

# COMMENTARY

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## Combating the Current Pandemic and Preparing for the Next: Lessons Learned From the COVID-19 Pandemic From the Perspective of Deployed Special Operations Forces

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**ABSTRACT** The coronavirus 2019 (COVID-19) pandemic continues to be a threat to global health, including the health of deployed armed forces. Servicemembers had to adjust to the “new normal” while maintaining the interests of the nation’s security as well as that of our host nation partners. This commentary examines how Special Operations Forces operating within four different regions worldwide leveraged the challenges presented by the onset of this pandemic in maintaining stability, sustaining a ready force, and operating forward deployed. Deployed forces face constant difficulties with logistical support, varied medical resources access and a medical system predominantly focused on trauma care. At the onset of the COVID-19 pandemic there was little guidance specific to these circumstances which required an improvised adaptation of the recommendations set by national and Department of Defense medical authorities. Plans were constantly revised to match the ever changing medical and operational environment. Strategies such as the “Bubble Philosophy” and tiered force protection measures helped our units to maintain a rigorous training cycle. New methods of communication and training with our host nation partners such as the use of Unmanned Aerial Systems (UAS) platforms to survey host nation training became standard. Through these measures all of our forces were able to maintain operational capacity, protect the force, and maintain rapport with the host nations. We hope these experiences will provide a rough framework for future forces faced with a similar struggle. We also want to stress that challenges vary depending on the area of operations and the pathogen responsible for the pandemic. Any feedback and collaboration that may come from this work is appreciated and encouraged.

### INTRODUCTION/BACKGROUND

In the first 145 years of U.S. history more military personnel died from infectious disease than combat. It was not until the introduction of vaccines and antibiotics during the World War

II era that trend shifted to death from combat.<sup>1</sup> In the setting of a global pandemic, however, that trend may reverse again. This emerging infectious disease risk was showcased by the SARS-CoV-2 (COVID-19) virus which as of August 2021, the Centers for Disease Control and Prevention (CDC) had tracked over 37 million cases resulting in a death toll of over 600,000 in the USA alone.<sup>2</sup> The military forces of the USA have not been sheltered from these cases or deaths.

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The COVID-19 virus rose to the level of global pandemic due to its high transmission rate and ability to be transferred from both symptomatic and asymptomatic hosts.<sup>3</sup> The most effective tool against viruses is prevention and this is best accomplished with vaccines. Unfortunately, vaccine development takes time and per one study the progression from Phase 2 to FDA Licensure occurs in under 10 years for only 10% of vaccines.<sup>4</sup> In the case of COVID-19 the vaccine was developed quickly; however, before its creation there were many months (close to a year) that the only protection was through facemasks, social distancing, and Restriction of Movement (ROM). When these preventative measures fail, we are dependent on the body’s immune system and supportive therapies.

These supportive measures are primarily restricted to supplemental oxygen and mechanical ventilation. Unfortunately, most forward deployed military units do not have access to a significant amount of these resources. For instance, the typical ventilator carried by Special Operations medics is the Simplified Automated Ventilator-II (SAVE-II) which is designed to be fit into a small rucksack and manage combat casualties, not treat patients suffering from acute respiratory distress syndrome (ARDS). It was not until the COVID-19 pandemic that the parent company created the SAVE-II+ which was more readily able to support these patients and is currently listed under the umbrella Emergency Use Authorization for Ventilators by the U.S. Food and Drug Administration (FDA).<sup>5,6</sup> Despite these changes an independent review on ventilators published in CHEST Journal notes that the SAVE-II+ should not be used for critically ill patients with COVID-19.<sup>7</sup> An appropriate ventilator would not be available for these patients until they were transported to one of the few field hospitals or Critical Care Air Transport (CCAT) Teams with more appropriate equipment.

During political unrest, natural disaster, and a global pandemic, a nation's healthcare infrastructure is at risk of becoming overwhelmed. Due to the military's aptitude and training to operate in austere settings, as well as their ability to quickly deploy resources, they are often called upon in times of crisis to render medical assistance. Examples of this during the COVID-19 pandemic includes the deployment of the USNS Comfort to New York<sup>8</sup> and in the use of military field hospitals in communities throughout France.<sup>9,10</sup> In recent years, U.S. Armed Forces have deployed to support a disease-driven foreign humanitarian aid mission (Operation UNITED ASSISTANCE) in the West Africa Ebola epidemic of 2014-2015.<sup>11</sup> Military forces are expected to respond in support of the civilian population, both nationally and internationally.

The active duty military tends to be younger with fewer medical comorbidities than the general population, and therefore it is at a statistically decreased risk of severe COVID-19 infections requiring hospitalization. However, this "protective" factor is countered by their increased risk for disease transmission due to the lifestyle factors such as barracks living.<sup>12,13</sup>

The vastly different operating environments make it challenging to design a "one size fits all" guideline for pandemic preparedness. Standardized guidelines from leading healthcare organizations such as the CDC, World Health Organization (WHO), and the U.S. Defense Healthcare Agency (DHA) need to be tailored to a specific region's disease prevalence, as well as duties and responsibilities. The information and recommendations provided by these authors are no different. The authors found the following methods and protocols to have functioned well for COVID-19 in the operational setting across multiple theaters. We offer the following as practices with the caveat that a future pandemic will provide its own unique challenges and therefore one must tailor these recommendations to the contemporary situation. Due to the

ever-changing operational environment, we have separated many of our recommendations into a "Good, Better, Best" format in order to provide options to future deployed units.

## METHODS

### The "Bubble Philosophy"

"The theory that a healthy force which has been effectively screened for disease and isolated from the rest of the population may remain healthy and unaffected so long as the protected environment is not breached."

This concept is a simplification of the fact that infectious disease requires transmission from host-to-host. It serves as a tool to define social distancing to nonmedical personnel and control who may travel or interact with whom. This allowed our members to better conceptualize the high level of restriction to pass in and out of the bubble compared to the relative freedom of movement within it. These bubbles may exist by unit, section, or by shift if operating on a 24-hour workday. In the event of an outbreak within one bubble risk would be mitigated to the adjacent bubbles (See Fig. 1).

The downside is that a "perfect" bubble is practically impossible and will have severe impact on operational capacity. In this case we offer a few considerations:

1. Who has the authority to approve breaks in the bubble?
  - a. Recommendation: Each section will argue that their work is important to the mission (and perhaps rightfully so), however not all requests should be honored. The unit Commander or close equivalent who understands the operational needs of the unit should make these decisions.
2. How do outsiders enter the bubble? (This may depend on short- versus long-term visitors)

#### Good

- Symptom screening questionnaire
- Vital signs check (temperature, pulse oximetry)
- Personal Protective Equipment (PPE) precautions

#### Better

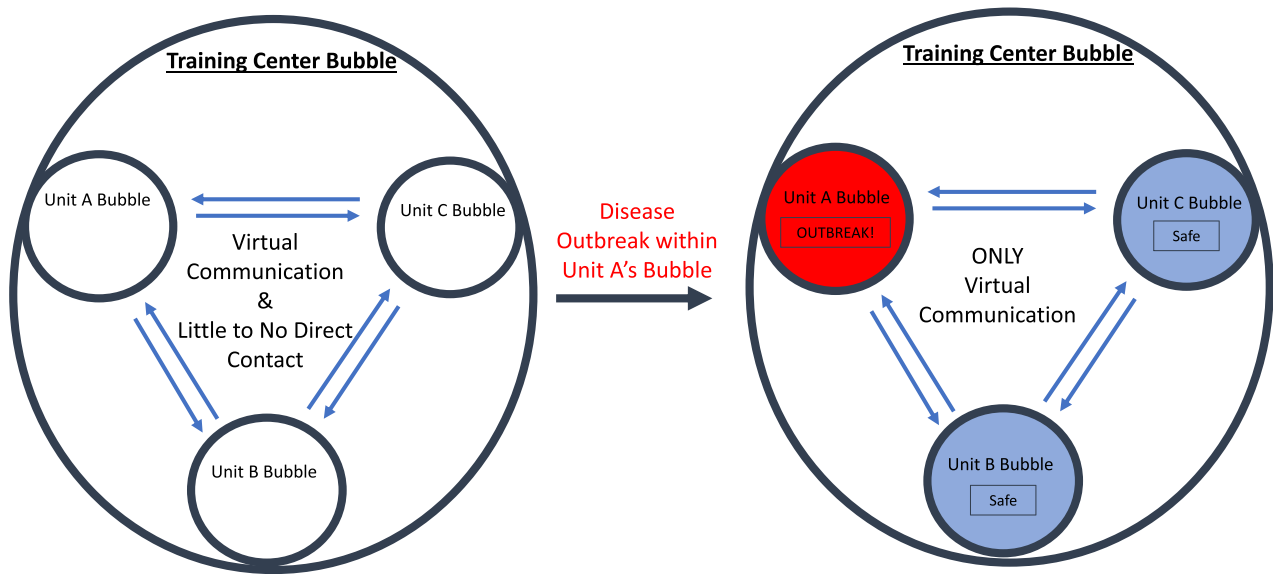
- Visitors are restricted from interaction with unit personnel.

#### Best

- Visitors contained in their own bubble on a ROM (14 days in the case of COVID-19). After this period, they may interact with the rest of unit staff.

### Tiered Force Protection Measures

In our experience developing a tiered system of force protection measures was an effective way of adjusting the unit's posture depending on the local risk. This allowed for increased operations while the risk from the pandemic was low, versus a quick increase in restrictions when there was a local outbreak.



**FIGURE 1.** Example of how the “Bubble Philosophy” may be utilized in a training environment to allow for continued training during a pandemic.

**Continuing the Mission in a Pandemic—How to Safely Interact with the Host Nation**

In military operations our armed forces often work closely with a host nation’s force. At the initial onset of a pandemic, it would be wise to halt all such activities and, if needed, tactfully withdraw any embedded forces. However, as the pandemic progresses to a “new normal”, so must interactions with the host nation. For this section the “Good, Better, Best” approach was directed at protecting to the force and not rapport with the host nation. In some instances, rapport with the host nation may take precedence over some force protection measures, but these situations should be weighed carefully.

Good

- Hand hygiene and facemask use.<sup>14</sup>
- Social distancing greater than 6 ft.
- Outdoor meetings whenever possible.
- Train your partner force on symptom identification, quarantine procedures and treatment.

Better

- Issue advanced PPE N95 Respirator and Powered Air-Purifying Respirator (N95 or PAPRs) to members of the unit who will have increased face-to-face interaction.
- Minimize the number of liaisons with the host nation force and consider keeping them in their own bubble.

Best

- Virtual communication
- Divided meeting space to provide a location for virtual meetings in proximity of one another.
  - Two separate rooms linked via non-secure and secure communication. Potentially divided by glass/plexiglass to help personalize the encounter.

- Observation of host nation force training via organic Unmanned Aerial Systems (UAS)

“Side Note: Do what you can to avoid the message that you are protecting yourself and not the host nation forces. We recommend implementing these changes with the message that they will protect both forces.”

**Dealing with Limited Medical Resources**

Medical resources available to deployed units vary greatly depending on the theater and are classically focused on treating trauma patients, rather than respiratory casualties.

Good

- Train the staff you have: Refreshers on respiratory care, critical care, available equipment.
- Request further support from outside the region, both active duty and reserve forces (keep in mind timelines to fill this request).
- Consolidate outstations to a single location. Allows for force protection and unites the medical staff in the event of a critically ill patient requiring 24/7 care.

Better

- Forward Surgical Teams (FSTs) already in your theater: These surgical teams typically have a staff of 5-15 members at a baseline and include a General Surgeon, Orthopedic Surgeon, Anesthesia Provider, Critical Care or Emergency Medicine Nurse, and Surgical Technician. Although still focused on trauma they provide a high level of knowledge and medical logistical support.

Best

- Recommend development of deployable critical care quick response teams: Experience in critical care, pulmonary medicine, infectious disease, and epidemiology. Standard equipment would include ventilators, advanced PPE, and lab testing capabilities. These teams would be stationed at regional support areas to be deployed as needed.

### Dealing with Limited Logistical Support

Much of a unit's medical equipment is brought with them. For example, one of our units only had thirty N95 masks available for a total staff of 150 personnel at the onset of the pandemic. Due to the worldwide PPE shortage, it took months for a resupply, which required mitigating strategies.

### PPE Options for Respiratory Protection

Good:

- Military gas masks—A theory developed by an allied unit while deployed. However, this strategy was used by Naval Medical Center Camp Lejeune and the USNS Comfort in early 2020 when no N95 masks were available. The French Military also studied the use of gas masks as a possibility for surgeons for tracheostomy procedures.<sup>15</sup>
  - Cons: Require further investigation to determine effectiveness at filtering viral particles. Also, the supply of canisters at a given location needs to be taken into consideration. While there is usually a large supply of these on Marine Corps bases, they may be in short supply in forward deployed areas.
  - Pros: Reusable, full face protection, able to clean
- Cloth Masks—community use only, cotton is recommended, wash daily.<sup>16</sup> This should be considered a last option as cloth masks offer the least amount of protection.
- Surgical Masks—Superior to cloth, still minimal filtration, do not maintain integrity with washing.<sup>16</sup>

Better:

Rotate N95 Masks

- Assign five masks per medical provider and rotate through each using one mask per day over a period of 5 days.<sup>17,18</sup> This recommendation is based on the 72-hour expected survival time of SARS-CoV-2. Discard each mask after it has been used for a total of five days unless the manufacture recommends otherwise. This method would allow for five masks to be stretch over 25 days.

Clean the N95 masks which you have

- As per an article from the Journal of Emergency Medicine in April 2020<sup>17</sup> we have found some options to

heat, steam and boil N95 masks. However, based on the likely non-standardized heating methods found in the deployed setting we do not recommend these methods except as a last resort.

Best:

- Dedicated pandemic response PPE Kit with PPE, vital signs monitoring equipment, viral filters for portable ventilators and sanitization materials. In developing your PPE kit, we recommend consulting several prominent organizations that have provided their recommendations on the topic to include the Infectious Diseases Society of America and the CDC.<sup>19</sup>

Another specific example noted in the early pandemic period was the decreased availability of isolation gowns. In these circumstances consider Mission Oriented Protective Posture (MOPP) gear:

- Mission Oriented Protective Posture (MOPP) Gear (or equivalent gear designed for chemical, biological, radiological and nuclear (CBRN) hazards)—Deployment requirement for most units and can be reused and cleaned with either bleach or ultraviolet (UV) light. Important to mention that comfort in this equipment will be drastically less than the breathable hospital gowns typically used.

### Thoughts Regarding Quarantine Facilities

Virtual Communication

- Upon entry to ROM issue patients with vital signs equipment and instruct on their use. Provider will conduct checks on the patient virtually, thereby decreasing the use of PPE unless in-person evaluation is warranted.

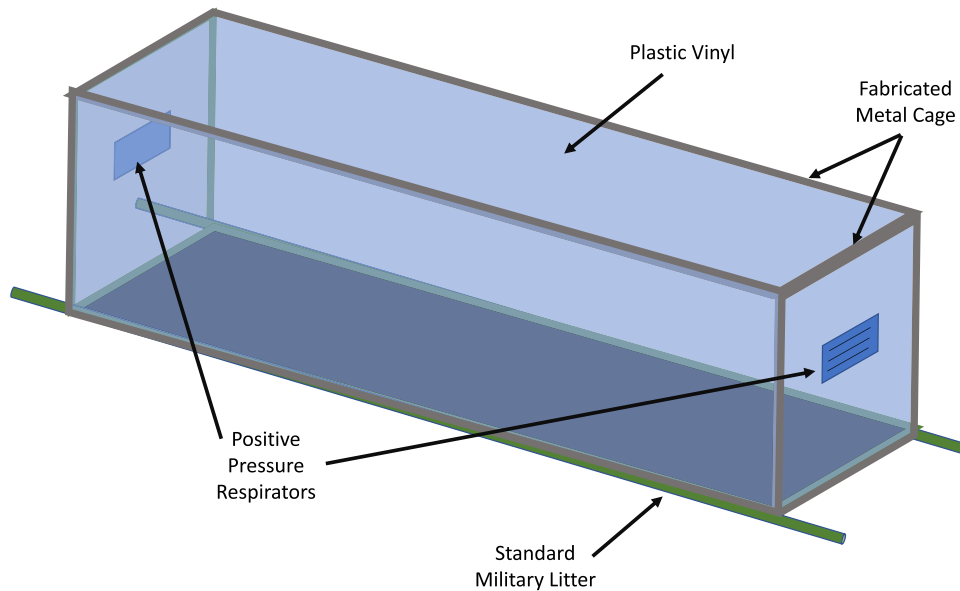
Base Defense

- Staff in ROM require their own base defense plan from a hostile attack while also maintaining separation from the rest of the unit.

### Other Things to Consider

#### MEDEVAC assets may be unwilling or unable to transport infectious disease patients

Maintain a relationship with your local Medical Evacuation (MEDEVAC) asset and their policies for transportation of infected individuals. In a proactive step, one of our units worked with their local fabrication engineers to develop a "Quarantine Litter" (See Fig. 2). A metal frame was constructed surrounding a standard military litter. This then allowed a clear vinyl fabric to fully encase both the litter and patient. On either end of the device positive pressure respirators were installed. Although this was only a prototype and did not undergo in-depth testing it still offered a potential option.



**FIGURE 2.** Prototype model for “Quarantine Litter” developed by one of our deployed units in order to transport COVID-19 patients.

### Utilize your chemical, biological, radiological or nuclear (CBRN) staff

Chemical, biological, radiological or nuclear staff is highly trained in the development of decontamination and quarantine facilities. When developing and staffing your facilities we recommend taking advantage of this expertise.

### Avoid tunnel vision

Although this is common knowledge, we felt that this was an important enough of a lesson that it could use a reminder. Remember to keep your differential diagnosis broad instead of assuming all symptoms point to the pandemic’s pathogen. The influenza and COVID-19 viruses have very similar clinical presentations, but very different therapeutic options.

### Don’t forget to maintain rapport with your host nation

In any pandemic a host nation is likely suffering from limited medical resources and will look to your forces for support. These situations can also be used to continue to build rapport and show dedication. A caveat to this is that your own force protection remains paramount. However, the presentation of a decision to protect your own force should be tailored in a way to preserve this relationship. These situations can lead to a variety of bioethical questions, but what clinicians must remember is that one must also practice safely and protect their own health. By protecting our own health, we are ensuring that future patients will receive care.<sup>20</sup> Furthermore, to continue counterterrorism efforts in foreign countries, we must maintain the health of our force.

*Vaccine education.* As mentioned before, vaccine development is crucial in combating viral infections. Rapid progress during an outbreak is not unique and has been highlighted in

the H1N1 pandemic in 2009. The difference with COVID-19 vaccine development was that 30 times more vaccine developers were involved in the effort.<sup>21</sup> This allowed the development of the SARS-CoV-2 vaccine to be an unprecedented feat of speed and coordinated effort; however, this speed has induced skepticism regarding its safety in some service members. As healthcare providers, we must be proactive and persistent with addressing vaccine concerns. In the case of COVID-19 there were at least two core factors to leverage. Firstly, scientific collaboration and international funding for this effort is unparalleled in history. Secondly, the high transmission rate and relatively low mortality yielded a large cohort of volunteers to test vaccine efficacy. Both factors helped expedite clinical trials.

At the time of this publication, the vaccine has become mandatory for all active duty personnel. This requirement has been put in place given the proven safety of the vaccine and to maintain the medical readiness of combat forces. The vaccination requirement is not a new concept and dates to 1777 when General Washington mandated the inoculation of smallpox throughout the entire force of Continental Regulars.<sup>22</sup> The vaccination of our forces is arguably the best intervention to avoid medical casualties from the COVID-19 virus.

### CONCLUSIONS

The COVID-19 pandemic impacted every unit deployed worldwide. Many adjoining units suffered large outbreaks hindering or halting operations. Using the above methods, our units were able to maintain full operational capacity, and one unit experienced zero organic cases of the disease.

Although the COVID-19 pandemic has not ended, the medical and Special Operations Forces communities are responsible for improving current methods and protocols.



It has revealed multiple areas of weakness in the medical capabilities of non-trauma patients, especially in the deployed setting.

We must also consider what impact a pandemic has on local medical infrastructure. If dependent on host nation resources, we need to immediately develop alternative options for when these resources become overwhelmed. As an example, the rapid deployment of critical physicians and nurses has proven difficult during this pandemic as Medical Treatment Facilities in the USA are also in need of these staff. The pandemic has proven how overwhelmed supply chains can quickly become for basic medical necessities like gloves and masks. This fact often complicates situations where deploying medical units are expected to be better equipped with required PPE and supplies.

As always, military forces operating in austere environments should share experiences with improvised methods. Specifically, in a pandemic response understanding appropriate methods of sanitization and air filtering capabilities. And finally, servicemembers need to remain educated on the benefits of receiving a vaccine to increase the distribution, prevent transmission and serious disease within our force.

Force health protection should always remain a high priority. However, we cannot forget the mission or our host nation. All rapport previously built may be easily ruined if there is any sense of abandonment.

We acknowledge that many of these recommendations have come from our own experience and that in the event of a future pandemic, the pathogen and deployed setting may be completely different than what the authors experienced. We hope that this article encourages dialogue and welcome any response or opinions regarding our methods.

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## CONFLICT OF INTEREST STATEMENT

None declared.

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