that provides guidance to support the mental health and well-being of responders during a pandemic.¹⁴ Although there are planning materials available, there is some evidence that the sector as a whole has highly variable preparedness plans in place.³⁷ Although many larger agencies, such as the Visiting Nurse Service of New York,³⁸ have extensive pandemic planning, small to midsize agencies, which comprise four-fifths of all managed care homecare agencies in the United States,³⁹ may be challenged to meet even the basic elements of a

pandemic plan. Lack of resources, including available planning personnel, may serve as a barrier. Although state and national homecare leadership have made important efforts to assist agencies of all sizes in their planning,⁴⁰⁻⁴³ with roughly 18,000 licensed and/or certified agencies in the United States, the need is great. The informal homecare sector (ie, neither licensed nor certified) is estimated to approximate the size of the formal sector, and these informal workers are even less likely to have planning capabilities. Additional resources targeting all segments of this important healthcare sector are clearly needed, as recently articulated in a timely publication by Baron et al.⁴⁴

Limitations

As this was a cross-sectional design, causality cannot be ascertained from this study. Furthermore, as HHCWs are reporting on their intentions, they may respond quite differently during an actual outbreak; however, intentions are the most powerful predictors of actual behaviors.⁴⁵ Another limitation, given the self-report, is the possibility that HHCWs provided socially desirable responses, although the anonymous nature of the survey may have mitigated this somewhat. The fact that this was a relatively small sample of HHCWs, all recruited from a single geographic area and through a proactive union, may have resulted in a sample that was not truly representative of the nation's nearly one million HHCWs. Furthermore, the lack of randomization could have led to sample bias; this could potentially lead to lack of strength of association between independent and dependent variables. Clearly, additional nationally representative random sample studies are warranted.

Recommendations

Based on these findings, a number of recommendations are made.

First, nonillness-related absenteeism due to the lack of ability and willingness to report to duty should be incorporated in surge capacity modeling to improve the accuracy of the models.

Second, organizational preplanning, such as alternate child care and transportation arrangements, should be implemented to reduce the barriers to

HHCWs' ability to report to work. Human resources policies regarding paid sick leave and family sick leave should be reviewed and updated if necessary. Targeted workforce education and provision and training on respiratory protection to reduce fear and support compliance with recommended policies and practices are warranted. Given our knowledge of best practices for training in this workforce, in-person training will most likely be most accepted. This can be augmented with videos. However, these workers appreciate the opportunity to communicate directly with knowledgeable trainers.

Third, future studies should focus on HHCWs' fear associated with an influenza pandemic and the impact fear has on willingness to report to duty during a pandemic. Interventions that decrease fear and increase HHCWs' knowledge of pandemics would be useful.

Finally, all aspects of agency-level pandemic-planning should be promptly assessed and gaps addressed, including respiratory protection plans.

Conclusions

In this study, we provide evidence of the potential nonillness-related shortfall in HHC personnel during a pandemic. Although the recent H1N1 influenza pandemic has been extremely mild so far, the possibility of a disastrous pandemic becomes more salient.⁴⁶ These data, collected in the fall of 2008, show a disturbing lack of preparedness at the most elemental level and should serve as a reminder of the importance and timeliness of planning. This may help ensure an adequate workforce, although the extent that this workforce can meet surge capacity needs is questionable. Importantly, effective preplanning undoubtedly will help to allay fears and concerns of the workforce.¹⁴ Additional studies are needed to translate national and state guidelines into best practices for homecare agency preparedness. While this study targeted HHCWs, it seems probable that every essential workforce will similarly benefit from organizational preplanning for a pandemic, in terms of ability and willingness.

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