Standardizing the supply chain in nursing units in response to the COVID-19 pandemic

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Inventory management is an important component of a healthcare system and directly influences patient outcomes and financial performance. Periodic automatic replenishment (PAR) levels refer to the minimum and maximum quantity limits that are set for a certain item. Determining the accurate PAR levels is crucial to ensure that a sufficient amount of a product is available without having a surplus that could expire or go to waste.

Since the first four cases of “pneumonia of unknown etiology” in Wuhan, China, were reported on December 29, 2019, the COVID-19 pandemic has surged worldwide and posed countless dilemmas for healthcare systems. Hospital executives and supply chain leaders concur that the pandemic has created vulnerabilities in their organizations’ supply chains. In a survey of 100 hospital organizations in August 2021, 93% of respondents had attempted to address pandemic-induced shortcomings such as inadequate supply stockpiles, unreliable suppliers, poor visibility into inventory, and staff safety risks. The supply chain issues also represent “a key factor” in burnout and retention across US hospitals. A total of 43% of respondents said that hospitals lost nurses due to supply shortages or challenges. Some hospitals have started to resupply stockpiles and manage undependable suppliers; however, most hospitals haven’t executed permanent changes that will
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strengthen the supply chain. Developing a well-organized and proficient supply chain is mandatory in these uncertain and unpredictable times instigated by COVID-19.

Background
Healthcare systems often face supply chain challenges because different departments have separate inventories, distribution personnel, processes, buyers, and leadership, which frequently results in redundancy and waste. Varied approaches have been implemented in healthcare systems to consolidate the supply chain and reduce inventory. The lowest unit of measure (LUM) program provides a hospital with medical supplies in the LUM, specifically a unit or box, from the distributor. The distributor, instead of internal staff, arranges orders, which are then packaged and delivered to the designated department in the hospital. The LUM method often allows hospitals to decrease personnel and bulk inventory while generating more available space in previously used storage areas. The LUM process has reportedly been shown to reduce costs and increase efficiency for the ordering provider. In the era of COVID-19, it has been suggested that certain items such as N95 masks, surgical masks, and face shields should be placed on a LUM in a separate stockpile due to the inherent shortages of these items.

In the fall of 2019, a safety and engagement survey of assistant nurse managers and bedside staff at our institution identified supply issues as a source of ongoing dissatisfaction with work. A lack of standardization of supply organization across departments was observed with inadequate space to meet PAR levels. Supplies were kept in different locations on each unit, which made it challenging to find needed supplies in a timely manner. Additionally, supplies weren’t ordered properly due to inadequate organization.

In January 2020, our institution developed a supply chain management team that was tasked with analyzing the responses to the safety and engagement survey, with a specific focus on the needs of each unit, the inherent barriers, and the supplies that were needed and those that weren’t. Our healthcare system has four adult hospitals and one children’s hospital with a total of 1,837 beds. We implemented the supply chain initiative in 23 units at our largest facility within the system, which comprises acute care, medical, and surgical units. We assessed the space in each of the 23 units, discussing space limitations, storage units, and desire to consolidate supplies. The primary aim of the supply chain management team was to standardize supplies in response to the influx of new or pulled nursing staff related to the surge of patients with COVID-19. Additionally, our goal was to decrease staff stress and frustration and ensure supplies and equipment were available when and where they were needed.

We laid the groundwork for this project prior to the COVID-19 pandemic, and it was implemented before our first surge of patients. We took the opportunity during decreased census awaiting a surge to use our frontline staff to quickly assess, organize, and implement the recommended solution. Staff buy-in is critical to any change. Giving our staff members the opportunity to create and fully implement the solution allowed for quick uptake.

Transition to a new system
Standardization of the supply chain at our institution involved a transition from a LUM system to a bulk supply chain model. Previously, the off-site supply warehouse received LUM orders, and the supplies remained in overfill bins or held until the following day. With the new system, the distributor delivered supplies in a bulk pallet to a central supply storage in our hospital’s basement. The pallet was subsequently broken down to several cases, then boxes, and finally, individual pieces. We identified and reallocated three new storage rooms strategically located throughout the hospital, to hold bulk items that were disseminated to each nursing unit. This intervention allowed for supply chain resources to remain near the patient-care areas rather than requiring personnel to traverse a distance to fill orders.

Table 1 depicts the central supply team’s goals and the ensuing strategies that were implemented. All units with their respective supply storage areas were analyzed, and unnecessary supplies were removed. This intervention was a partnership between nursing and supply chain and allowed for greater understanding and development of a common language and terminology with supplies. The PAR levels of each unit were
reviewed daily with central supply. PAR levels were based on the needs of the specific unit with attention to the patient population and the number of beds. Nurses and the supply chain team collaborated to design the blueprints and organize the supplies. Nurses decided which supplies they needed, which weren’t being used, and into which zone the supplies would go. Nurses grouped the supplies into what made sense for patient care. The PAR levels were standardized into 12 zones (Table 1). Zones 1-5 were located on each unit and consisted of urgent

Table 1: Standardization of the supply chain at our institution

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<th>Goals</th>
<th>Strategies implemented and barriers</th>
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| 1. To assess all current supply storage areas and units, focusing on acute specialty care | • Assessment of potential supply storage areas  
• Obtained feedback from direct care staff |
| 2. To evaluate PAR levels for acute specialty care | • Adjusted based on recommendation of central supply to stock daily  
• Removed unnecessary supplies  
• Defined specialty area supplies  
• Standardized PAR levels based on size of unit |
| 3. To develop general blueprint for the layout of the zones | • Linen and supplies in same area  
*Barriers:* not all units designed the same, inconsistent cabinet/storage space, not all areas had a supply closet |
| 4. To organize PAR levels into 12 zones | Zones 1-5: urgent need (located on unit)  
1: Respiratory supplies  
2: Medication administration  
3: Lab supplies  
4: I.V. supplies  
5: Food and nutrition  
Zones 6-12: nonurgent need (located in supply closet or storage area)  
6: Gastrointestinal/genitourinary  
7: Wound care  
8: Housekeeping  
9: Vital signs and isolation  
10: Personal care  
11: Unit specialty  
12: I.V. fluids  
*Barrier:* each unit may not utilize a supply (such as suction) the same way |
| 5. To implement a plan using staff and labor pool | • Purchased shelving  
• Cleaned every bin and closet  
• Moved supply spaces around to accommodate unit need  
• Blocked a room on some units to create adequate storage space  
• Removed supply automated dispensing cabinet and replaced it with a bin system when needed  
• Relabeled supply bins and made bar code sheets  
• Placed new signage on cabinets for easy identification of zones  
*Barriers:* time, space, consistency of help, knowledge of supplies; lack of manager/staff accountability; staff moved supplies after project completion |
supplies. Zones 6-12 were in a supply closet or storage area and included items that were deemed nonurgent. Stocking identical supplies in the same zone within each unit promoted efficiency and competency in emergency situations and reduced the time taken to locate items. For example, a nurse may venture to a particular zone when starting an I.V. line, and this zone was consistent in all units.

Because the off-site warehouse was more aligned with the zones in each unit, the zones were stocked with the appropriate supplies and a lesser quantity was discarded. Additionally, standardizing supplies within zones allowed for ease in finding an item for both the supply chain team and nursing when terminology differed or when new staff members were introduced.

Barriers to standardization
Several barriers to standardizing the supply chain posed a dilemma, many of which were ameliorated during the organizational process (Table 1). Before the supply chain management team’s initial meeting, the participants acknowledged that not all units were designed in the same fashion, a supply closet wasn’t present in every unit, and there was inconsistent cabinet and storage space. These factors were resolved when we implemented consistent zones for all units and established supply closets in each unit.

Other barriers included varying knowledge of the supplies, unreliable assistance with the standardization, and lack of accountability with adherence and communication. Furthermore, we noted instances when the staff moved supplies after the project was complete.

Innovations for standardization
Within 3 months of the supply chain modifications, our institution observed a dramatic subjective improvement in the supply chain. We attributed this advancement to numerous innovations incorporated at our institution in response to the standardization of the supply chain (Table 2). Integral components included visible leadership to implement the plan coupled with nurse leaders who routinely rounded with frontline supply staff. Educating nurses and staff about how processes worked, as well as the use of each supply item and its location, were also important. PAR adjustments and labeling to provide a product number enabled nursing and supply chain staff members to speak a common language when seeking a product.

New signs clearly identified every zone in a nursing unit, and supply bins within each zone were cleaned and relabeled. Reliable supply stockers were assigned and standardized to the same unit, which allowed them to become familiar with the unit and anticipate usage of the supplies. These stockers were easily identified in their green scrub uniforms, a new intervention designed to create visibility and be inclusive of the supply chain team. Individuals who stocked the supplies were trained more quickly and effectively, and the turnaround time was shorter with the standardized approach to stocking and nomenclature.

Supply chain improvements permitted more efficient replenishments of supplies and faster responses to requests. Previously, each unit was replenished once daily despite nurses working two shifts, and the nursing staff had to call for any needed replenishments outside
of the restocking schedule. The supply chain management team now restocks two to four times per day. Full-time equivalents were reallocated from the previous central storage area to now being dispersed throughout the patient-care area. Shift changes were needed to accommodate a proactive stocking approach and align with patient volume and trends in admit/discharge/transfer. A central supply call log replete with the date, time, and item requested was also collected from individual nursing units to inform the team about supply depletions and further enhance the supply chain process. By implementing the numerous innovations in our supply chain, we accomplished our goal of decreasing stress and frustration among staff members and enhancing nurse satisfaction.

Measuring our success
Our project used data from employee feedback to establish a sense of urgency to resolve the issues. Our intent was to resurvey the staff and use the data to determine our success and opportunities for additional improvements. Unfortunately, the pandemic surges resulted in specialized patient placement changes, staff reallocation, and increased turnover. Additionally, we opened two new patient-care units during this time, and our oncology unit moved to a new space. The entire world experienced supply chain disruptions, both in and outside of healthcare.

Prior to this project, supply shortages resulting from inefficient supply chain processes and organization of supplies were a primary concern noted during leader rounding, shift changes, and email feedback. Postimplementation, supply chain concerns were rarely mentioned, even with pandemic-related disruptions to the supply chain. Supply issues after implementation were typically resolved within the hour and were related to global outages or a rare, isolated item depletion.

We did conduct two employee surveys specific to satisfaction with the supply chain postimplementation in an attempt to quantify this project. Feedback was minimal except from our relocated oncology unit, and feedback from this unit was negative. Upon further investigation, we found the unit wasn’t set up in zones and leader rounding with the supply chain team hadn’t been implemented. After we rezoned supplies and implemented leader rounding, we received an immediate positive response from the staff members. In lieu of formal objective data collection due to the barriers identified previously, a lack of staff complaints and patient safety reports indicated success for this project.

Future supply chain goals
Based on the feedback from assistant nurse managers, we’ll be incorporating several enhancements to the supply chain. Visible weekly supply rounding, as well as rounding of assistant nurse managers and a supply supervisor, will ensure that product needs are met. We’ll also be communicating information in multiple formats, including TikTok, Facebook, flyers, email, and shift huddles that will detail supply chain changes and how staff can best escalate their needs. Our most recent innovation was the placement of a small orange cone in the bin when an item wasn’t available. This change was communicated in a TikTok video, posted to our Facebook page, and included in unit pages, flyers, and shift huddles. This unified teamwork approach will proactively share the ways in which our institution is addressing needs voiced by our staff members.
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Long-term efficiencies
Our institution’s supply chain standardization process signifies that the bulk supply model is the preferred replenishment system compared with the LUM model. With increased access to resources, our institution effectively maintained thoroughly stocked and compatible nursing units. Bedside staff feedback offered continued insight into improvements that enriched the supply chain process. The innovative supply chain model implemented at our institution can be applied to other metropolitan healthcare systems to facilitate and expedite medical supply stocking. Standardizing and fortifying the supply chain is imperative not only during the COVID-19 pandemic but also for long-term system efficiencies. NMI

REFERENCES

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