

# Survey

## ICU Clinician Perceptions of COVID-19 ICU Readiness: Results of a Thematic Analysis of National U.S. Survey Data

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### ABSTRACT

The COVID-19 pandemic has greatly impacted intensive care unit (ICU) clinicians worldwide. Case number surges resulted in high or even above-capacity ICU patient census, limited bed availability, clinical staffing strains, and concerns about maintaining adequate medication, personal protective equipment (PPE), and equipment supplies to ensure optimal patient care. In the United States, a series of rapid cycle COVID-19 surveys were disseminated to ICU clinicians to assess ICU readiness and ongoing challenges posed by the pandemic. This article reports on a qualitative thematic analysis of the descriptive data for general themes provided by over 800 ICU nurses, advanced practice providers, physicians, pharmacists and respiratory therapists, reflecting upon their perceptions from the early to mid-pandemic timeline.

**Keywords:** Intensive care, COVID-19 pandemic, equipment, communication, survey

### OVERVIEW

The COVID-19 pandemic has become a rapidly-emerging, far-reaching, deadly killer (Horesh & Brown, 2020). Due to the global case numbers, surges in case numbers and the predilection to cause respiratory failure, which inherently necessitates high levels of acute medical care, there has been immense strain on health care providers, especially ICU clinicians. ICU preparedness is essential because of high ICU utilization during the pandemic. Approximately 12%-19% of

patients with COVID-19 have required hospital admission, and 3%-6% became critically ill (Edelson et al., 2020). Ensuring effective ICU preparedness and response will remain paramount as the pandemic continues.

According to the Society of Critical Care Medicine (SCCM) (2020), the burden for COVID-19 patient care in the ICU mandates a better understanding of ICU resource needs to meet the anticipated healthcare requirements of this patient population. Information regarding national ICU readiness for COVID-19 remains limited (SCCM, 2020). A series of rapid cycle surveys were developed by SCCM to assess ICU readiness across the United States (Kaplan et al., 2020; Kleinpell, 2020). Included in these surveys were open-ended questions that allow for free-text, narrative responses from clinicians. This article reports on an analysis of the descriptive data for general themes provided by over 800 ICU nurses, physicians, pharmacists and respiratory therapists.

## DISASTER PREPAREDNESS

Effective pandemic response necessitates a multifaceted approach. As outlined in Figure 1, several complex relationships exist between critical care pandemic preparedness and the supporting concepts of critical care staffing capacity, critical care bed/surge capacity, equipment capacity (such as ventilators), resource capacity (PPE, COVID-19 testing, medication availability, etc.), critical care clinician stress, and triage preparedness.

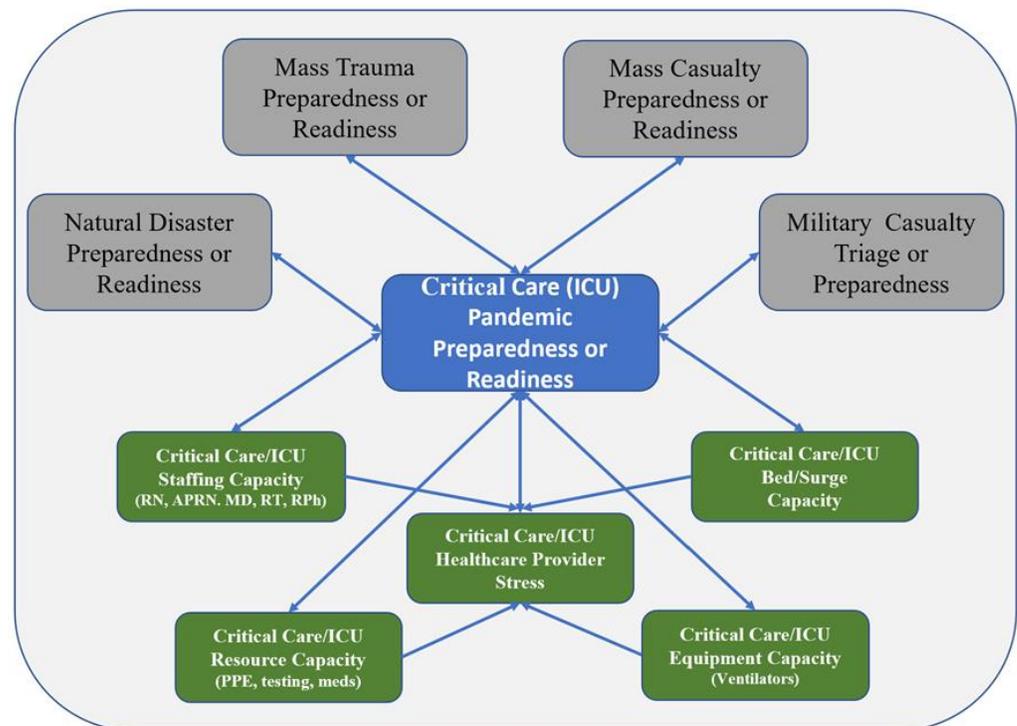


Figure 1. Critical Care (ICU) Pandemic Preparedness or Readiness

The COVID-19 pandemic has resulted in a unique circumstance during which care for critically ill patients. Early challenges included a lack of pathophysiologic knowledge of the natural course of the disease and lack of evidence relative to safety and efficacy of novel treatments. Additionally, surges inherently stressed all ICUs because common themes that limited effective care included shortages of space, staff, and supplies. Rubinson et al. (2008) proposed the framework of Emergency Mass Critical Care (EMCC) as a set of changes from everyday ICU patient care to address staffing, equipment, and treatment spaces intended to maximize survival for an overall population of critically ill and simultaneously minimize adverse outcomes that may happen as a result of those changes from usual practice. Lastly, although assurance of adequate space, staff, and stuff in a pandemic is highly important for success of institutional or regional health care preparedness, clinician stress and burnout has been prevalent, and consideration for the well-being of healthcare providers on the frontlines is also necessary (Ripp et al., 2020).

## **METHODS**

SCCM, an international organization of over 16,000 ICU clinicians including physicians, nurses, pharmacists, respiratory therapists and others, launched a series of rapid cycle surveys to gather input on the impact of the COVID-19 pandemic. The first survey launched on March 18, 2020 and had over 4,000 respondents; a second survey launched on April 7, 2020, had over 9,000 respondents (Kaplan et al., 2020; Kleinpell et al., 2020). These anonymous, national surveys were provided to potential respondents through a web-based portal. Each of the surveys was available for 1 week and interspaced 2 weeks apart and offered participants with opportunities to answer participants open-ended questions with free-text, descriptive responses.

The first of the two national web-based, anonymous surveys, which focused on pandemic preparedness, was launched March 18-25, 2020. This 12-item questionnaire assessed practicing ICU clinician perceptions the degree to which ICU facilities and teams were prepared to treat COVID-19 patients, concerns related to caring for COVID-19 patients in the ICU, efforts that have been made to care for patients, anticipated personal protective equipment (PPE) supply shortages, and techniques being used to add critical care capacity. In this context, two questions permitted responses of “other” by participants. Those questions were:

- What concerns do you have related to caring for COVID-19 patients in your ICU?
- What efforts has your primary ICU made to prepare for COVID-19?

The second rapid cycle survey focused on concerns related to caring for COVID-19 patients in the ICU and was launched April 8, 2020. This 17-item questionnaire again targeted practicing ICU clinician perceptions of the degree to which ICU facilities and teams were prepared to treat COVID-19 patients, concerns related to caring for COVID-19 patients in the ICU, efforts that have been made to care for patients, anticipated PPE supply shortages, and techniques being used to augment critical care capacity. The qualitative questions that permitted a free-text response in this second survey assessed the most critical needs that ICUs were currently facing to manage the COVID-19 pandemic. Table 1 outlines the open-ended questions used in these surveys.

**Table 1.** Open-ended Questions

*Open-ended Questions*

What concerns do you have related to caring for COVID-19 patients in your ICU? Other (please specify)

What efforts has your primary ICU made to prepare for COVID-19? Other (please specify)

What is the most critical need that your ICU is currently facing to manage the COVID-19 pandemic?

Other (please specify)

In order to analyze the open-ended responses, thematic analysis was used to identify themes across all cohorts and by clinician cohorts. Thematic analysis methodology was used to guide the analysis of open-ended question responses received from SCCM's quasi-qualitative designed survey. Thematic analysis is a framework that provides investigators with a process to identify common themes in a qualitative data set. These common themes may be ideas, topics, or patterns of meaning that appear frequently in the data (Caulfield, 2020). Braun and Clarke (2006) maintain that thematic analysis methodology for qualitative research can be broadly employed across a variety of research questions and epistemologies. The thematic analysis methodology proposed for this project followed a six-step process: (a) familiarization; (b) coding; (c) generating themes (d) reviewing themes; (e) defining and naming themes; and (f) writing up results (Caulfield, 2020).

## RESULTS

A total of 737 clinicians responded to the open-ended question "What concerns do you have related to caring for COVID-19 patients in your ICU?" including nurses (n=557, 75.6%), physicians (n=64, 8.68%), advanced practice providers (n=45, 6.11%), respiratory therapists (n=41, 5.6%), and pharmacists (n=6, 1%). There were an additional 136 secondary response themes conveyed in the descriptive responses for a total of 873 response themes. The following themes were identified:

- Lack of supplies, including PPE and masks (n=322, 36.8%)
- Safety of staff, patients and families (n=113, 12.9%)
- Inadequate staff preparedness (n=91, 10.4%)
- Lack of adequate facilities and equipment (n=67, 7.7%).

A total of 234 ICU clinicians responded to the question which listed pre-determined response choices "What is the most critical need that your ICU is currently facing to manage the COVID-19 pandemic? Other (please specify)" Majority (n=208, 88.9%) were nurses, advanced practice providers (n=11, 4.7%), physicians (n=10, 4.3%), and respiratory therapists (n=2, 1%). The primary response themes included the following:

- Lack of PPE, masks, and supplies (n=43, 17.70%)

- Low patient census and shift cancellations (n=24, 9.88%)
- Lack of or inadequate cleaning supplies and housekeeping (n=22, 9.05%)
- Lack of powered air-purifying respirators (PAPR) hoods and equipment (n=20, 8.23%)
- Lack of leadership and poor communication (n=17, 7.00%)
- Lack of institutional support (n=15, 6.17%)
- Lack of adequate facilities and equipment (n=14, 5.76%)
- Lack, delay, or inappropriate testing (n=11, 4.53%)

For the open-ended response option to provide any additional information “Other (please specify)?” a total of 121 professionals responded including nurses (n=109, 89.2%), physicians (n=4, 2.2%) advanced practice providers (n=3, 2.48%), and respiratory therapists (n=1, 0.83%). Main themes included:

- COVID-19 patient care, pronation, and PPE time requirements (n=41, 33.06%)
- Safety of staff, patients, and families (n=10, 8.06%)

The second open-ended question asked ICU clinicians “*What efforts has your primary ICU made to prepare for COVID-19?*” A total of 206 professionals responded including ICU nurses (n=151, 73.3%), advanced practice providers (n=19, 9.2%), physicians (N=16, 7.7%), respiratory therapists (n=11, 5.3%), and pharmacists (n=2, 2.4%)

The 206 respondents provided primary response themes from the drop-down response choices. There were an additional 11 secondary response themes conveyed in the descriptive responses for a total of 217 response themes from the survey. From this data set, and after researcher triangulation to mitigate bias, the following themes emerged:

- Inadequate response and lack of communication 28.11% (61)
- Increased communication and implemented visitor restrictions 19.35% (42)
- Prepared facilities, beds, and equipment 12.44% (27)
- Staff preparedness, training for PPE, and patient care 28.57% (62)

## DISCUSSION

The results of this thematic analysis of open-ended comments from a series of national rapid cycle surveys assessing the ongoing impact of the COVID-19 pandemic on ICU clinicians identified a number of priority areas for ICU care in the initial phase of the pandemic. These included adequate equipment and supplies, adequate staffing, and staff preparedness. Nurses, physicians, and advanced practice providers all identified a lack of PPE, masks, and supplies as a top area of concern, as well as concerns about leadership and communication. Similar to the findings of the National Academy of Medicine’s report on clinician responses to the pandemic (Madera et al 2021). ICU clinicians reported that key elements of the initial response were to develop clinical guidelines, adapt care delivery systems, and focus on education and training.

Nurses identified the safety of staff, patients, and families (13.65 %, n=89), while physicians and advanced practice providers reported inadequate staff preparedness in their top three concerns (15.79%, n=12 and 19.61%, n=10 respectively). For example, “I work in peds but if the adult side gets overwhelmed, they may spill into our unit. I have never worked as a bedside RN with the adult population” (Table 2). The need to enhance staffing by using non-ICU trained clinicians is an identified strategy to ensuring adequate

ICU manpower (Halpern and Tan, 2020). As highlighted in updated US statistics on the availability of critical care resources, the pandemic brought concerns about ICUs potentially being overwhelmed with critically ill patients (Halpern and Tan 2020). Guidance was provided by SCCM to ICUs about the need for contingency and crisis beds for critically ill patients, including augmenting critical care staffing (Halpern and Tan 2020). A Rand report on the critical care surge response strategy during the pandemic highlighted similar findings related to crisis capacity strategies including adapting medical care spaces and changing staffing ratios to increase capacity (Abir et al, 2020).

**Table 2:** Sample Themes and Examples Reported by ICU Clinicians

Theme	Example	Profession
Inadequate staff preparation	I work in peds but if the adult side gets overwhelmed they may spill into our unit. I have never worked as a bedside RN with the adult population.”	Nurse
	The unpredictability of this disease and how deadly it is; we don’t know what to do to manage these patients”	Physician
Institutional process changes	Mandatory overtime and/or change in work hours and safety overall (what if I get infected despite PPE)	Advanced Practice Provider
	Communication with families	
	As a provider in an ICU setting, we are not entering the room as often as we would if they were not on such strict isolation, so I feel like the patients are not getting the care they normally would.	Advanced Practice Provider
	Patients are dying without their families. We are face timing with the family members during the death process but this does not support the families enough.	Nurse
	Imagine the patient anxiety when everyone tries to spend the least amount of time in the room and no visitors are allowed .	Nurse
Lack of adequate negative pressure rooms, no facilities/equipment	anterooms at all	Inadequate Nurse

	Not enough ventilators	Physician
Lack of institutional support	Childcare given school and daycare closure	Advanced Practice Provider
Safety of staff, patients Families	Taking every precaution to not bring this home to my family	Nurse
	I am pregnant and concerned about safety specifically related to my health	Nurse
Hospital preparedness	I am proud of how well ahead of the curve my hospital system seems to be compared to others in the area. Thankfully we had an Ebola plan that has been adapted for COVID.	Nurse
Staff preparedness/ Training	Added a full FTE for donning/doffing resource and made an infection prevention specialist hotline for staff to call 24/7 for questions regarding COVID-19 care	Nurse
	Trained ancillary staff to assist nursing and cancelled elective surgeries to conserve PPE	Pharmacist
	Psychological support to healthcare staff by spiritual coordinator	Physician
Lack of PPE, masks and supplies	Need more N95 masks	Nurse
	Turnaround time for cleaning our PAPRS	Nurse
COVID-19 care	The time it takes to done PPE The general difficulties of caring for someone when in isolation gear	Nurse
	The PPE and isolation introduce a barrier to our physician/patient interaction such that it is hard (if not impossible) to develop any relationship with them. Thus, the reward of a therapeutic relationship is lost.	Physician
Lack of compensation Or hazard pay	Massive amounts of (over) documentation has not changed even though our jobs are harder, riskier, and scarier. We are now doing the job of ancillary staff (EKG, phlebotomy, etc) with no more pay and same lengthy documentation requirements.	Nurse

Early in the pandemic, the most common theme across the total cohort of respondents was “no critical needs” (21.81%, n=53). A respiratory therapist shared, “No critical needs at this time” and a nurse wrote, “No critical need identified at this time. My hospital leadership is proactive with planning and strategies setup already for potential surge. PPE is available when needed. Redeployment already setup to address staffing issues”. The second most common theme, which was also identified in the first survey, was the Lack lack of PPE, masks, and supplies (17.70%, n=43). Responses were similar to the earlier examples with respect to this theme, such as “All forms of PPE, especially masks, gowns, and face shields.” The theme of safety of staff, patients, and families was described in the responses. This is consistent with well-documented needs for safety and wellness of healthcare workers in the literature review. Previous writings note that the predictable surge in mask demand during an influenza pandemic would create a gap that may expose critical care workers to unacceptable risk of infection (Caria et al., 2015). The concerns of staff, patient, and family risk were clearly articulated through the survey responses. Additionally, the capacity of staffing resources is of utmost importance when responding to a pandemic.

## **LIMITATIONS**

Limitations include the low number of responses from respiratory therapists and pharmacists, precluding identification of significant concerns related to those healthcare providers. Overall, thematic analysis has limitations related to the potential for inconsistency when deriving themes. As a type of qualitative analysis, thematic analysis can also be prone to personal inferences by the researcher in interpreting the results.

## **CONCLUSIONS**

COVID-19 is an ongoing global pandemic that has significantly impacted critical care clinicians including nurses, physicians, advanced practice providers, and respiratory therapists. Significant gaps in ICU readiness to care for COVID-19 patients, adequate supplies and equipment, staffing concerns, and barriers to providing patient and family centered care were identified in the descriptive, qualitative responses from the early time period of the pandemic. Lessons learned regarding ICU preparedness during the pandemic and strategies used to meet the demands for ICU care can be used to prepare for the next disaster/pandemic. It is crucial that healthcare leaders and administrators ensure adequate resources and support for ICU clinicians during the ongoing pandemic.

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