


# Determinants of Workforce Preparedness during Pandemics Among Healthcare Workers at the U.S. Department of Veterans Affairs

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## Abstract

**Objective:** An infectious disease outbreak can place a significant burden on healthcare systems, however, our understanding of the broader healthcare workforce's preparedness during a pandemic is limited. This study examines factors that influence perceived workforce preparedness at the U.S. Department of Veterans Affairs (VA) during a pandemic. **Methods:** The VA Preparedness Survey was a random, anonymous, web-based survey fielded nationwide October to December 2018. Multivariate statistical analyses examined the effects of study relevant factors (sociodemographic, work-related, general health, and household-related characteristics of VA employees) on perceptions of workforce preparedness, including institutional readiness and understanding of individual roles during a pandemic. **Results:** Four thousand and twenty-six VA employees responded. Overall, 55% were confident in their VA medical facility's ability to respond; 49% understood their role; and 68% reported their role to be important during a pandemic. After controlling for study-relevant factors, household preparedness, having plans that address the health care needs of family members, and higher self-reported health status were associated with all 3 workforce preparedness variables. Clinical staff (compared to non-clinical staff) were less likely (OR:0.80, 95% CI:0.68-0.94,  $P < .01$ ) to have confidence in their medical facility's ability to respond but more likely (OR:1.77, 95% CI:1.49-2.10,  $P < .001$ ) to believe their role was important. Employees who have been at the VA longer (OR:1.07, 95% CI:1.01-1.14,  $P < .05$ ) or have experienced a disaster while working at the VA (OR:1.29, 95% CI:1.04-1.59,  $P < .05$ ) were more likely to understand their role during a pandemic. **Conclusion:** The findings from this study suggest the need for identifying ways to increase VA employees' confidence in their medical facility's ability to respond to a pandemic; develop trainings to improve understanding of their different yet critical roles, for both clinical and non-clinical staff, during a pandemic; create different workforce trainings for newly hired employees; and identify ways to improve household preparedness for a pandemic outbreak.

## Keywords

healthcare worker, pandemics, workforce preparedness, determinants, U.S. Department of Veterans Affairs

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## Introduction

One consistent feature of a pandemic outbreak is an increase in demand for healthcare. This surge requires hospital staff to work additional hours under considerable strain and may place them at risk of infection or transmission to family and friends. During recent infectious disease outbreaks, healthcare providers were disproportionately more likely to become ill or lose their lives than non-healthcare professionals.<sup>1-3</sup> For example, 21% of SARS victims were healthcare workers,<sup>3</sup> and hospital staff were 21 to 32 times more likely to become infected during the

Ebola epidemic than the general population.<sup>4</sup> Between February and late December 2020, it has been estimated that 2921 healthcare workers have died of COVID-19 and

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related complications in the United States.<sup>5</sup> During the first wave of the pandemic, a study found that healthcare workers had a 7.0% greater absolute risk of SARS-CoV-2 infection than nonhealthcare workers, with infections most common among nursing staff.<sup>6</sup> Thus, employee absenteeism, whether voluntary or otherwise, is expected to be a significant challenge for hospitals during a pandemic outbreak.<sup>7-9</sup> In fact, during the peak of a pandemic, absenteeism rates for healthcare workers may range from 20% to 60%.<sup>7,8,10</sup> Reasons for the unwillingness to report to work during pandemics often include caretaking obligations, personal health issues, concerns about safety of self and family members, or lack of confidence in their medical facility's ability to respond or protect staff.<sup>7-15</sup>

As the largest integrated healthcare system in the U.S., with 1255 healthcare facilities serving 9 million Veterans, the VA plays an important role in the nation's disaster preparedness and response.<sup>16</sup> In fact, the VA's Fourth Mission is to provide backup medical resources to both the military healthcare system and to local communities following major disasters.<sup>17</sup> As such, the VA has responded to numerous national emergencies,<sup>18</sup> including the COVID-19 pandemic outbreak,<sup>19</sup> and has provided care for non-Veterans during many major disasters.<sup>18-20</sup> Therefore, understanding the perceptions of workplace preparedness for all VA healthcare employees is critical to both ensure the continued delivery of timely, high-quality care to U.S. military Veterans and to support the nation's overall preparedness during a pandemic.

Previous studies examining workforce preparedness during an infectious disease outbreak often have a narrow scope, focusing mainly on the willingness of a single type of healthcare worker to report to work<sup>11,13,14</sup> or are limited to a single hospital setting or geographic area.<sup>9,12,15</sup> There is a gap in the literature regarding what factors are associated with workforce preparedness or willingness to report to work during a pandemic for the broad healthcare workforce. Consequently, the first nationwide survey of disaster preparedness of VA healthcare employees was developed and conducted across the U.S. in late 2018. The VA All Employee Disaster Preparedness Survey (VA Preparedness Survey) focused on several key factors on perceptions of institutional readiness and understanding of individual response roles during pandemic outbreaks. This paper identifies factors that influence VA healthcare workers' perceptions of workforce disaster preparedness during a pandemic outbreak.

## Methods

### Study Design

The VA Preparedness Survey gathered information on perceptions of disaster preparedness at work and at home

from VA employees nationwide. The following items were included in the questionnaire: age, gender, education, military service, ethnicity, race, marital status, household composition, and information about employment status such as full-time or part-time, length of employment at the VA, supervisory status, and clinical and non-clinical responsibilities. The key study questions regarding perceptions of workforce preparedness included: (a) confidence in medical facility's ability to respond to a pandemic; (b) understanding of roles during a pandemic response; and (c) perceptions about the importance of roles during a pandemic. The study defined a pandemic as a widespread infectious disease such as a pandemic influenza that causes disruption in services, mass injury, loss of life, or widespread damage to property, and requires resources outside of the local community to help with recovery efforts. For details on the questionnaire and study population refer to previously published work on the VA Preparedness Survey.<sup>21</sup> In accord with the policies regarding activities that constitute human subjects research at the Authors' Institution, this quality improvement study was determined by the local Institutional Review Board to be a non-research project (#2020-000051), since the study intended to evaluate an existing practice with the intention to improve it based on existing knowledge.

### Statistical Analyses

Descriptive statistical analyses were conducted to illustrate the sociodemographic, work-related, general health, and household-related characteristics of the study population, as well as the weighted percent distribution of key study variables, including perceptions of workforce preparedness during a pandemic. For this paper, determinants of perceptions of workforce preparedness during pandemics were examined, where each dependent variable was dichotomized by combining the "strongly agree/agree" responses into 1 category and the remaining responses ("strongly disagree," "disagree," and "neutral") into another category. The dependent variables were: (1) I am confident in my medical facility's ability to respond to pandemics; (2) I understand my role in my facility's overall disaster response to pandemics; and (3) My role in my facility's overall disaster response to pandemics is important. The analyses included 3 multivariate logistic regressions—1 for each dependent variable. The following covariates were included in the multivariate logistic regression models: overall general health status, work-related characteristics (clinical duties, supervisory responsibilities, number of years at the VA, and whether the respondent previously experienced 1 or more disasters while at the VA), and household characteristics (household preparedness, and have plans to meet family's healthcare needs during major disasters), while controlling for sociodemographic characteristics (gender,

age, race, marital status, education, and military background). The svy command was used to account for the sampling weights and stratification. Statistical analyses were conducted using Stata (Version 15, StataCorp LP, College Station, Texas USA). Odds Ratios (OR) and 95% Confidence Intervals (95% CI) were calculated to determine the statistically significant predictors of workforce preparedness for pandemic outbreaks. Statistical significance was set at  $P < .05$ .

## Results

### Characteristics of Participants

For details on the sociodemographic characteristics of the study participants, refer to previously published work on the VA Preparedness Survey.<sup>22</sup>

### Perceptions of Workforce Disaster Preparedness during Pandemics

Table 1 presents the weighted percent distribution of responses for the 3 dependent variables. According to the study's findings, 55% reported being confident (ie, "strongly agreed" or "agreed") in their VA medical facility's ability to respond to a pandemic; 49% understand their role in their VA medical facility's overall response to a pandemic; and 68% reported that their role in the overall response to a pandemic is important.

### Determinants of Workforce Preparedness during Pandemics

Table 2 shows the odds ratios (ORs) and 95% Confidence Intervals (CIs) for all study covariates predicting perceptions of workforce preparedness during pandemics after controlling for employee sociodemographic characteristics (age, race, gender, education, marital status, military status). For the first dependent variable, the findings indicate that clinical staff, compared to non-clinical staff, (OR=0.80, 95% CI: 0.68-0.94), and VA employees not prepared at home for major disasters (OR=0.60, 95% CI: 0.53-0.69) were *less likely* to have confidence in their facility's ability to respond during pandemics. In contrast, employees with better self-reported health status (OR=1.16, 95% CI: 1.06-1.27) and those who have plans to meet their family's health care needs in the event of a disaster (OR=1.09, 95% CI: 0.93-1.28) were *more likely* to have confidence in their facility's ability to respond during pandemics.

With regard to the second dependent variable, employees with supervisory responsibilities (OR=1.54, 95% CI: 1.30-1.83), employees who have been at the VA longer (OR=1.07, 95% CI: 1.01-1.14), employees who had experienced a disaster while at the VA (OR=1.29, 95%

**Table 1.** Perceptions of VA Workforce Preparedness<sup>†</sup> during Pandemics (N=4026).

	Strongly agree/agree (%)	Neutral (%)	Strongly disagree/disagree (%)
I am confident in my medical facility's ability to respond	55	28	17
I understand my role in my facility's overall response	49	30	22
My role in my facility's overall response is important	68	26	6

<sup>†</sup>Weighted percent.

CI: 1.04-1.59), employees who have plans to meet their family's health care needs in the event of a disaster (OR=1.72, 95% CI: 1.45-2.03), and employees with better self-reported health status were *more likely* (OR=1.18, 95% CI: 1.07-1.29) to understand their role during pandemics, whereas VA employees not prepared at home were *less likely* (OR=0.54, 95% CI: 0.47-0.62), to understand their role during pandemics.

For the third dependent variable, the findings indicate that employees with supervisory responsibilities (OR=1.80, 95% CI: 1.49-2.18), clinical staff (OR=1.77, 95% CI: 1.49-2.10), employees who have plans to meet their family's health care needs in the event of a disaster (OR=1.43, 95% CI: 1.20-1.71), and employees with higher self-reported health status were *more likely* (OR=1.17, 95% CI: 1.07-1.29) to perceive their role in responding to pandemics as important. In contrast, VA employees not prepared at home for disasters were *less likely* (OR=0.75, 95% CI: 0.65-0.87) to perceive their role as important.

## Discussion

Healthcare workers play an important role in response and recovery when a disaster occurs, yet, the COVID-19 pandemic has shown that an infectious outbreak would place a significant strain on healthcare systems, particularly emergency care, intensive care units (ICU), and inpatient care. In fact, in late December 2020, an estimated 74.2% of inpatient beds were being occupied nationwide,<sup>23</sup> compared to the 65% routinely occupied without a public health emergency,<sup>24</sup> and 36 states were using 70% or more of their ICU capacity.<sup>23</sup> Additionally, some healthcare workers are often unwilling to place themselves at risk of exposure to infectious disease outbreaks, as seen during the early years of the HIV/AIDS epidemic, the avian influenza A, SARS, and Ebola epidemics, and the 2009 H1N1 pandemic.<sup>1,9,13,25</sup> Accordingly, understanding the perceptions of workforce preparedness and identifying which factors influence these

**Table 2.** Determinants of Workforce Preparedness during Pandemics.

	I am confident in my medical facility's ability to respond	I understand my role in my facility's overall disaster response	My role in my facility's overall response is important
	Odds ratio (95% confidence interval)		
Supervisory responsibilities	1.02 (0.87-1.21)	1.54 (1.30-1.83) <sup>a</sup>	1.80 (1.49-2.18) <sup>a</sup>
Clinical duties	0.80 (0.68-0.94) <sup>b</sup>	1.09 (0.93-1.28)	1.77 (1.49-2.10) <sup>a</sup>
Number of years at the VA	0.97 (0.91-1.03)	1.07 (1.01-1.14) <sup>c</sup>	0.98 (0.92-1.04)
Experienced a major disaster while at the VA	0.88 (0.72-1.09)	1.29 (1.04-1.59) <sup>c</sup>	1.19 (0.95-1.51)
U.S. military Veteran	0.71 (0.59-0.86) <sup>a</sup>	0.83 (0.68-1.01)	0.82 (0.67-1.00) <sup>c</sup>
Age (ref: 18-44)	1.19 (1.10-1.28) <sup>a</sup>	1.08 (1.00-1.16)	1.21 (1.11-1.31) <sup>a</sup>
Male	1.02 (0.85-1.22)	1.02 (0.84-1.23)	0.84 (0.69-1.03)
White	0.85 (0.72-1.01)	0.66 (0.56-0.79) <sup>a</sup>	0.64 (0.53-0.78) <sup>a</sup>
Education (ref: High school or less)	0.80 (0.73-0.87) <sup>a</sup>	0.78 (0.71-0.86) <sup>a</sup>	0.81 (0.73-0.89) <sup>a</sup>
Married	1.04 (0.89-1.24)	1.11 (0.93-1.32)	0.90 (0.75-1.09)
Household preparedness (ref: Not prepared)	0.60 (0.53-0.69) <sup>a</sup>	0.54 (0.47-0.62) <sup>a</sup>	0.75 (0.65-0.87) <sup>a</sup>
Plans that meet family's health care needs in a major disaster	1.09 (0.93-1.28) <sup>c</sup>	1.72 (1.45-2.03) <sup>a</sup>	1.43 (1.20-1.71) <sup>a</sup>
General health status (5 = excellent. . . 1 = very poor)	1.16 (1.06-1.27) <sup>b</sup>	1.18 (1.07-1.29) <sup>b</sup>	1.17 (1.07-1.29) <sup>b</sup>
Constant	2.18 (1.17-4.04) <sup>c</sup>	1.21 (0.63-2.31)	1.31 (0.67-2.59)

<sup>a</sup>P < .001.<sup>b</sup>P < .01.<sup>c</sup>P < .05.

perceptions is critical in maintaining vital healthcare services during a pandemic.

Perceived safety and confidence in their medical facility's ability to manage an infectious outbreak have been cited as influencing factors to healthcare workers' willingness and ability to respond.<sup>7,12,14</sup> Yet previous studies have similarly found that approximately half of healthcare personnel believed their workplace would be safe during a pandemic.<sup>8,12,14</sup> Concerns about transportation to and from work were also cited as a potential barrier, particularly in urban areas where public transit may be suspended, or otherwise dangerous, during an outbreak.<sup>7,8</sup> Previous studies have found that the provision of adequate personal protective equipment (PPE) and vaccines or other preventive medications were the most significant influencers in improving healthcare workers' willingness to report to work or confidence in workplace safety.<sup>7,8,14,15</sup> Unfortunately, results of a nationwide survey conducted by National Nurses United (NNU) found that high percentages of U.S. hospitals either lacked sufficient stocks of PPE or were not providing sufficient PPE to staff, that tests for COVID-19 were unavailable or insufficient for staff and patients, and that hospitals did not have plans, procedures, and policies in place for COVID-19.<sup>26</sup> Further, a database aimed at counting every U.S. healthcare worker who has died after contracting COVID-19 while on the job found that at least 105 of the 318 profiled frontline workers (33%) had reported

concerns of inadequate PPE.<sup>5</sup> This study found that clinicians were less likely to be "confident in their VA medical facility's ability to respond to a pandemic" compared to non-clinicians. Although the VA Preparedness Survey did not include specific questions regarding PPE and other relevant supplies, it is plausible that clinicians may be more familiar with the availability, or lack thereof, of these supplies compared to non-clinical staff, which could cause them to be less confident in their facility's level of preparedness. Therefore, the VA should consider implementing strategies to increase clinicians' confidence in their institution's ability to respond, which could include communicating the medical facility's pandemic plan and infection control practices with staff, ensuring adequate supplies of PPE and other protective measures, providing vaccines or other preventive medications to staff and family, delivering training on the use of PPE, and supplying safe transportation to and from work.

During an infectious disease outbreak, the roles and responsibilities of hospital staff may change, and their workload will likely be immense. Studies have found that healthcare workers with a specified role were significantly more willing and able to report to work during a pandemic,<sup>7,12,27</sup> and those who perceived their role during pandemic response as important were also more likely to respond.<sup>7,8,12,15</sup> However, it is been cited that healthcare professionals are often unsure of their specific responsibilities



during a pandemic.<sup>8,11</sup> In addition, clinicians<sup>7,8,11,28</sup> have been cited as more willing to respond to disasters than their non-clinical counterparts and healthcare workers who have been employed at their facility for a longer duration,<sup>8,29</sup> and those with prior disaster experience,<sup>8,27</sup> were more likely to respond or felt better prepared to respond to a disaster. While a majority (68%) of VA employees believed their role “in their VA facility’s overall response to a pandemic is important,” only half reported that they “understand their role in their VA facility’s overall response to a pandemic.” Furthermore, this study found that respondents who had been at the VA for a shorter period of time and employees without supervisory responsibilities were less likely to *understand their role* in response to a pandemic. Non-clinicians were also less likely to perceive their role in pandemic response as *important*. Employees who had “experienced a major disaster while at the VA” were more likely to *understand their role* during a pandemic response. The findings suggest a need for additional disaster preparedness trainings. All VA facilities are required to be accredited by The Joint Commission and thus meet its emergency preparedness requirements, which include conducting an exercise to test their emergency plans at least annually (either a full-scale community-based exercise or facility-based functional exercise every other year, and then a mock disaster drill or a tabletop exercise the following year).<sup>30</sup> There are also state-level training requirements for individual clinicians set by professional standards boards. In contrast, non-clinicians are not subject to these same professional licensing requirements. Similarly, recently hired VA employees may not have yet had an opportunity to participate in an annual exercise, and not all employees participate in exercises every year, although at least some training is required every year. Therefore, the VA should consider developing targeted trainings for non-clinicians and supplemental training for newer employees. Training around preparedness should be prioritized to occur earlier and perhaps more often for newer employees and non-clinical staff. Our findings suggest that such trainings should outline individual response roles during a pandemic, particularly the importance of their individual roles. While it can be difficult to designate predetermined, specific roles for all possible emergencies, a set of potential roles should be defined and introduced to all employees shortly after onboarding. Non-clinical staff may require additional training to better understand their potential roles and the preparedness of their facilities compared to clinical staff. Annual simulation exercises and drills could also be helpful for all employees, whether clinical or non-clinical, who have never experienced a disaster.

Studies have found that healthcare professionals and U.S. military Veterans tend to have better household disaster preparedness than the general population.<sup>28,31,32</sup> However, rates are still low, with only 23% of VA

employees disclosing that they felt “well prepared” at home for a major disaster. This finding is consistent with other studies assessing aspects of personal preparedness of healthcare workers.<sup>27,28,32,33</sup> Studies have also shown that improving household preparedness will likely increase willingness or ability to report to work or improve level of workforce preparedness during disasters.<sup>8,21,27</sup> Common barriers to household preparedness often include lack of financial resources, time, and knowledge of how to achieve preparedness.<sup>32</sup> Additionally, personal health problems has been cited as a barrier to ability or willingness to respond during pandemics,<sup>10,15</sup> which is particularly poignant during the novel coronavirus outbreak, as pre-existing health conditions has been shown to have a considerable effect on COVID-19 outcomes.<sup>34</sup> This study’s findings indicate that household preparedness and health status is a strong predictor of workforce preparedness for all 3 dependent variables. In addition, employees who stated that they had “plans to meet their family’s health care needs in the event of a major disaster” were more likely to *understand their role* and more likely to believe their role was *important* during a pandemic response. Accordingly, an increased focus on enhancing the household preparedness of healthcare workers by their employers may offer potentially significant benefits in terms of improving an organizations’ preparedness for public health emergencies. For example, organizations could develop more effective policies and strategies, such as flexible work arrangements for those with preexisting conditions, in order to mitigate factors that may serve as barriers to workforce and household preparedness. Employees should also be encouraged to create written disaster plans for their household, which includes how they will meet their family’s health care needs in the event of a pandemic. In addition, employers should promote the use of basic disaster kits, and perhaps even supply some items to employees. As U.S. military Veterans tend to have higher levels of household preparedness than non-Veterans,<sup>31</sup> VA employees who are Veterans could be a valuable resource to train their colleagues about how to prepare their households for a major disaster.<sup>35</sup>

### Limitations

This study has several limitations. Since the focus on the survey was on perceptions of workforce preparedness during pandemics nationwide, we were unable to collect information on a specific event. Perceptions of institutional readiness may not reflect actual, objective readiness or willingness/ability to report to duty during pandemics, therefore, future surveys should explore perceptions to actual response metrics. In addition, this study collected data in 2018, so these results may not be an accurate reflection of perceptions of disaster preparedness during the COVID-19 pandemic outbreak. It would be interesting to

conduct a similar survey in light of the COVID-19 pandemic to compare whether the results differ and evaluate its impact on use of healthcare services, for example, primary care. It should also be noted that the results of this study are not necessarily generalizable outside of VA, however, the sociodemographic characteristics of the VA workforce are not different compared to other healthcare workers in the U.S., except with regard to the number of workers who served in the U.S. military. Further, VA respondents should not differ significantly from healthcare workers in other settings with respect to their type, scope, or amount of disaster preparedness training either during their professional training or employment. For example, VA complies with the emergency preparedness requirements set by The Joint Commission, and additional requirements for training are set by professional standards boards for clinicians at the state level. The applicability of these standards is the same for both VA and non-VA healthcare entities and individuals.

## Conclusion

As of January 8th, 2021, there have been over 14 372 convalescent cases of COVID-19<sup>36</sup> and 105 deaths<sup>37</sup> among VA employees in the United States. The VA plays an important role in the country's disaster preparedness and response and as a nationwide, integrated health system, VA has certain advantages in terms of preparedness and response compared to smaller systems and standalone facilities. For example, VA is able to use its bulk purchasing power to obtain supplies at discounted rates, and more readily shift capacity in terms of both staff and supplies in order to meet surges in demand. Since the onset of the COVID-19 pandemic, VA has provided care to approximately 488 non-Veteran patients in 15 states who tested positive for the virus and more than 2453 VA employees have provided support to non-VA facilities as of that date.<sup>38</sup> As such, the illness or death of these essential workers negatively impacts not only the VA system's ability to deliver care to its Veteran patients, but also care to the community during the current pandemic. The novel coronavirus underscores the need to understand the various determinants that may influence the healthcare workforce's preparedness for pandemics so that medical facilities can take precautions necessary to protect staff and their families, and potentially increase willingness to report to work. The findings from this study suggest the need for identifying ways to increase VA employees' confidence in their medical facility's ability to respond to a pandemic; to develop trainings that aim to improve understanding of their different yet critical roles, for both clinical as well as non-clinical staff; to create different workforce trainings for newly hired employees; and to identify ways to improve household preparedness for a pandemic outbreak.

Understanding and addressing the various factors that influence the perceptions of workforce preparedness of healthcare workers during a pandemic could aid in the development of more effective disaster policies and programs, which in turn should lead to a more resilient healthcare system that can be better prepared to protect its employees and serve the needs of patients during infectious disease outbreaks.

## Authors' Note

The views expressed in this manuscript are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.

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