

CANADIAN Healthcare Technology

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Supply chain processes in ORs can be improved using industrial practices

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The healthcare sector is facing a constant struggle to provide quality patient care while coping with shrinking budgets, increasing costs, and demand for healthcare services that continues to rise. These factors have accelerated the need to control costs and improve the efficiency of healthcare professionals.

Some years ago, Professors Chow and Heaver from the University of British Columbia documented that approximately 46 percent of an average hospital's operating budget is related to logistics activities. Due to the limited automation solutions normally in place, the potential for sizeable cost savings exists.

Although not all logistics activities are related to materials management, this sector easily represents 75 percent of logistics and is growing constantly due to the increasing cost and use of supplies. In this article we explore how certain practices and technologies applied in the industrial world can improve hospital supply chain processes, particularly in the operating room.

The clinical activities conducted in the operating room are critical and require careful planning of human

and material resources. Given the nature of the OR's mission, the management of inventory in this area presents challenges that differ from those on other wards.

Firstly, the department uses a wider variety of medical supplies than found elsewhere in the hospital. Anywhere from 2,000 to 4,000 different product codes must be managed. Some of these supplies are also extremely expensive. In fact, supplies can account for almost 50 percent of the operating room budget, which easily represents one-third of the hospital's overall supply budget and is growing. It is not unusual to see hospitals accumulate millions of dollars worth of inventory in the OR.

Consignment inventory from vendors is also a particularity of clinical specialty

areas and is a practice used in most ORs to manage high-value items. Although this practice reduces risk, exposure and inventory carrying costs for the hospital, it comes with additional administrative processes that are for the most part manual and cumbersome and require a high level of involvement from clinical staff.

Employees, also usually clinical staff, go to great lengths to assemble supplies for each surgical procedure, based on the specifications of the surgeon involved. Documented and up-to-date supply lists for each procedure and surgeon (commonly known as preference cards), which ensure the right supplies are prepared, are a necessary tool. However, the work that goes into keeping these cards current is

often inconsistent, which means that unneeded items may be included, while necessary supplies may be missed altogether.

The requirement of documenting the use of certain products on patients for traceability purposes, particularly implant supplies, is another particularity of the OR. Here again, common processes are primarily paper-based and nursing-intensive.

Logistically speaking, an OR can in many ways be compared to a manufacturing environment. This has been widely documented, particu-

Product code	Description	Qty	Location	Voice
10008	Three-Quarter sheet	1	CSD/ A.2.1.P	<input checked="" type="checkbox"/>
10001	Gas sponges 2X2 12 ply	2	CSD/ A.4.1.P	<input checked="" type="checkbox"/>
10002	Low adherent absorbent dressing 4x4	2	CSD/ A.4.2.P	<input checked="" type="checkbox"/>
10007	Transparent dressing 4 X 4 3/4	3	CSD/ A.6.1.P	<input checked="" type="checkbox"/>
10009	Convertors	1	CSD/ A.12.1.P	<input checked="" type="checkbox"/>
G10	Instrument tray	1	CSD/ B.1	<input type="checkbox"/>
12005	Syringe with needle 3cc/ml	2	Centre core/ A.8.1.P	<input type="checkbox"/>
12012	Chloride injection USP 0.9% Sodium	1	Centre core/ A.14.1.P	<input type="checkbox"/>
G2	Suture	1	Centre core/ A.10	<input type="checkbox"/>
G1	Nurse gloves	1	Centre core/ A.4	<input type="checkbox"/>
C1	Lens	1	Centre core/ B.1	<input type="checkbox"/>

larly by Professor Sylvain Landry of HEC Montréal and one of his master's degree students, Nelson Lafond, in a working paper entitled "Material requirement planning (MRP) for the management of operating room inventory: exploratory study, 1999" (published in French). Key similarities relate to scheduling, capacity management and constraints, and the possibility of planning and tracking supplies for a case based on case type and surgeon. The hospital preference card is equivalent to the industrial bill of material used to assemble a finished product.

In terms of automating materials management in the OR, an opportunity is thus presented to track a set of supplies based on the surgery performed rather than on an individual basis for inventory control, traceability and case costing purposes. And while the approach is borrowed from the industrial sector, one of the distinctive features of the operating room is the average 20 percent variability of certain supplies per case, compared to a manufacturing environment, which is typically much more stable. This variability of supplies per case is usually a result of the patient's condition as the case evolves and must be considered when developing an automation model.

It was within this context that Logi-D, a provider of supply chain automation solution for hospitals, developed CIRCUIT-iD, a solution built on the predictability of supplies related to a case while automating data capture for a case's inevitable variances. The solution allows all of the information about a case to be automated and combined, and the cost per procedure, and ultimately per patient, to be precisely established with minimal human intervention.

The process starts with information regarding a treatment or procedure being

received via the scheduling or another clinical application. The initial process involves printing the preference card pick list for the procedure as well as a label containing an RFID inlay. The RFID-enabled label is affixed to the pick list, which is used to identify the procedure to which items are added or removed and follows the procedure during the entire cycle.

By generating the pick list, all predictable items are automatically added to the procedure's cost record. The printed pick list specifying the items and quantities that need to be picked as well as each of their storage locations can then be used to pick these predictable items.

Pre-case unpredictable supplies that are defined just prior to the surgery (e.g. nursing glove size) can be associated with a procedure by first scanning the RFID-enabled pick list and then scanning the RFID label assigned to a product in its storage location or the manufacturer's barcode on the packaging, when available. This action records the product that was picked and links it to the procedure and ultimately the patient.

Certain items are also unpredictable until the procedure has actually begun. These items often require item level traceability for financial or clinical reasons. One such example is implants. In their case, the cost justifies unit level RFID tagging. The consumption of these items is recorded automatically for inventory management purposes and added to the procedure cost record, and ultimately, to the patient file when their RFID-tagged packaging is disposed of in an RFID-enabled intelligent receptacle located in the OR theatre.

In order to link supplies to the procedure, as the case begins, the employee swipes the RFID-enabled pick list across

the intelligent receptacle, which captures the procedure number. All RFID-tagged packaging subsequently disposed of in the receptacle will automatically be associated with the procedure.

To complete the process, items not used during the case are returned to their storage locations. It is important to track these returns, not only to obtain precise case costing, but also to identify patterns in returns to optimize preference cards and avoid unnecessary initial picking of items.

This process is automated using voice recognition, another proven technology used extensively in the industrial supply chain sector to automate the picking of supplies. In this case, the system guides users through the put-back sub-process by interrogating a database using voice prompts.

The technology states the physical location in the storage equipment where the user should return each unused item. It also captures the quantity put back in stock through a voice command from the user, thus adjusting the charge capture as part of the returns process.

A growing number of hospitals, in their ongoing quest for increased efficiency, are turning to supply chain automation as a cost-effective and progressive option. Leading practices in healthcare logistics now include proven technologies and processes from the industrial sector. These new practices have the potential of becoming the cornerstone of supply chain management solutions for hospitals.

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