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Practice Forum

Converting an Inpatient Nursing Unit to a Pandemic-Response Unit: Lessons Learned

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A B S T R A C T

The University of California, San Francisco (UCSF) Hospital Epidemiology and Infection Prevention and the Department of Nursing used lessons-learned during COVID-19 as a foundation to create a framework to be used as a guide for converting an inpatient unit to a pandemic-response unit. This article provides details of this framework and other lessons learned that can be applied to other pandemic pathogens.

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The quick spread of COVID-19 and subsequent patient hospital admissions required hospitals across the world to quickly adapt and pivot to provide care safely and adequately. As the initial COVID-19 surge approached, the University of California, San Francisco (UCSF) Medical Center was among the institutions that started to quickly formulate plans to care for these patients and through this journey, learned many elements that provided guidance for future surges and provided structure for responses to future pandemics. One of these lessons, and a much-needed part of our overall plan of care, was the conversion of an inpatient nursing unit to a unit solely dedicated to COVID-19 care. Through an interdisciplinary approach, led by the Infection Prevention Department, UCSF Medical Center was successful in planning, implementing, and sustaining the care for COVID-19 patients within a converted inpatient unit. The result of this work was formulated into a framework that helped provide visualization, organization, and communication around some of the key elements that are needed to successfully convert a unit in this manner. This article provides a summary of the lessons the teams learned and provides a guide for converting an inpatient unit to a pandemic-response unit.

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The UCSF Medical Center response started from the time COVID-19 was recognized as having potential for pandemic spread. First, leadership weighed the risks and benefits of creating specialized unit(s) to care for the pathogen versus widespread training of all nursing units. Based on the highly contagious nature of COVID-19, the team opted to transform an inpatient medicine unit into a COVID-19 specific unit to condense resources, focus training, and minimize transmission. An interdisciplinary team was quickly assembled to analyze the needs of this unit. Physical and process changes were discussed early (such as HEPA Filters and negative air flow) to best limit the pathogen. Engagement of direct care clinicians was also critical in the development of standards of care and strict isolation procedures.

As lessons were learned, the creation of a structure for controlling exposures was key in maintaining staff and patient safety. The team utilized the CDC's Hierarchy of Controls¹ to summarize the lessons learned and to visually present which elements were the most effective at creating safety. This hierarchy will be utilized to guide the team in future pandemic responses and will be one of the first considerations when the need arises. See [Figure 1](#).

As noted, the interdisciplinary approach was essential in achieving successful pandemic response planning. The Infection Prevention team created a framework that highlighted the various interdisciplinary considerations that were learned from the lived experience of going through this process. See [Figure 2](#). Given the important nature of the

Considerations in Pandemic Response Unit Planning: Hierarchy of Controls

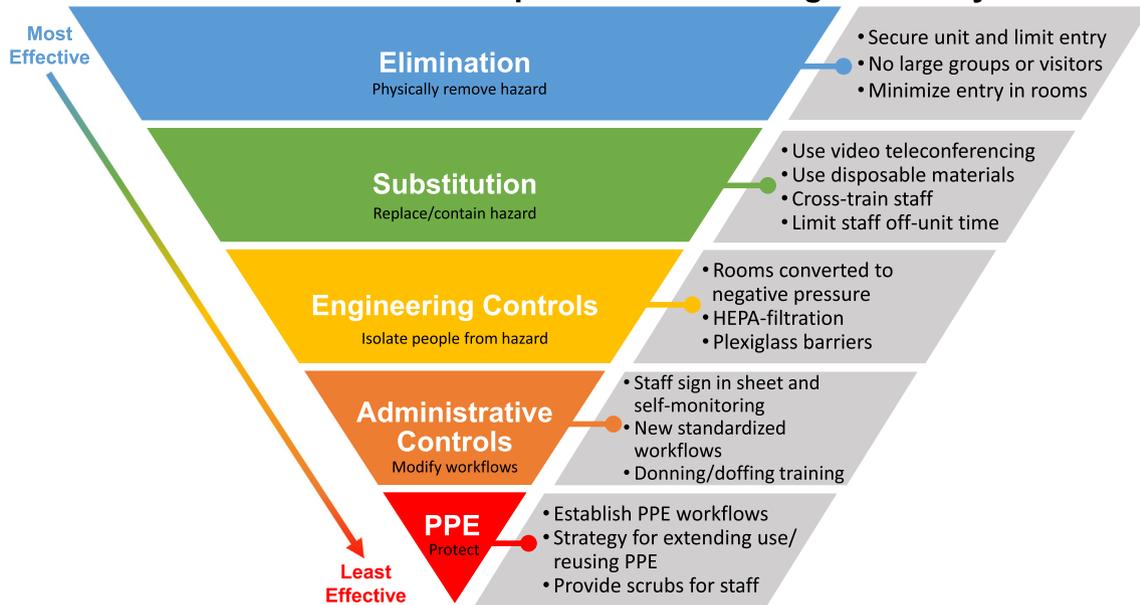


Fig 1. Hierarchy of Controls as pertains to establishing a pandemic-response unit. Modified by UCSF Infection Prevention (2021).¹

elements within this framework, a summary of each section below provides guidance based upon the experiences of each of the teams.

INFECTION PREVENTION

The Infection Prevention team was at the core of pandemic policy and procedure creation. The Infection Prevention team helped determine the overall management approaches for COVID-19 admitted patients from the initial presentation to the hospital, through admission orders and the individual patient assessment of readiness for discharge. The Infection Prevention team in

collaboration with the Department of Medicine Division of Infectious Diseases, provided guidance to the care teams regarding treatment best practices, isolation requirements and associated Personal Protective Equipment (PPE). This team also created signage, checklists, and tip sheets for quick dissemination. Other important activities included collaborating on workflows with direct care teams, staff training activities, rounding for potential safety concerns, and ensuring protocols are in place and being followed. Redeployed workers, including nurses and other professionals across the health system, were utilized in various roles to support the Infection Prevention team, including the creation of Infection Prevention Observers and PPE Monitor roles. Infection Prevention also played an important role in supporting and advising Occupational Health on screening and exposure follow-up.

NURSING

Nursing input and support was key in converting and maintaining a successful unit. The involvement of direct care nurses in the decisions regarding staffing ratios and unit workflows helped ensure safety, success, and satisfaction among nursing staff. Staffing the isolation unit was a high priority for hospital. All nursing units also needed to develop alternative staffing models in case the pandemic impacted hospital staffing (eg, numerous sick calls).

Training of nursing staff before the unit opened was critical. Infection Prevention, Environmental Health and Safety (EH&S), and Nursing Professional Development assisted in the unit training. Training included a multi-modal approach consisting of eLearnings, a train-the-trainer model, simulation, and standard work support materials. Mandatory training for all unit staff included donning/doffing and N95 fit testing/PAPR training. Initially, when the unit opened, trained observers were stationed on the unit to assist and ensure safe donning and doffing practices.

Nursing workflows were established early and refined throughout the pandemic. Patient rooms were set up identically with tables, carts, emergency equipment and isolation caddies all stocked with the same supplies. Visual reminders on standard workflows were posted inside and outside room. A room-entry log was posted outside

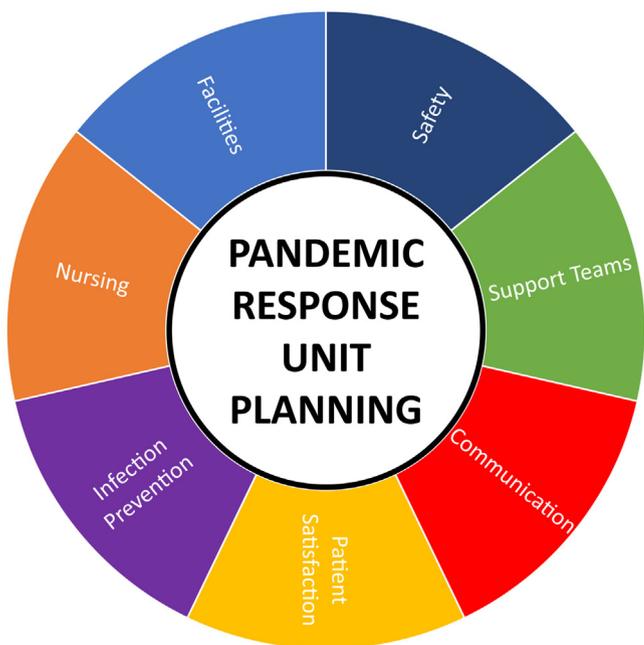


Fig 2. Framework for multi-disciplinary preparation of the pandemic-response unit. Created by UCSF Infection Prevention (2021).²

each room for staff to complete before entry, which allowed for any follow ups needed from Occupational Health. Centralized PPE supply carts and centralized PAPR locations were also established. Other departments, such as the Rapid Response Team, Transport, and Radiology had their own supply carts and gurneys stored on the unit to be ready for urgent patient needs.

The Nursing staff absorbed tasks that were typically done by other departments. This was done to limit room entry only to well-trained staff and to conserve PPE (eg, blood draws, food tray delivery). In addition, nursing leadership also provided staff amenities (scrubs, access to showers, meals, and snacks) to limit the need for staff to leave the unit to minimize the possible transmission of the pathogen through the hospital.

Due to the staffing model and need for additional nursing interventions, the use of float and/or temporary staff (eg, travel nurses) was required. After the initial unit training, just-in-time training was made available for the float and/or temporary staff working on the unit. The unit's Staff Engagement Council developed a "tip sheet" for temporary staff that highlighted key unique workflows. Nursing leaders provided ongoing education and highlighted important updates during the daily huddles and Nursing-specific documents were housed in a central repository that all staff had access to (eg, Nursing intranet website).

Clustering care and coordinating room entry with others healthcare team members (eg, Physicians, Patient Care Assistants) was essential to optimize the time spent in patient rooms. All patient rooms were equipped with video teleconferencing so nurses and physicians could quickly communicate and coordinate with the patient prior to room entry but did not replace required in-person provider/specialist assessments. The video teleconferencing was also used by the patients and their families to stay connected, as there were visitor restrictions throughout the pandemic.

Initially, a physician was dedicated to the unit 24/7 due to the potential for rapid changes in patient conditions allowing for timely collaboration with nurses to optimize care. Nursing partnered with clinical researchers on investigational studies and the research teams ensured that the staff were sufficiently educated on the protocols and purpose of each study. This partnership built trust with the patients since the nurses could speak about the unit's involvement in ongoing research to understand and treat this pathogen.

Special issues for Nursing to consider included:

- Limiting fomite transmission:
 - Nurses created workflows for in-room care supplies to minimize transmission. This included workflows around lab specimen collection, medication administration, and other workflows that required supplies that typically went in and out of patient rooms (eg, glucometer, inhalers). The nurses hung a plastic bag on the outside of the patient's door and developed a workflow to place specimens and medication supplies into the bag prior to leaving the room so they would be able to handle them after exiting.
- Meal tray delivery and pickup
 - Nutrition and Food Services delivered meals to a designated area at specific times. Staff clustered care to ensure timely delivery of meals.
- Fans
 - If personal fans are being used for patient comfort, alternate cooling strategies may be required to maintain negative pressure.

- Fans are challenging if negative pressure is required, as it may alter the room airflow.

- Breastfeeding mothers
 - Clinical decisions needed regarding safety of breastfeeding specific to the pathogen.
 - Workflows were developed around collection, storage, and transport of breastmilk including the need to have a separate refrigerator for storage.

FACILITIES

Early guidance from local, state, and national health experts helped inform the isolation precautions needed. The COVID-19 pathogen required respiratory/airborne isolation be used as a first measure of defense. Hospital and Nursing leaders collaborated with Facilities in the decision to convert the entire unit to negative pressure.

The choice to convert an entire unit took into consideration both the benefits and downsides of doing so. The team considered various factors that contribute to the airflow of individual rooms and whole units. In some areas, there was only a portion of the unit could be converted, making it necessary was to add air scrubbers and HEPA filtration to achieve the appropriate airflow. The downside of these devices was that they were found be loud and took up valuable floor space. In the end, we found converting one unit facilitated patient placement and cohorting of patients onto one unit rather than multiple units and helped to keep resources centralized.

The Facilities and Engineering team converted the 28-patient rooms unit to negative pressure. Daily smoke testing and reporting was critical to ensure compliance with regulations to ensure safety. In addition to maintaining proper air flow, Facilities prioritized work related issues on this unit, and stayed updated on changes in recommendations for managing this pathogen.

SAFETY

The Safety Department includes the Environmental Health and Safety (EH&S) and Security teams, each of which were integral in establishing the pandemic-response unit. EH&S provided N95 fit testing clinics and PAPR training (train-the-trainer). The Safety Department provided their expertise in selecting PPE and suggesting alternative solutions when PPE was in short supply. Due to the high volume of PPE and the difficulty obtaining masks, EH&S had to develop an appropriate means of disinfection and storage of PPE. This included the disinfection of eye protection, extended-use or reuse of N95s, and converting between washable and disposable gown depending on supply availability. EH&S collaborated with end users and hospital leadership to ensure the benefits of reusing PPE outweigh the risks.

Security played a large role in limiting non-essential personnel from accessing the pandemic-response unit. The Security team first established the path of travel workflow for transporting patients to the designated unit. They stationed personnel outside the isolation unit to limit entry. Until more was known about the pathogen, hospital leadership decided to keep the unit locked. This meant no visitors, no large rounding teams, and only trained staff with badge access were granted access onto the unit. Security maintained the badge access permissions.

An additional challenge that our Security team dealt with was outbreaks in the local prison systems. The forensic patients were accompanied by Correctional Officers (CO). Security managed the testing of each CO upon arrival to the hospital and provided training on PPE and distancing requirements.

Support teams

There were many support teams involved in the creation and maintenance of the pandemic response unit. One of the essential teams was Environmental Services (EVS.) They had a major supporting role in ensuring proper cleaning and disinfection of spaces to limit spread of the pandemic pathogen. EVS leadership identified and trained designated staff on PPE donning and doffing. Regular EVS workflows required modification to reduce exposure time in the patient room, including partnering with nursing to assist with garbage and linen removal from the patient room. During times of supply shortages, special procedures were created with collaboration of the Infection Prevention team to reduce waste essential items, while minimizing the possibility of cross-contamination of new patients admitted to the room.

COMMUNICATION

The Hospital Leadership utilized Incident Command standards of practice to align decisions, manage escalations, and dissemination strategies. Members of this team included key stakeholder leaders (eg, physicians, nursing, Infection Prevention, EH&S, Security, Patient & Family Advisory Council). Pandemic response unit leadership provided regular updates to Incident Command on the number of admitted COVID-19 positive patients. These volumes determined operational workflows that impacted the entire medical center. For example, when the pandemic response unit was full, communication triggered the tiered response plan for admitting patients to other areas within the medical center. This alignment in the organization helped with bringing a clarity and predictability during uncertain time. Visitor restrictions were also tied to the tiered response plan. Communication to patient's families and loved ones was done in consultation with the Patient and Family Advisory Council.

PATIENT SATISFACTION

While staff and patient safety are paramount, leadership and unit staff kept patient comfort and satisfaction as a priority. Patients were scared and confused, especially early in the pandemic. It was important to help patient's feel calm and safe despite being physically and emotionally isolated. Upon arrival, staff set the expectations of how care would be clustered, the importance of remaining in their rooms, mealtimes, and the use of video telecommunication for ease of connecting. Activities were provided to patients to keep mental and physical stimulation, such as stationary bikes, word puzzles, activity books, music therapy via video, etc.

CONCLUSION

Standardization and communication were crucial in maintaining safety and consistency, especially for physicians and nurses on the front line. This unit did not have any patient to staff transmission of COVID – 19 due to the highly reliable processes that were put in place. These best practices create a framework for future pandemics. As we continue to learn from this and future emerging pathogens, this framework can be utilized as a foundational starting point and modified to fit the next challenge.

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