

ORIGINAL RESEARCH

Transformation of observation unit to address higher acuity patients and increase bed capacity during a Covid-19 surge

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ABSTRACT

A Magnet[®]-designated acute care community hospital in Southeast Texas experienced a COVID-19 surge during the summer of 2020 that increased the acuity of admitted patients. The critical care, intermediate care, and COVID-19 units were consistently at capacity. These beds were no longer considered an available resource, but their need continued to grow. As hospital acuity increased, patients were placed in medical or surgical (medsurg) units when historically they may have been placed in a critical care unit. Hospital leadership determined that more space was needed to cohort COVID-19 patients, specifically those on high-flow oxygen. Given the decrease in observation status patients, an existing observation unit was converted into a high-flow oxygen unit using team nursing and personal protective equipment (PPE) zones. The successful transformation of the observation unit provided a guide on the cohorting of patients and team nursing approach for any future disease surges.

Key Words: COVID-19, Cohorting, Team nursing, High-flow oxygen, Nurse-driven innovation

1. INTRODUCTION

The Southeast region of the United States experienced several severe acute respiratory syndrome coronavirus (SARS-CoV-2) surges prior to implementing successful vaccines. During the summer of 2020, a 230-inpatient bed Magnet[®]-designated acute care community hospital in Southeast Texas experienced its worst surge to date. This was the second SARS-CoV-2 surge experienced in the area but the first occasion in which higher patient volumes and higher acuity patients presented to the hospital. From March 2020 through the end of May 2020, the hospital averaged less than two positive SARS-CoV-2 test results per day. Positive SARS-CoV-2 tests began to increase on June 13, 2020, with 14 positive test results in one day. The Hospital Incident Command Team,

consisting of senior and nursing leadership, began cohorting positive coronavirus 2019 (COVID-19) patients within the critical care unit, intermediate care unit, and on a 26-bed medical unit with fully private rooms. As the surge continued, physicians triaged patients due to the increased acuity of those requiring inpatient services. Physicians were required to rethink critical care patient criteria as overall hospital-wide patient acuity increased beyond the bed capacity of the critical care and intermediate care units. Consequently, this increased the overall acuity of patients being cared for on medical or surgical (medsurg) units because many of those patients had historically been placed in critical care beds.

In early June 2020, a COVID-19 patient admitted to a medsurg unit had a cardiac arrest episode resulting in the initial

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tion of the code blue team. Appropriate interventions were given during this event; however, the patient still deteriorated related to the disease process. This rapid deterioration increased staff awareness of the need for a higher level of care. Following this event, there were eight code blue occurrences on the non-COVID-19 medurg units in June 2020, a marked increase from the hospital's average of five per month prior to this surge. The hospital reached a peak for code blue occurrences at the beginning of July 2020. The increase in patient volume requiring a higher level of care prompted hospital leadership to reexamine the cohorting of COVID-19 patients.

Higher acuity patients could not be transferred to other facilities as the other area hospitals were also at critical care capacity. During this time, the entire state of Texas experienced bed capacity issues, and at one time, only 23% of statewide beds were open. There were times when critical care bed capacity was at zero in larger cities.^[1] July 11, 2020, marked the highest inpatient COVID-19 patient census for this hospital, with 91 patients. To combat the increased acuity and the need for critical care beds, the Hospital Incident Command team determined that an additional unit would be transformed to cohort more COVID-19 patients.

1.1 Cohorting patients

Cohorting patients for improved outcomes is a commonly used strategy in nursing care. Cohorting may lead to improved outcomes, including increased compliance with standards to prevent the spreading of contagious diseases, the monitoring of patients' status, and the perceptions of staff members as to increased care and patient safety.^[2] Cohorting has been used to decrease length-of-stay and in-hospital transmission in influenza patients.^[3] An Irish hospital practiced cohorting during the 2017/2018 influenza season. Patients cohorted into a "flu ward" led to a significant reduction in the use of antibiotics and length-of-stay and reduced influenza transmission. Furthermore, this practice provided real-time education regarding vaccines, hand hygiene, and other infection control practices to the target population.^[3] Based on these past experiences, as well as the recent efforts of an Italian hospital to cohort COVID-19 patients,^[4] the Hospital Incident Command partnered with the hospital's departments of Education and Infection Prevention to implement the Centers for Disease Control and Prevention (CDC)-approved guidelines for cohorting this patient population.^[5,6] These efforts were implemented to address both quality of care for patients and staff safety.

Prior to this surge, the current cohorting system of employing the single medical unit, critical care, and intermediate care units was sufficient for patient care and staff safety. As

the surge progressed, the cohorted beds reached capacity and additional beds were needed. Following the increasing SARS-CoV-2-positive census, nursing leadership, physician leadership, pulmonologists, and the Infection Prevention department held a series of meetings resulting in the plan to convert an underutilized unit into an area for cohorting COVID-19 patients. The use of high-flow oxygen through nasal cannula had been shown to significantly decrease the use of mechanical ventilation support for COVID-19 patients.^[7] This new unit would be for patients who required high-flow oxygen or BiPap with acuity deemed too high for traditional medurg units. The objective of this unit was to decrease the need for critical care beds by reducing the need for mechanical ventilation support.

2. METHODS

2.1 Location of COVID-19 high-flow oxygen unit

Due to the increased inpatient COVID-19 census, observation status patient admissions declined, leading to the temporary closure of observation beds, along with pausing many other outpatient service lines. Because the observation unit, its nurses, and single-bed rooms were vastly underutilized, it was deemed an ideal location for the COVID-19 high-flow oxygen unit. On July 9, 2020, hospital leadership finalized the details to cohort COVID-19 patients on high-flow oxygen and BiPap to this unit beginning July 13, 2020. The high-flow oxygen unit was called the OBSCU (Observation COVID Unit).

The unique features of the observation unit made it an ideal location to cohort these patients. The unit was already equipped with transparent breakaway doors, which aided in monitoring patients for signs of rapid deterioration. The unit was not connected to any other medurg unit and thus could be isolated to prevent the risk of spreading SARS-CoV-2 to other medurg patients. The unit's design is u-shaped, allowing for a unique patient flow plan to provide safe and efficient care to these patients. This unique design allowed zoning stations to be used to prevent cross-contamination and the implementation of donning and doffing stations (see Figure 1).

2.2 Staffing the unit

Once the decision was made to create the OBSCU, Hospital Incident Command and nursing leadership rapidly assembled stakeholders. The Chief Nursing Officer (CNO) and Associate Chief Nursing Officer (ACNO) met with pulmonologists. They established the leadership of the unit, a framework for staffing, and the criteria pulmonology would use to triage cohorted patients. Given the location of OBSCU, the nurse manager of the observation unit was an ideal

choice to be the nurse manager of this converted unit. The nurse manager had an extensive background in critical-care nursing as an emergency room nurse, flight nurse, licensed paramedic, an American Heart Association (AHA) instructor

for Advanced Cardiac Life Support (ACLS), Basic Life Support (BLS), Pediatric Advanced Life Support (PALS), and an Airway Management Facilitator, as well as experience in opening a new unit.

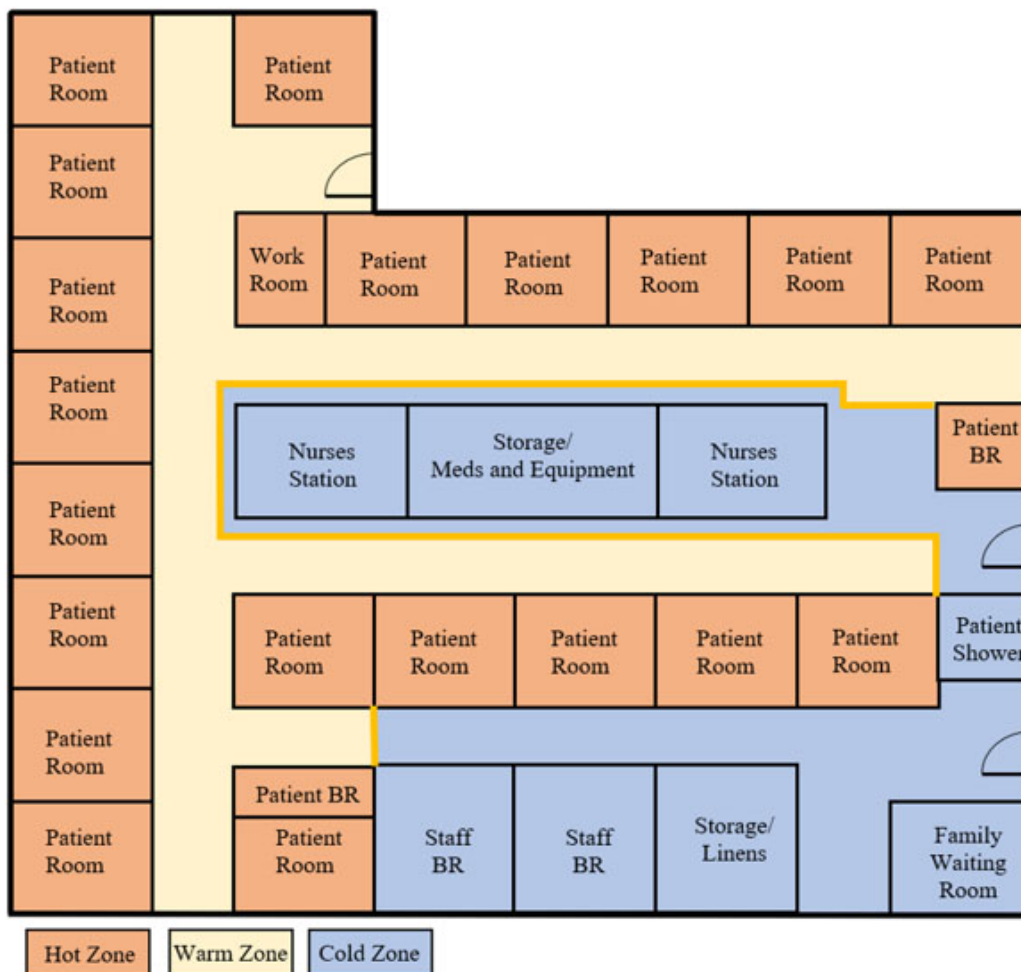


Figure 1. Layout of Observation Unit with yellow lines to mark zones

The nurse manager of the OBSCU was intentional with her staffing assignments and chose clinical nurses based on their areas of specialty and years of experience in the delivery of care to work alongside pre-operative nurses to care for high-flow oxygen acute care patients. The nurse manager and ACNO partnered with other stakeholders, including the director of Medical/Surgical Services, the director of Peri-Operative Services, and the Maternal Child and Neonatal Intensive Care Unit (NICU); they immediately selected a team of nurses prepared to work this OBSCU. Other clinical staff included two nurse runners and a third runner not required to be a nurse. The unit had a designated charge nurse who was not assigned patients and a unit administrator assistant. Under the leadership of the pulmonologist, who

triaged each patient seen in the OBSCU, two designated critical care nurse practitioners (NPs) worked as providers. In addition to the nursing care staff, the care collaboration included designated patient care assistants (PCA), respiratory therapists, phlebotomists, and physical/occupational therapists. Other staff not involved in direct patient care were also designated to this unit. The patient-to-nurse ratio was 3:1, with a patient-to-ancillary staff ratio of 9:1. The two NPs provided 12-hour day shift care on a rotation schedule. Some night shifts with 12-hour NP coverage were designated for the OBSCU only, but this was not consistent given staffing needs across the hospital, and the unit was able to use the night shift hospital-wide NPs as needed. If needed, critical care nurses also floated to the OBSCU.

2.3 Creation of unit

Reconfiguring the observation unit began on July 10, 2020, with the departments of Infection Prevention and Facilities partnering to create an environment that would foster not only quality of care for patients but also optimize the safety of the staff. Three zones were created labeled hot, warm, and cold that determined which personal protective equipment (PPE) was needed to be safe. The hot zone was where there was the highest risk of spreading SARS-CoV-2. Patient rooms, therefore, were the hot zone, with all bedside care taking place there. Full PPE, including gowns and gloves, was always worn in this zone. Staff used either an N95 mask with a face shield, Halo Device with a face shield, or a Pureflo alone.

The warm zone was marked with yellow tape and consisted of the area six feet beyond patient room doors. Staff prepared to provide patient care in the warm zone and wore full PPE. Other warm zone activities included documentation of the performance of the initial cleaning of equipment. Drop zones were also located in the warm zone. These allowed for the passing of patient care items such as medication, supplies, equipment, and patient meals to staff working in the warm and hot zones, preventing cross-contamination of the entire unit. The warm zone was a physical barrier for staff providing care to prevent prolonged viral exposure from direct contact with COVID-19 patients. Staff only entered patient rooms to provide direct patient care and remained in the warm zone to complete any indirect patient care tasks. Peri-operative, observation, and med-surg nurses were primarily in the hot and warm zones. To help with the flow of patient care, the staff in the hot and warm zones remained dressed in full PPE, allowing for flexible movement from room to room while providing care. Staff were able to quickly respond to any patient care needs without having to don/doff PPE when entering or exiting rooms while in the hot and warm zones.

The cold zone was any area outside of the yellow-taped warm zone parameters and was considered the non-contaminated zone of the OBSCU. Staff designated to this cold zone acted as runners to prevent cross-contamination. NICU, maternal child, and peri-operative nurses with no med-surg or critical care background were primarily assigned to the cold zone. Any non-patient care areas and any closed-door areas without patients were considered cold zones. Cold zones also included the supply room, medication room, equipment room, and nutrition room. The second cleaning of equipment took place in the cold zone. OBSCU staff had to wear an N95 mask and face shield in the cold zone.

A team nursing approach has been applied internationally. A hospital in Spain specifically assigned more experienced

nurses in a critical care atmosphere to COVID-19 patients. In contrast, less experienced nurses worked in a “clean zone” to prevent exposure while providing quality care.^[8] Using examples like the one provided in the hospital in Spain, nurse runners in the OBSCU were responsible for bringing any needed supplies or equipment to the primary care nurses in the drop zones and retrieving any necessary medications. This approach required coordination with the pharmacy director to safely allow nurses to dispense medications for another nurse to administer. A medication transfer form was created to help document this medication exchange. To help prevent staff burnout, frequent breaks from PPE were encouraged. The staff would go to a designated donning/doffing station where a non-nurse runner would assist them in removing their PPE. The OBSCU also used non-nurse runners to restock supplies, assist with transfers of patients to the critical care unit, and if emergent tests were needed, which would not be able to be performed at the bedside. The non-nurse runners were trained PCAs with med-surg experience. All OBSCU staff were rotated to other patient care areas to be given a break from the high acuity atmosphere of the OBSCU in order to prevent burnout and mental fatigue.

If a non-trained OBSCU staff member came to the unit short-term, for example, to drop off or pick up supplies or equipment, they could enter the cold zone in a surgical mask. This non-trained OBSCU staff member had to follow the PPE standards should they prolong their stay beyond making a drop-off. An example of this policy was when a pharmacist making medication deliveries had to enter the unit. Time spent on the unit was limited for non-trained OBSCU staff. Efforts were made to have these non-trained staff be the staff who were consistently visiting the unit to reduce time spent away from patient care for the education of non-trained OBSCU staff members.

2.4 Education of staff

Given that the unit was staffed with a mixture of nurses from many specialty areas with a tremendously varied scope of experience and skills, it was vital to have uniform training for each OBSCU staff member. Initial training started on July 11, 2020, with the nurse manager hosting a session encompassing both shifts to maximize staff reach. This session served as an introductory meeting, informing staff about the changes and discussing the patient population to be admitted to the OBSCU. The training was also conducted in real-time at the beginning of each shift, including opening day. Prior to accepting any patients, all employees working the inaugural shift were trained by the nurse manager, nurse educator, infection preventionist, critical care NPs, respiratory therapists, and physical/occupational therapists. Training included

the nurse runners' process for assisting in the donning and doffing of reusable gowns, medication preparation, zone locations, transporting patients to and from the unit, cleaning of equipment, and supply gathering. Education on respiratory equipment was provided to the staff by respiratory therapy leads. An interdisciplinary team contributed to staff education.

Following the unit's opening, several in-services were completed in the first week to address lessons learned and overcome any initial barriers identified. There was also discussion of needed skills training, such as additional proning education and advanced critical care skills related to medications, equipment, and airway management. Many of the topics discussed during these sessions focused on critical care training due to the acuity of the patients and advancing the knowledge of the med-surg nurses.

A specialized code blue process was developed to ensure OBSCU staff could provide care for patients; this process also included specialized post-mortem care. All OBSCU nursing staff were ACLS certified and able to participate on the Code Blue Team. This training allowed staff to practice mock codes to increase competency related to the increased responsibility of taking care of higher acuity patients. The safety risk of staff members unfamiliar with OBSCU processes and zones coming into the unit was avoided unless deemed necessary to prevent further disease exposure and cross-contamination. Continuous education was provided during each shift change huddle for the duration of the unit, as there continued to be updates on best practices, especially regarding the treatment of COVID-19 patients dependent upon high-flow oxygen. To ensure shift-to-shift consistency, training was maintained by the nurse manager. The nurse manager completed one-on-one sessions with the charge nurses working on OBSCU. This train-the-trainers model allowed the charge nurses to provide shift-change education to all staff working each shift. The same charge nurses continued to work in their leadership role for the duration that the OBSCU was operational to ensure consistency in leadership.

2.5 Patient care

Pulmonologists were involved in each patient's consult to identify those needing to be transferred to the OBSCU. Patients admitted to the hospital who were on high-flow oxygen or BiPap but did not meet the criteria for critical care were admitted to the OBSCU. Barriers to patient care were identified and mitigated prior to the arrival of patients to the unit. Patients needing hemodialysis were unable to be accepted to the unit due to the inability to perform dialysis in OBSCU rooms. These patients could not be transported to the open area for traditional dialysis related to infection control

concerns. Patients who were not yet confirmed positive for SARS-CoV-2 were also unable to transfer to the OBSCU because all patients were treated as SARS-CoV-2-positive. If patients pending a positive SARS-CoV-2 test result had tested negative, they would have been incidentally exposed to SARS-CoV-2 if accepted to the unit.

The utilization of critical care and med-surg nurses through a team nursing approach in the OBSCU allowed for the acceptance of higher acuity patients. Patient acuity varied from those requiring high-flow oxygen, BiPap, or intubation. A critical care nurse or NP cared for patients requiring titratable cardiac medications while awaiting ICU-level placement. With the creation of the unit, the higher acuity patient care needs were considered for supplies and equipment. To ensure appropriate patient care, any intermediate or critical care supplies, equipment, and medications were stocked in the OBSCU to ensure appropriate patient care. This also included adding additional equipment such as code carts and respiratory supplies throughout the duration this unit was operational. Overall, the OBSCU was open from July 13, 2020, to August 15, 2020, when the number of COVID-19 patients subsided and the surge was over. During this timeframe, 79 patients were treated in the OBSCU.

3. RESULTS/NURSING IMPLICATIONS

Although the COVID-19 pandemic has continued as of the time of this publication, the surges of COVID-19 patients began to plateau in the months after August 2020. The actions taken by physician and nurse leadership at this hospital during the peak in July 2020 impacted the quality of care for patients. The transformation of the observation unit for cohorting high-flow oxygen patients showed success in providing quality treatment in a safe environment for patients and staff members. This first transformation of an established unit allowing for the cohorting of high-flow oxygen patients using team nursing set guidelines for future COVID-19 surges at this community hospital.

In addition to the unit's central location, other factors also contributed to the success of the OBSCU. The staff reported that having glass doors improved patient safety because they could always see patients and their monitors. Having two designated critical care NPs during the day allowed the unit to operate independently. Lessons were also learned during this process. Having designated 24-hour OBSCU NP provider coverage was requested by staff. Due to surge-induced staffing challenges, only some night shifts had NP coverage. Education materials were posted in all zones with clear instructions pertinent to those zones to keep staff informed and engaged. Constant training was provided to staff as new guidelines became available from the CDC. Nurses

received extensive training in patient care and cleaning instructions every shift, including signs, symptoms, and tip sheets. Given the purpose of the OBSCU, having private bathrooms and larger rooms that would have fully accommodated equipment would have been a plus, but at the time, such a unit was not available. Mounted cardiac monitors at the bedside with a centralized monitoring system located on OBSCU versus the hospital centralized monitor room would also have been ideal for NPs and providers. However, the staff successfully used bedside monitors and bedside commodes to compensate for these limitations. It was also determined that tablet devices would be connected directly to the bed to prevent the need for devices to travel back and forth. This allowed patients to video chat with their loved ones and watch television on demand while minimizing risks for cross-contamination.

Historically, team nursing was the original approach to care within the profession. The version of team nursing practiced in the OBSCU assigned the primary nurse in the hot and warm zones up to three patients and used nurse runners in the cold zones as assistants to ensure infection control measures were maintained. Initially, there were concerns about the increased responsibility of a higher number of patients per nurse. To combat this, the nursing ratio was maintained at one nurse with up to three patients to maintain safe delivery of care based on the acuity of the patient population. Overall, most nurses reported the benefits of team nursing to their leaders and believed in its positive effects, such as patient-centeredness, improved care, and improved teamwork.^[9] It has been shown that the use of single room approaches to nursing increased the usage of PPE,^[10] and the hot, warm, cold zones helped to save PPE when there were initial short-

age concerns. Additional equipment was also provided to assist in caring for these patients, including iPads, PureFlos, and Halos; training was also provided on these devices. Staff feedback was critical to prevent burnout, and chaplains frequently rounded to the break areas and cold zones to help with the emotional and spiritual needs of the staff.

4. CONCLUSION

This community hospital successfully transformed an observation unit to cohort COVID-19 patients on high-flow oxygen. This transformation relied upon a multidisciplinary team and nurses at all levels to make the physical changes to the space and provide quality care to COVID-19 patients. The foundation laid with this initial transformation enabled the hospital to continue to convert this unit and additional spaces into safe areas to cohort COVID-19 patients as the pandemic continued. The success of this unit's transformation was pivotal to ensuring seamless transitions during future surges. When more areas needed to be converted to increase bed capacity during the rise in 2021 of more virulent SARS-CoV-2 variants, including Delta and Omicron, staff were quick to mobilize and float to these areas with confidence in their leadership and teams. As future cohorting needs become present, the practices and lessons learned during this time will continue to be employed.

BIO STATEMENT

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CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest.

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